# Public Policy Analysis on Plastic Waste Control in Merauke

**Novike Bela Sumanik[1]**
Universitas Musamus
sumanik_fkip@unmus.ac.id

**Wayrohi Meilvidiri[2]**
Universitas Musamus

**Lamtiar Siregar[3]**
Universitas Musamus

**Serli Hatul Hidayat[4]**
Hasanuddin University, Makassar, Indonesia

Corresponding author: Universitas Musamus Email: sumanik_fkip@unmus.ac.id

**Abstract**

Merauke is a relatively small area in eastern Indonesia, but the waste problem is serious, one of which is plastic waste. Most plastic waste is classified as a type of non-biodegradable waste that takes hundreds of years to decompose. The amount of plastic waste is directly proportional to its population, in other words humans contribute to plastic waste and cause environmental pollution. Therefore, it requires the role of society, government processes and regulations, as well as public awareness of the use of plastics. This study aims to examine whether public policies related to plastic waste can build social values, knowledge, abilities, and attitudes of environmental awareness by looking at the available evidence. The evidence-based analysis method is used to see people's environmental awareness through the evaluation of the literature and the quality of the research base. Data research was obtained through the Department of Environment of Life, Regulation of Regents, and the Regions, observation, and surveys. Results of the study showed the rate of consumption of plastic is still high although it knew would impact; custom carrying pouch-friendly environment in the supermarket not be applied when the market traditionally (predisposing); the government has been providing facilities and infrastructure will be but the ratio of the means of infrastructure are not comparable with the number of people Merauke (enabling); implementation of the policy is not effective need to be assessed again (reinforcing). Keep in the education policies of government through a campaign that routine can change the behavior and is slowly becoming a habit.

# Introduction

Plastic waste is a problem that occurs in various countries, both developed and developing countries. Various efforts have been made by various parties, both government and NGOs (Non-Governmental Organizations), but the waste problem cannot be resolved just like that. The community is both the source and the key to the waste problem. This article presents the implementation of public policies (regulation and management of waste management) in fostering individual/community environmental awareness.

Half, or even more of the accumulated plastic waste ends up in the sea (Li et al., 2021). This condition prompts ASEAN to declare that it's members will take real action and help each other to prevent and reduce marine debris, including plastic waste, through the development of action plans and regional guidelines for East Asia (Waller, 1983). Indonesia as a member of ASEAN is the second largest contributor of plastic waste in the world after China. According to the Ministry of Environment and Forestry in 2020, waste piles in Indonesia will amount to 67.8 million tons/day, while plastic bag waste is around 10.95 million tons per day (Atmadi, 2019; Jati & Ardi, 2020).

This problem also occurs in Merauke Regency, although in terms of area (46,791 $M^2$) the population is relatively small (227,441 inhabitants). Mote (2020) revealed that the waste pile is approximately 100 tons/day and the pile of plastic waste is 60%, or 40 tons/day, and can reach 70-80 tons/day of plastic at the end of the year(Dinas Lingkungan Hidup, 2020). More details can be seen in Table 1, which shows the composition of the population, waste generation, and waste services (Mote, 2020).

**Table 1**
Merauke Garbage Data on Facilities and Infrastructure in the Field of Waste Management

| **Number of Districts / Kecamatan** | : | **20 Districts** | | |
|---|---|---|---|---|
| Number of Villages / Kelurahan | : | 11 Kelurahan | | |
| | | 160 Villages | | |
| Number of RW/RT | : | 388/1.196 | | |
| **Solid Waste Technical Data** | | | **Infrastructure** | |
| Domestic Waste Generation (Regency Scale) | : | 433 $M^3$/day | Dump Truck | 5 Unit |
| Urban Waste Generation (IKK Scale) | : | 197 $M^3$/Hari | Amroll | 5 Unit |
| Waste Transport Services (IKK Scale) | : | 32 $M^3$/Hari | 3-wheel vehicle | 15 Unit |
| Percentage of Service (IKK Scale) | : | 32,99 % | Excavator | 1 Unit |
| Percentage of Services (Regency Scale) | : | 15,02 % | Dozer | 1 Unit |
| Percentage of Organic Waste (Urban) | : | 137,0 $M^3$ | TPA | TPS Ndoremkai |
| | | | | TPS Arafura |

