Constructing Environmental Awareness: The Implementation of Plastic Bag Reduction Policy in Bekasi Regency

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Abstract. This study analyzes the implementation of Bekasi Regency Regent Regulation Number 34 of 2019 concerning the Reduction of Plastic Shopping Bag Usage. The policy was introduced to reduce plastic waste that harms the environment through measures such as public socialization, social media campaigns, and improvements to waste management facilities and infrastructure. The research employed a qualitative approach, with data collected through observation, interviews, and documentation studies. The findings reveal that the policy's implementation still faces several challenges. While human resources at the Burangkeng Final Disposal Site have shown support, the Environmental Service remains constrained by a shortage of field officers. Moreover, waste management facilities at the Burangkeng site are inadequate, and time and financial resources within the Environmental Service are poorly organized. Although inter-organizational communication has been established, the consistency of socialization efforts has not been maximized. Additionally, the social, economic, and political context influences policy execution, with key obstacles including limited budget management and low public awareness regarding the importance of reducing plastic waste. The results of this study are expected to provide recommendations for the government to enhance the effectiveness of plastic waste reduction policies in Bekasi Regency.

Keywords: Environmental Awareness, Waste Management Challenges, Policy Implementation, Plastic Bag Reduction Policy

1 Introduction

The ongoing population growth in Indonesia is a major factor that worsens this condition. In recent decades, Indonesia has experienced significant population growth, accompanied by increasing consumption of goods and services. The large population, especially in urban areas such as Bekasi Regency, produces an increasing volume of waste every day. This phenomenon is exacerbated by the high consumption of single-use plastic bags which are the main choice for people when shopping [1].

According to data from the Ministry of Environment and Forestry (KLHK), around 18.4% of the total national waste in Indonesia consists of plastic, making it one of the most dominant and dangerous types of waste [2]. This shows that plastic waste is one of the biggest challenges that must be faced in waste management in Indonesia. One of the main reasons why plastic is a serious problem is because of its non-biodegradable nature. The decomposition process of

plastic can take up to hundreds of years, so plastic that is thrown into the environment can last a long time and continue to accumulate [3].

Bekasi Regency, as one of the areas with rapid population growth, faces major challenges in managing waste. Based on data from the National Waste Management Information System (SIPSN), Bekasi Regency produces thousands of tons of waste every day [2]. Most of the waste comes from households, markets, and other commercial activities. Of the total waste produced, single-use plastic bags dominate. Most people still depend on plastic bags because they are practical, cheap, and easy to obtain. This causes the volume of plastic waste to increase and threatens environmental sustainability [4].

This problem is further complicated by the condition of the Burangkeng TPA, the only landfill in Bekasi Regency. This TPA has been operating beyond its optimal capacity since 2019, with an open dumping method that no longer meets environmentally friendly waste management standards [9]. Open dumping, which is a method of disposing of waste carelessly without further processing, worsens air, soil, and water pollution. In addition, the TPA which is already overcapacity makes waste management less effective and risks polluting the surrounding environment [7].

In response to the problem of plastic waste, the Bekasi Regency Government issued Regent Regulation Number 34 of 2019 concerning Reducing the Use of Plastic Shopping Bags [1]. This regulation aims to reduce public dependence on single-use plastic bags, by promoting the use of environmentally friendly shopping bags. This policy also aims to reduce the amount of plastic waste disposed of in landfills, thereby reducing the burden of waste management in the area [5].

This regulation involves various strategic steps, including socialization to the community, campaigns through social media, and improving waste management facilities. The main targets of this policy are business actors, shopping centers, and modern shops which are the main contributors to the use of plastic bags in Bekasi Regency [6]. The Bekasi Regency Government hopes that this policy can reduce the use of single-use plastic and replace it with environmentally friendly alternatives.

However, although this policy has good intentions, its implementation still faces various obstacles. One of the main obstacles found in the field is the low public awareness of the importance of reducing plastic use [8]. Many people still feel that plastic is a more practical and cheaper option compared to environmentally friendly shopping bags. In addition, the influence of old habits that are difficult to change is also an obstacle in the implementation of this policy. In addition, the production cost of environmentally friendly shopping bags which is higher than plastic is also an obstacle for business actors. Many shops and shopping centers are reluctant to provide environmentally friendly bags because they are worried that customers will choose to shop at cheaper places.