The reality that occurs in the field is that there are facilities and infrastructure as well as regulations that do not work optimally to handle waste, especially plastic waste, which is still a lot in the Merauke area. The greater the amount of plastic consumption without proper management, the worse the impact will be on various environmental, health, and socio-economic problems (Mulasari, Husodo, & Muhadjir, 2014). The study on "Plastic Waste Associated with Disease on Coral Reefs" states that Indonesia is projected to dispose of the most plastic waste into the sea in the period 2010-2025 (Lamb et al., 2018). Environmental awareness for both individuals and society is the key to reducing plastic use, so that plastic waste does not end up in the sea.

Environmental awareness is human behavior towards the environment (multidimensional construct) which consists of cognitive components, attitudes, and behavior (Schlegelmilch, Bohlen, & Diamantopoulos, 1996). A person's behavior regarding minimal plastic is influenced by several factors, namely predisposing (knowledge, attitudes, education, culture, customs), enabling (facilities and infrastructure), and reinforcing (policies/regulations, family, teachers) (Lestari, Septaria, & Putri, 2020). The government is pursuing various hierarchical policies from the center to the regions in dealing with the problem of plastic waste in Indonesia, but they are still not optimal. This can be seen in terms of the amount of plastic waste which still dominates 15% of the total waste, and becomes 69% of the total waste that is managed by landfills (Putra, Damanhuri, & Sembiring, 2019). The challenge faced by environmental education is a dialectical process of social and cultural transformation. Amitha and Manoj (2020) uses evidence base on

the problem of Urban Local Bodies (ULB) in managing solid waste, its causes, and knowledge of solutions in the legal framework. Amitha and Manoj (2020) further combines with a silo-approach (knowledge that produces assessments) ineffective sustainable waste management involving balancing regulatory agencies, executive authorities, and service providers that have not been adequately addressed, improvising administrative systems, making attitude changes, and utilizing technology.

This is an urgent matter to study because this problem is quite simple, but it is becoming increasingly complex because it is rooted in the behavior of individuals who are insensitive to environmental conditions. So that the authors examine this issue from an educational perspective through public policy regulation. Do policies are actually implemented and capable of shaping the behavior of minimal plastic and awareness of the environment? The purpose of using evidence base analysis is to examine whether public policies related to plastic waste can build social values, knowledge, abilities, and attitudes of environmental awareness by looking at the available evidence. By applying a type of predisposing, enabling, and reinforcing framework on plastic waste in the Merauke district.

# Materials and Methods

Evidence-based analysis methods are used to examine people's environmental awareness by evaluating the literature which affects environmental awareness for each individual and society and the quality of the research base is intended as a reference for formulating the best solution in improving plastic-minimum behavior. Previously, Amitha and Manoj (2020) used evidence base on the problem of urban local bodies (ULB) in managing solid waste, its causes, and knowledge of solutions in the legal framework. More advanced Amitha and Manoj (2020) combine with silo-approach (knowledge which resulted in ratings) in the management of garbage sustained which effectively involves the balance of system weight regulator, the authority of the executive, and providers of services which have not been addressed in an adequate, improvising on system administration, making changes in attitude, and take advantage of technology. To run evidence-based analysis, you need some data including:

1. Community Perceptions

Why is the perception of the community's needs, because people are the subject of research and the community is the perpetrator of the problems of garbage plastic? To obtain the data of perception that proper and valid then be made in the form of questions or statements that have been validated by two validators in the form of questionnaires were distributed online through a google form, especially in the area of Merauke which is spread through social media. A total of 211 responses were obtained. Data based on interviews.

2. We interviewed:

a. Head of Dinas Lingkungan Hidup (DLH) Kab. Merauke: the amount of garbage and facilities and infrastructure rubbish, reception levy garbage.
b. Society: the behavior of people shopped in stores and market-related policies deduction garbage plastic
c. Modern and traditional market: the policy use of bags of plastic

3. Data from policy documents on initiatives on plastic waste management.

**Table 1**
Data from Policy Documents

| No | Policy | Description |
|---|---|---|
| 1. | Peraturan Bupati No.23 Tahun 2019 | Concerning the reduction of plastic bags, prohibiting modern shops and shopping centers prohibited from providing plastic bags. |
| 2. | Peraturan Daerah No.5 Tahun 2014 | Concerning waste management |
| 3. | Peraturan Daerah No.6 Tahun 2017 | Concerning public order, that perpetrators who throw garbage in any place will be subject to a fine of Rp. 50,000, - and a maximum imprisonment of 6 months |

## Field observations

Data were obtained from questionnaires usually are biased and to avoid the researchers do observation field. Researchers observed in a field related to the policies and behavior of the individual/community regarding the use of plastic. Once the data is obtained, will be in comparison with the data results of the questionnaire, so that the obtained data is valid.

The data were analyzed by using the evidence-based analysis method by examining the three factors of environmental awareness: i) predisposing; ii) enabling; and iii) reinforcing. There are 5 stages must be passed, the first stage (ask a question) when collecting data on perceptions, interviews, and observations; and the second stage (search) in compiling the legal framework for government policies. In the next phase to 3 critically, here the data that has been collected will be sorted so that obtained data is valid and is not biased. Stage to four implements: valid data will be analyzed descriptive and deeply through the study of literature, so it can be drawn conclusions that answer the question of research. Stage to five Evaluate which seek constraints and deficiencies are derived from the research is to the development of research further.

# Results

Individual/community environmental awareness is the accumulation of predisposing, enabling, and reinforcing, the chart can be seen in Figure 1:
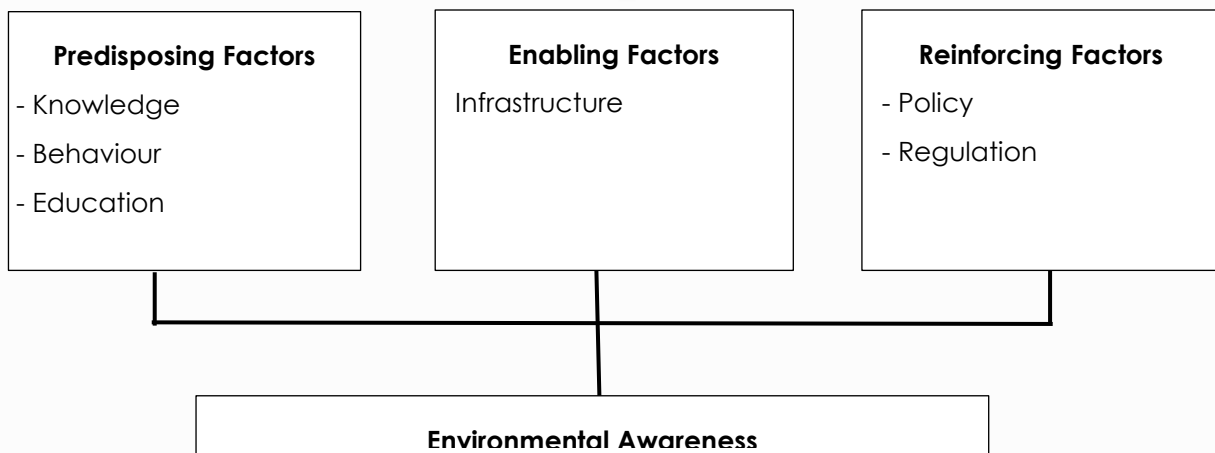


**Figure 1.** Environmental awareness

Results of the research is in categorized into three aspects:

### 1.     Predisposing

a.     Analysis perception through questionnaires online in 15 questions on 211 respondents concluded that awareness of the environment is still very less, evident from the high level of consumption of the use of plastic although respondents already know the dangers of the impact of garbage plastic.

b.     Observations were made in traditional markets (Pasar Wamangu, and Pasar Baru); modern markets (Golden Supermarkets, Garuda, Orange, National, and Sentra Belanja Merauke) and store grocery. The results of observations show the customs people when shopping in the store supermarket carrying a bag of groceries non-plastic because they do not want to expend the cost to buy a bag of shopping which the price is relatively expensive on the contrary when they go shopping in the market traditionally.