On the government side, limited human resources (HR) and budget are also major problems in implementing this policy. The Bekasi Regency Environmental Agency, which is responsible for administering this policy, has limited personnel to carry out maximum supervision. Without adequate supervision, business actors who violate this policy will not receive strict sanctions, so this policy loses its coercive power. In addition, the minimal budget allocation to support the implementation of the policy, such as the provision of waste management facilities or incentives for business actors who switch to using environmentally friendly shopping bags, makes this policy less effective.

Communication between organizations related to the implementation of this policy is also not optimal. Local governments, business actors, and the community have not been involved in effective coordination, so that the message about the importance of reducing plastic waste is not conveyed properly. The public often does not get enough information about the obligations of

business actors to provide alternative environmentally friendly shopping bags, so that compliance with this policy is still low.

In terms of social aspects, the level of public awareness of the negative impacts of using plastic bags is still low. Many people do not understand how important it is to switch to more environmentally friendly alternatives. They tend to think of plastic as a harmless item and do not pay serious attention to its impacts. For this reason, more intensive education about waste management and the importance of using environmentally friendly bags is needed.

From an economic perspective, the higher production costs of environmentally friendly shopping bags compared to single-use plastic bags is a major challenge. For business actors, replacing plastic bags with environmentally friendly bags means they have to spend more to provide more expensive bags. In addition, business actors are also worried that customers will feel uncomfortable with this change and switch to competitors who still provide plastic bags.

Weak law enforcement is also a factor that influences the success of this policy. Many violations are committed by business actors, such as not providing alternative environmentally friendly shopping bags or still providing free single-use plastic bags to consumers. Without strict sanctions, this policy will have difficulty providing a significant impact.

However, despite the many challenges faced, this study also noted several positive potentials that can strengthen the implementation of this policy. One of them is the involvement of local communities and civil society organizations that can play a role in expanding the reach of socialization and providing education to the public about the importance of reducing plastic use. Collaboration between the government, business actors, and the community can also accelerate behavioral changes in terms of reducing plastic waste.

In the long term, this policy is expected to help create a cleaner and healthier environment in Bekasi Regency, as well as support national efforts to reduce plastic waste. The Bekasi Regency Government needs to evaluate and strengthen the implementation of this policy by making improvements in various aspects, such as strengthening human resources, adequate budget allocation, and increasing education to the public.

This study is expected to provide an important contribution in identifying obstacles faced in policy implementation and formulating the necessary improvement steps. With stronger support from all parties, plastic waste management in Bekasi Regency can be improved, towards a cleaner, healthier, and more sustainable environment.

2 Method

Data analysis was carried out using the Miles and Huberman model which consists of three stages: data reduction, data presentation, and drawing conclusions. Data reduction is done to filter relevant information, data presentation systematically organizes information to facilitate analysis, and drawing conclusions aims to formulate final results based on findings.

Data validity is guaranteed through triangulation of sources, techniques, and time. Triangulation is done to ensure the consistency and validity of data obtained from various collection methods and informant perspectives. This step aims to minimize bias and increase trust in the research results, so that it can provide meaningful contributions to the development of environmental policies and management in Bekasi Regency

This study uses a qualitative approach with a descriptive research type to provide an in-depth description of the implementation of the plastic bag reduction policy in Bekasi Regency. The qualitative approach was chosen because this approach allows researchers to explore

information in more depth and detail, and understand the social phenomena that occur in a complex local context. The main focus of this study is how the policy is implemented, the obstacles faced in its implementation, and the efforts that have been made to overcome these challenges. The Bekasi Regency Environmental Service was chosen as the research location because it is the agency responsible for managing this policy, and this study was conducted for more than two months to obtain comprehensive and in-depth data.

The descriptive method used in this study aims to describe the ongoing situation or phenomenon without changing or manipulating existing conditions. In this case, the description provided aims to explain how the plastic bag reduction policy is implemented in Bekasi Regency, what obstacles arise, and the efforts that have been made to improve the implementation of the policy. With this approach, it is hoped that the actual conditions in the field can be revealed and provide clearer insight into the effectiveness of the policy.

This study involves two main types of data, namely primary and secondary data. Primary data is data obtained directly from sources relevant to the research. For this reason, in-depth interviews were conducted with nine informants selected based on their relevance to the research topic. The informants consisted of government officials involved in the formulation and supervision of policies, business actors directly affected by the policy, and the community who are expected to actively participate in reducing plastic use. Through these interviews, researchers were able to explore their views, experiences, and perceptions of the plastic bag reduction policy implemented in Bekasi Regency.