### 2.     Enabling

a.   The government has been providing a system transporting garbage. Garbage is transported 3 times in a week and all house stairs are worn restricts amounting to Rp 20,000 per month. Not all home households willing to pay retribution rubbish, society is choosing to dispose of

their trash them either by way of burnt, and unisex was placed so only on the area of land vacant and was followed by the public more and behaviors have become an entrenched habit.

b. The government has been providing a system transporting garbage. Garbage is transported 3 times in a week and every household are worn restricts amounting to Rp 20,000 per month. Not all home households willing to pay retribution rubbish, society is choosing to dispose of their trash them either by way of burnt, and there are also was placed so only on the area of land vacant and was followed by the public more and behaviors have become an entrenched habit.

c. The number of transport cars is still limited, the government has also provided a temporary dumpsite on Jalan Dorem Kai KPG before being transported to a landfill in Bokem.

d. Rubbish bank: Bank Sampah Mandiri Prajurit Merauke inaugurated March 2020 on the wishes of the service environment to live Merauke which facilitates people to save d ith service pick up trash recycle repeated in the form of craft hand.

## 3. Reinforcing

a. The interview field observation method to see the performance of Peraturan Bupati No.23 Tahun 2019 found that the implementation of this regulation was effective in supermarkets and not suitable in grocery stores and traditional markets.

b. Peraturan Daerah No.5 Tahun 2014 concerning waste management and Peraturan

Daerah No.6 Tahun 2017 concerning public order, that the perpetrator who dumps rubbish in any place will be subject to a fine of Rp. 50,000, - and maximum imprisonment of 6 months. The observation results of this perda have not been subject to sanctions for imprisonment and monetary fines for dumping littering. Before implementing policies, the government has been doing socialization regarding the regulation regents and regulatory areas. Peraturan Bupati No.23 Tahun 2019 promoted a few months before officially applied on the date of 1 September 2019. Implementation of the rules is effective on store supermarket or shop modern others and are not applicable in the shop grocery market and traditional. Through this regent's regulation policy, the government has provided education to the public to reduce the use of plastic bags so that when they shop, they use shopping bags that are environmentally friendly and can be used repeatedly. But the fact of observation that is done in markets traditionally, people just do not carry the habit of carrying and using a bag that friendly environment, because in the market traditional policy is not applicable and sellers still use a bag of plastic.

Dinas Lingkungan Hidup Merauke calls on the public to report the act of littering to officers from the Satpol PP as an implementation of Peraturan Daerah No.5 Tahun 2014 concerning Waste Management and Peraturan Daerah No.6 Tahun 2017 concerning Public Order, that the perpetrators throw garbage anywhere. Subject to a fine of Rp. 50,000, - and maximum imprisonment of 6 months. This regional regulation is a form of education by providing a deterrent effect on the community so that they do not repeatedly litter. However, in reality, since the socialization until its implementation until now, no community has been levied by this regulation. The public is reluctant to report because it is not an obligation, those who report have no benefit and are afraid of causing personal problems with the person being reported. The government has provided facilities and infrastructure for transporting waste with a fee of Rp.20, 000 per household per month. However, not all households are willing to pay waste fees, people prefer to dispose of their waste either by burning it, and those who are simply placed on empty land areas are followed by other communities and this behavior has become an entrenched habit. Household waste is not classified by type into organic, inorganic, and toxic hazardous materials. Society, in general, collects all waste in one plastic container for disposal. The government has provided garbage containers at several points for people who do not pay fees, but people do not dump garbage in containers disposed of outside the containers. This made it so difficult for the janitor to make it so that the environmental service pulled the container back and moved it to a temporary disposal site which was easily managed by the officers before being taken to a landfill.

# Discussion

Regarding the waste policy, the government has issued several policies to minimize waste, these

policies are contained in regent and regional regulations which are derivatives of policies at the national level. The policy is one component of environmental awareness, (Lestari et al., 2020) develops environmental awareness policies, namely reinforcing, enabling, and predisposing. Reducing waste in landfills or the ecosystem requires public awareness and support about the impact of plastic waste, reducing consumption, and proper management of plastic waste (Mahyudin, 2017), which according to Arum et al is a community lifestyle (Arum et al., 2019).