In addition to interviews, other data collection techniques are observation and documentation. Observations were conducted to see directly how this policy is implemented in the field, including observing the activities of business actors, the community, and government officials in responding to the policy. These observations are also useful for capturing dynamics that may not be fully explored through interviews, such as observing the behavior of people who may not yet be fully aware of the importance of reducing plastic waste. With this direct observation, researchers can gain a clearer understanding of the challenges of implementing the policy at the local level.

Documentation is also an important part of data collection. This secondary data was obtained from documents related to the plastic reduction policy, such as regional regulations, policy evaluation reports, and related literature that can enrich the analysis. This documentation provides deeper context regarding the objectives, strategies, and indicators used in the policy. Through documents, researchers can obtain more structured and systematic information regarding existing regulations and their implementation in the field.

In data analysis, this study uses the Miles and Huberman data analysis model which consists of three main stages, namely data reduction, data presentation, and drawing conclusions. Data reduction is the process of filtering relevant information from the data that has been collected. In this stage, researchers will select and group data that is directly related to the research objectives, so that only information that is in accordance with the focus of the research will be analyzed further. Data presentation is done by compiling information systematically and structured to facilitate deeper understanding and analysis. The data that has been processed and presented will be used as the basis for drawing conclusions regarding the implementation of the plastic bag reduction policy in Bekasi Regency.

The last stage is drawing conclusions, where researchers formulate the final results based on the findings obtained from data analysis. This conclusion will answer the research questions regarding the extent to which the policy is implemented, what obstacles are faced, and what solutions or improvements need to be made to increase the effectiveness of the policy. This

conclusion also includes recommendations for the Bekasi Regency Government to improve the implementation of the plastic bag reduction policy.

Data validity is very important in qualitative research, because valid and reliable data is the basis for drawing accurate conclusions. Therefore, this study uses triangulation as a method to increase data validity. Triangulation is carried out by examining data from various sources, using various data collection techniques, and comparing information obtained at different times. With triangulation, researchers can ensure that the data obtained is consistent and reliable, and reduce the potential for bias that can arise during the data collection and analysis process.

In addition, technical triangulation is also used to strengthen research results. For example, data obtained through interviews with informants can be compared with the results of direct observations in the field and data contained in documents related to the policy. Thus, data obtained from various sources can support each other and form a more complete and accurate picture of the implementation of the plastic bag reduction policy in Bekasi Regency.

The entire research process aims to provide a comprehensive picture of the plastic bag reduction policy in Bekasi Regency, by identifying existing problems and formulating steps for improvement that need to be taken. This research is expected to provide significant contributions to improving environmental policies in Bekasi Regency, as well as providing references for other regions facing similar problems. By using a systematic and valid approach, the results of this study are expected to provide useful insights for future policy making.

3 Result

This study aims to evaluate the implementation of Bekasi Regency Regent Regulation Number 34 of 2019 concerning Reducing the Use of Plastic Shopping Bags. This policy aims to reduce the use of single-use plastic bags that have a negative impact on the environment, as well as to encourage changes in the behavior of the community and business actors towards the use of environmentally friendly alternatives . However, although this policy has been launched with various strategic steps, there are still a number of obstacles that hinder the effectiveness of its implementation in the field. Thus, a comprehensive evaluation is needed to identify existing constraints in order to then propose actionable solutions [1].

Bekasi Regency Regent Regulation Number 34 of 2019 regulates the reduction of plastic bag use in the retail sector, especially in shopping centers and modern stores. This policy targets business actors, shopping centers, and modern stores to replace single-use plastic bags with more environmentally friendly alternatives, such as cloth shopping bags or non-plastic bags. To achieve this goal, the Bekasi Regency Government has set the main targets in the form of business actors and the public who use plastic bags. The effectiveness of these regulations will depend largely on the consistency of their enforcement and public compliance [4].

The socialization of this policy is carried out through various communication channels, including social media, posters, and direct campaigns in various public locations. However, although this socialization is carried out with quite high intensity, its scope is still limited. Many people and business actors do not fully understand the contents and objectives of the policy. This indicates that socialization needs to be expanded and adjusted to local conditions in order to more effectively reach all levels of society. One thing that can increase the reach of outreach efforts is to strengthen collaboration with local community leaders and organizations [5].