People know the impact of plastic, but are reluctant to reduce plastic consumption. Knowledge must be actualized in the form of minimal plastic behavior. Knowledge is an important domain in shaping environmental care behavior based on good education. Education is an important part, because the better the knowledge, the better the waste management (Gusti et al., 2015, 2017). The perception of the Merauke people, when confirmed regarding the dangers of plastic waste, is that 88% of the public know the dangers of plastic waste. However, this knowledge when juxtaposed with the reality in the Merauke district does not reflect environmental awareness behavior. Waste management can be done either individually, in groups, or by the government. Merauke district government carries out waste management through the Environmental Service by providing facilities and infrastructure. Together with the local government issued a series of waste management policies, also, together with the community, they formed a waste bank as Bank Sampah Prajurit Merauke.

The lack of environmental awareness encourages the government to act more assertively by issuing several policies which are expected to be able to change people's behavior, according to Bemelmans-Videc, Rist, and Vedung (1998) that there are four policy instruments capable of changing behavior, namely incentives, prohibitions and mandates, communication campaigns, and encouragement (Bemelmans-Videc et al., 1998). Tummers states that behavior change is supported by policy effectiveness and efficiency, support from politicians, organizational implementers, and citizens (Tummers, 2019). There are at least three policies issued by the Merauke district government, namely Peraturan Bupati No.23 Tahun 2019; Peraturan Daerah No.5 Tahun 2014 and No.6 Tahun 2017. In its implementation, these regulations have experienced several obstacles so that they are less effective and efficient even though the infrastructure already exists. Ineffective because the ratio between household heads is not comparable to three-wheeled waste-carrying vehicles. In addition, there are still many family heads who are not willing to pay retribution garbage.

The need to provide more concrete in-depth education to foster environmental awareness. Education that fosters environmental awareness and minimal plastic is implied in government public policy regulations. The problem is that people are not aware of it, for example, the environmentally friendly pocket policy in supermarkets; the government educates the public to change the behavior pattern of using plastic and become a habit for the community. Another example, namely waste management education, the government gives options to the community, whether to manage it themselves or to be managed by the government. If the community does not want to manage it themselves, the community will be charged a waste retribution fee, if they do not want to pay waste retribution, then the community must be able to manage their waste, whether it is taken directly to the TPS or other garbage collection point.

Phase end of Evidence-based analysis methods can be concluded that the government through Peraturan Bupati No.23 Tahun 2019 should be extended not only to the store supermarket but also to the store grocery market and traditional. Peraturan Daerah No.5 Tahun 2014 and No.6 Tahun 2017 provide fines and confinement in prison just to scare people to be obedient to dispose of garbage. Implementation researchers assess the regulation as not effective and do not materialize, the growing awareness of the environment in the society, so that needs to be done reviewing back. The author suggests to raise awareness of the environment, the government must vigorously be giving campaign either through posters, radio, media mass, television, even the media of social-related hazards of waste plastic and trash.

## Conclusions

This Growing environmental awareness is very difficult, why is that? Because in terms of knowledge, the public knows the dangers of plastic waste. The public also knows that the government has made policies, both regional regulations and regent regulations, from those that are appealing to those that provide strict sanctions. There are policies that have been implemented (Peraturan Bupati No.23 Tahun 2019), there are also policies that have not been implemented (Peraturan

Daerah No.5 Tahun 2014 and No.6 Tahun 2017). The government has also provided facilities and infrastructure that support waste management. It is hoped that with the existence of government policy education through regular campaigns, it will be able to change behavior and gradually become a habit.

## Acknowledgments

## References

Amitha, A. J., & Manoj, V. (2020, 2020//). *Evidence-Based Analysis of Patterns of Challenges in Solid Waste Management by Urban Local Bodies in India.* Paper presented at the Sustainable Waste Management: Policies and Case Studies, Singapore.

Arum, H., Jamiati, J., Ineza, M., Kusumo, F., & Amelia, R. (2019, 24 sep). *Making Vertical Gardens in the Lamtoro Region.* Paper presented at the Proceedings of the National Seminar on Community Service LPPM UMJ, UNIVERSITAS MUHAMMADIYAH JAKARTA.

Atmadi, G. (2019). *HOW COMPANY MANAGE STAKEHOLDER ENGAGEMENT FOR REDUCING PLASTIC WASTE IN INDONESIA?* Paper presented at the Proceeding of International Conference on Communication, Culture and Media Studies (CCCMS).

Bemelmans-Videc, M.-L., Rist, R., & Vedung, E. (1998). Carrots, sticks and sermons: Policy instruments and their evaluation *Introduction: Policy instrument choice and evaluation* (pp. 21-58). New Brunswick, NJ: Transaction publishers.

Gusti, A., Isyandi, B., Bahri, S., & Afandi, D. (2015). The Behavioral Intention to Implement Sustainable Waste Management on Primary School Students in City of Padang, Indonesia. *International Journal of Innovation and Applied Studies, 13*(2), 309-315. doi: http://www.ijias.issr-journals.org/

Gusti, A., Isyandi, B., Bahri, S., & Afandi, D. (2017). Determinant Factors of Behavioral Intentions of Sustainable Waste Management in Elementary School Students. *Andalas Public Health Journal,, 9*(2), 65-72. doi: https://doi.org/10.24893/jkma.v9i2.138

Jati, R. K., & Ardi, R. (2020). *Conceptualization of Systems Dynamics Analysis on Informal Plastic Waste Management Systems in Indonesia.* Paper presented at the Proceedings of the 3rd Asia Pacific Conference on Research in Industrial and Systems Engineering 2020, New York, NY, USA.

Lamb, J. B., Willis, B. L., Fiorenza, E. A., Couch, C. S., Howard, R., Rader, D. N., . . . Harvell, C. D. (2018). Plastic waste associated with disease on coral reefs. *Science, 359*(6374), 460-462. doi: 10.1126/science.aar3320

Lestari, P. W., Septaria, B. C., & Putri, C. E. (2020). "Minim Plastic" education as a form of love for the environment at SDN Pejaten Timur 20 Pagi. *Transformation: Journal of Community Service,, 16*(1), 43-52. doi: https://doi.org/10.20414/transformasi.v16i1.2034

Li, Z., Chen, K., Chen, Z., Li, W., Biney, B. W., Guo, A., & Liu, D. (2021). Removal of malachite green dye from aqueous solution by adsorbents derived from polyurethane plastic waste. *Journal of Environmental Chemical Engineering, 9*(1), 104704. doi: https://doi.org/10.1016/j.jece.2020.104704

Mahyudin, R. P. (2017). Increasing the Role of Scavengers to Improve Management of Final Waste Processing Sites. . *EnviroScienteae,, 13*(1), 62-68. doi: http://dx.doi.org/10.20527/es.v13i1.3516

Mote, H. H. F. (2020). *POLICY OF THE ENVIRONMENT SERVICE AND THE ROLE OF MALIND ANIM INDIGENOUS COMMUNITY INSTITUTIONS IN ABRATION MANAGEMENT EFFORTS IN MERAUKE DISTRICT* (phd Doctoral dissertation), Universitas Hasanuddin.

Mulasari, S. A., Husodo, A. H., & Muhadjir, N. (2014). Government policy in domestic waste management. *National Public Health Journal, 8*(8), 404-410. doi: http://dx.doi.org/10.21109/kesmas.v8i8.412

Putra, H. P., Damanhuri, E., & Sembiring, E. (2019). A new sector of waste management in Indonesia (case studies in Yogyakarta City, Sleman and Bantul Regencies). . *Journal of Environmental*

*Science & Technology,, 11*(1), 11-24. doi: https://doi.org/10.20885/jstl.vol11.iss1.art2

Schlegelmilch, B. B., Bohlen, G. M., & Diamantopoulos, A. (1996). The link between green purchasing decisions and measures of environmental consciousness. *European Journal of Marketing, 30*(5), 35-55. doi: 10.1108/03090569610118740

Tummers, L. (2019). Public Policy and Behavior Change. *Public Administration Review, 79*(6), 925-930. doi: https://doi.org/10.1111/puar.13109

Waller, R. (1983). EIA guidelines for the United Nations Environment Programme. *Impact Assessment,* 2(1), 44-52. doi: https://www.tandfonline.com/doi/pdf/10.1080/07349165.1983.9725943