One of the efforts made to reduce the use of plastic bags is to launch a campaign to use environmentally friendly shopping bags. This campaign includes distributing cloth shopping

bags and educating the public about the benefits of using environmentally friendly bags. Several shopping centers and modern stores have begun to implement a paid plastic bag policy, but many have not fully implemented the policy. This indicates a gap in the implementation of the policy in the field. Regular monitoring and providing incentives for compliant businesses can help bridge this implementation gap.

This uneven implementation can be caused by several factors, including the lack of supervision and law enforcement against business actors who do not comply with the rules. Weak supervision and the lack of a clear sanction mechanism make this policy difficult to implement consistently. As a result, even though this policy has been regulated in regulations, its implementation is still less effective. To address these challenges, it is critical to build stronger monitoring systems and enforceable penalties [7].

The human resources (HR) involved in implementing this policy are one of the important factors influencing its effectiveness. The Bekasi Regency Environmental Service, as the agency responsible for implementing this policy, admitted to experiencing limitations in the number of personnel involved. This makes it difficult for them to carry out maximum supervision in the field. In addition, training and competency development for officers responsible for policy implementation are also still lacking. This lack of training has an impact on the quality of supervision and officers' understanding of the policy and effective ways to implement it. Conducting and providing extensive training and personnel expansion will increase the overall capacity of the parties to enforce the policy.

This limited human resources also hamper efforts to educate the public and business actors about the importance of switching from using plastic bags to more environmentally friendly alternatives. Without adequately trained and dedicated personnel, efforts to reduce the use of plastic bags are difficult to run optimally. By adding personnel and providing various special training, these educational efforts can be implemented more effectively.

Financial resources are also a factor that hinders the implementation of this policy. The budget allocation to support the implementation of the policy, such as the provision of adequate waste management facilities and incentives for business actors who switch to using environmentally friendly shopping bags, is still very limited. Plastic waste management requires a lot of money, both for the procurement of waste collection sites, processing facilities, and supervision and law enforcement. The availability of a dedicated budget for waste management and environmental initiatives would support a more comprehensive approach to addressing these issues [6].

Due to the minimal budget, efforts to encourage changes in the behavior of the public and business actors are less effective. Without sufficient incentives, many business actors are reluctant to replace their plastic bags with environmentally friendly alternatives. In addition, limited funds also hamper efforts to educate the public more widely, either through social media campaigns, advertising, or direct training.

The organizational structure of policy implementers at the Bekasi Regency Environmental Service also affects the success of the implementation of this policy. The lack of synergy and coordination between divisions within the organization causes several programs to run separately and not be well integrated. This causes the policy to reduce the use of plastic bags to not be implemented comprehensively and optimally. There needs to be an improvement in the organizational structure that better supports synergy between divisions and more coordinated planning and supervision. A lean organizational structure with clear roles and communication channels will improve coordination and policy implementation.

It is important to ensure that each division involved in the implementation of this policy understands their role and can work together well to achieve common goals. Without strong

coordination, this policy will be difficult to implement effectively and achieve the desired results. Creating a unified vision and strategy for all parties involved can increase the impact of policies [5].

The attitude or disposition of the policy implementers also plays an important role in the success of the implementation of this policy. Although most policy implementers have a high commitment to reducing the use of plastic bags, some implementers are still not firm in carrying out their duties. This causes the policy not to be implemented consistently. There are also implementers who tend to ignore regulations due to certain factors, such as lack of understanding or insufficient pressure to implement the policy. It is critical to reinforce a strong work ethic among implementers through accountability measures and ongoing support [8].

The different dispositions of policy implementers indicate that it is important to strengthen training and supervision of officers involved in policy implementation. Officers who are less assertive or do not understand the policy can hinder the implementation process and make it difficult to apply the policy consistently in the field. Regular performance reviews and guidance can ensure that officers remain committed and fully informed about policy objectives.

Communication between organizations related to the implementation of this policy also needs to be improved. Coordination between local governments, business actors, and the community has not been going well. This is evident from the unclear information received by business actors regarding their obligation to provide alternative environmentally friendly shopping bags. As a result, many business actors have not fully followed this policy. To address this, it is essential to establish clearer communication and provide detailed and accessible information to all stakeholders [9].

In addition, communication between local governments and the community is still limited. Many people do not yet realize the importance of reducing the use of plastic bags and switching to more environmentally friendly alternatives. Without effective and structured communication, it is difficult for this policy to achieve its desired goals. Therefore, it is necessary to improve communication and socialization of policies that are more focused and involve various parties. Involving local media and influential community leaders can increase the visibility and impact of policies.

The level of public awareness of the negative impacts of using plastic bags is still low. Many people do not yet understand how important it is to switch to environmentally friendly alternatives to maintain environmental sustainability. The use of plastic bags is considered more practical and cheaper, so people are reluctant to switch to more environmentally friendly solutions. Targeted educational campaigns that emphasize long-term environmental benefits will help change public perception.

In addition, the high level of consumer behavior in society also exacerbates this problem. Many people prefer convenience in shopping and do not pay attention to the long-term impacts of using plastic bags. Therefore, more intensive education is needed for the public regarding the dangers of using plastic bags for the environment, as well as the benefits of switching to more environmentally friendly alternatives. Inclusion of environmental education in school curricula and public service announcements can also help foster greater awareness.

The economic aspect is also an obstacle in implementing this policy. Many business actors are still reluctant to replace their plastic bags with environmentally friendly alternatives because the production costs of environmentally friendly shopping bags are higher. This is a consideration for business actors, especially those in the retail sector, because they are worried about losing customers if the prices of the goods they sell become more expensive. Providing subsidies for environmentally friendly packaging and offering tax breaks to them may also encourage businesses to adopt more environmentally friendly practices.

The government needs to provide economic incentives for business actors who switch to environmentally friendly solutions. These incentives can be in the form of tax reductions, subsidies, or other assistance that eases the burden of costs for business actors. Without these incentives, business actors may continue to choose to use plastic bags because they are cheaper and easier.

Political factors also influence the implementation of this policy. Support from policy makers at the regional level still needs to be improved so that plastic waste management becomes an important part of the regional development agenda. Without strong political support, this policy risks losing momentum and is difficult to implement effectively in the field. Continued advocacy efforts and policy dialogue are essential to securing political commitment.

The regional government needs to ensure that plastic waste management is a priority in the regional development agenda. Strong support from all stakeholders, both politically, economically, and socially, will strengthen the implementation of this policy and increase its impact on the environment. Building a coalition of environmental stakeholders can help ensure continued policy momentum.

On the other hand, waste management in Bekasi Regency also still faces many challenges. The Burangkeng Final Disposal Site (TPA), which is the only waste disposal site in this area, has been overcapacity since 2019. The open dumping system used at the Burangkeng TPA not only pollutes the environment but also violates modern waste management standards. Investment in modern waste treatment infrastructure is needed to improve waste management practices and reduce environmental damage.

Waste processing facilities at the Burangkeng TPA are also very minimal. The absence of a permanent wastewater treatment plant worsens the environmental impact of the increasingly high piles of waste. This underscores the need for major investment in waste management infrastructure in Bekasi Regency, such as the provision of more modern waste processing facilities and a more efficient collection system. Public-private partnerships can be a solution to mobilize resources and expertise in improving waste management systems.

Although this policy has been implemented, public acceptance of the policy to reduce the use of plastic bags still varies. Some people have started using environmentally friendly shopping bags, but others are still reluctant to switch due to cost or habit. More intensive education is needed to raise public awareness of the importance of protecting the environment and reducing the use of plastic bags. Engaging communities through local workshops and interactive campaigns can encourage greater public involvement.

Law enforcement is one of the most important factors in the implementation of this policy. Many violations committed by business actors and the community are not dealt with firmly, so this policy loses its coercive power. A clearer and more assertive sanction mechanism needs to be implemented to increase the level of compliance with this policy. Clearer penalties and consistent law enforcement will provide a stronger deterrent effect against violations.

This study also noted several positive potentials in the implementation of this policy. The involvement of local communities and civil society organizations can be an additional force to expand the reach of socialization and accelerate changes in community behavior. Cross-sector collaboration, between the government, business actors, and the community, is also an important step to achieve policy goals. Taking advantage of these partnerships can strengthen the impact and speed of policy implementation.

Overall, the implementation of the plastic bag reduction policy in Bekasi Regency still faces many obstacles. However, with the right steps for improvement, such as increasing human resource capacity, adequate budget allocation, and more effective public education, this policy

has great potential to have a positive impact on the environment. By addressing these obstacles systematically, Bekasi Regency can become a model for other regions facing similar challenges.

This study provides practical recommendations for the Bekasi Regency Government to evaluate and strengthen the implementation of the policy. Stronger support from all parties, including policy makers, business actors, and the community, will greatly assist in improving plastic waste management in Bekasi Regency and creating a cleaner and more sustainable environment. The results of this study can also be an inspiration for other regions in Indonesia that face similar problems.

4   Conclusion

Based on the results of the research conducted, the implementation of Bekasi Regency Regent Regulation Number 34 of 2019 concerning the Reduction of the Use of Plastic Shopping Bags still faces several major challenges, both in terms of policy, implementation, and acceptance by the community and business actors.

In terms of policy, the Bekasi Regency government has set clear standards and objectives, such as socialization to the community and campaigns through various media. However, the implementation of the policy is hampered by budget constraints that hinder the implementation of the program widely. In addition, the lack of clear technical guidance for business actors makes it difficult for them to replace the use of plastic with environmentally friendly alternatives.

In terms of implementation, limited human resources (HR) and budget at the Environmental Service level are major obstacles. Without sufficient manpower and funds, supervision of the implementation of this policy is less than optimal. Coordination between related organizations has also not been running well, resulting in information related to the policy not being conveyed effectively to the community and business actors.

From the perspective of the community and business actors, their awareness of the importance of reducing the use of plastic bags is still low. People prefer plastic bags because they are practical and cheap, while business actors face higher cost constraints if they use environmentally friendly shopping bags. In addition, business actors also lack understanding about environmentally friendly alternatives to plastic.

However, this study also found several positive potentials that can be utilized to improve the effectiveness of the policy. One of them is support from local communities and civil society organizations that can help disseminate information and raise public awareness about the importance of reducing plastic waste. In addition, strengthening law enforcement and providing incentives for business actors who comply with the policy can encourage them to be more committed to reducing plastic use.

Overall, the success of implementing this policy is highly dependent on cross-sector collaboration between the government, the community, and business actors. The Bekasi Regency Government needs to increase human resource capacity, improve coordination between organizations, and increase budget allocations to support this policy. In addition, it is important to increase public and business awareness about the importance of reducing plastic. With these improvements, this policy has the potential to create significant changes in plastic waste management in Bekasi Regency.

This research is expected to contribute to the Bekasi Regency Government in strengthening the implementation of plastic waste management policies and provide inspiration for other

regions with similar problems. With a shared commitment, reducing the use of plastic bags can be achieved, creating a cleaner and more sustainable environment.

References

[1]   Bekasi Regency Government, "Bekasi Regent Regulation Number 34 of 2019 Concerning Reducing the Use of Plastic Shopping Bags," 2019.

[2]   Ministry of Environment and Forestry, "National Waste Management Information System (SIPSN)," [Online]. Available: https://sipsn.menlhk.go.id. [Accessed: Jan. 5, 2025].

[3]   R. C. Ritch, "Plastics and Their Impact on the Environment," Environmental Science Review, vol. 5, no. 3, pp. 123–135, 2009.

[4]   Bekasi Regency Environmental Service, "Bekasi Regency Waste Management Report 2022." Unpublished report, 2022.

[5]   A. Goleman and L. Barlow, Green Behavior: Building Sustainable Communities, 2nd ed., New York: Earth Publications, 2012.

[6]   Ellen MacArthur Foundation, "The New Plastics Economy: Rethinking the Future of Plastics," 2016. [Online]. Available: https://ellenmacarthurfoundation.org. [Accessed: Jan. 5, 2025].

[7]   Kompas.id, "Trash Crisis in Bekasi Regency," Kompas Online News, Jan. 10, 2023. [Online]. Available: https://www.kompas.id. [Accessed: Jan. 5, 2025].

[8]   A. Napitupulu, et al., "Plastics and Waste Management in Indonesia: Opportunities and Challenges," Indonesian Journal of Environmental Science, vol. 15, no. 4, pp. 215–230, 2021.

[9]   Voi.id, "TPA Burangkeng and Waste Management Problems in Bekasi Regency," Voi News, Mar. 2023. [Online]. Available: https://voi.id. [Accessed: Jan. 5, 2025].