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Socio-cultural dynamics in community support in post-consumtion plastic waste management: A case study of DKI Jakarta region

Siti Kardian Pramiati[1], Tri Edhi Budhi Soesilo[1], Haruki Agustina[1]
[1] *Environmental Science, School of Environmental Science, University of Indonesia;, Depok, 16424, Indonesia*
*Correspondence: haruki.agustina11@ui.ac.id

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ABSTRACT

Introduction: Population growth in urban areas, fuelled by migration from rural areas, has changed lifestyles and socio-cultural dynamics. The dynamic lifestyle of urban communities changes consumption behaviour so that people prefer practical and economical products. There are fundamental issues that arise in the waste management system in Indonesia, including limited waste management capacity in the regions, inadequate infrastructure, implementation of regulations, and lack of public awareness including the consumer goods manufacturing industry on post-consumption waste management issues. This study aims to understand the perception and level of community participation as well as the role of the informal sector in post-consumption plastic waste management, with a focus on the implementation of the extended producer responsibility (EPR) scheme. **Methods:** Data was collected through a questionnaire survey and literature study in five areas of DKI Jakarta. Through the concept of Extended Producer Responsibility (EPR), the manufacturing industry is encouraged to contribute to the management of plastic packaging waste produced. This research uses quantitative and qualitative methods with data analysis using descriptive statistics. **Finding:** The results show that the community supports EPR-related regulations and is ready to participate in plastic waste management schemes. This positive perception reflects changes in socio-cultural values that prioritise environmental concerns. The informal sector also makes an important contribution to plastic waste reduction, especially through collection, distribution, and processing activities in stalls and waste banks. Community support and the role of the informal sector in plastic waste management reflect changes in social attitudes and behaviours that are increasingly concerned about the environment. **Conclusion:** Therefore, active involvement in plastic waste reduction initiatives also reflects a cultural change that is increasingly integrated in urban communities.

KEYWORDS: circular economy; extended producer responsibility (epr); plastic waste management.

1. Introduction

Traditional markets in Indonesia still dominate in number. Based on data from BPS, the percentage of traditional markets is 89%, shopping centers are 4%, and modern stores are 7% (BPS, 2018). However, the amount of competition is getting tighter in getting consumers between traditional markets, supermarkets, and malls. Based on Ministry of Trade

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Regulation No. 37/2017 concerning Guidelines for the Development and Management of Trade Facilities, the nomenclature of traditional markets has been changed to people's markets. The definition of a people's market in the regulation is a certain area where buyers and sellers meet, either directly or indirectly, with the process of buying and selling various types of consumer goods through bargaining. However, traditional markets, which in this study are called people's markets, are identical to smelly, shabby and dirty. The arrangement of merchandise in the people's market is not neat, the distance between stalls is too narrow, and for the best price of goods consumers have to bargain because of price variations between traders (Arianty, 2013).

The results show that the community supports EPR-related regulations and is ready to participate in plastic waste management schemes. This positive perception reflects changes in socio-cultural values that prioritise environmental concerns. The informal sector also makes an important contribution to plastic waste reduction, especially through collection, distribution, and processing activities in stalls and waste banks. Community support and the role of the informal sector in plastic waste management reflect changes in social attitudes and behaviours that are increasingly concerned about the environment. Therefore, active involvement in plastic waste reduction initiatives also reflects a cultural change that is increasingly integrated in urban communities.

The high population of Indonesia in 2020, which reached 270.2 million people, has an impact on the increase in the amount of waste generated (Badan Pusat Statistik, 2021). According to data from the National Waste Management Information System, the national waste generation in 2020 reached 32,168,135.19 tonnes. However, only 15,167,553.06 tonnes or around 45.81% of waste can be handled. The National Plastic Action Partnership (NPAP) report revealed that around 4.8 million tonnes or 70% of all plastic waste in Indonesia is not managed properly. Waste that is not managed properly can end up in the sea, which can cause various problems both directly and indirectly such as water, air and soil pollution; increase greenhouse gases (GHG), become a source of disease; flood disasters; and other problems. A similar study conducted by the Oceanographic Research Centre of the Indonesian Institute of Sciences found that there are around 0.27-0.60 million tonnes of plastic waste entering Indonesia's seas each year (Cordova et al., 2019). Marine plastic debris has caused serious negative impacts on marine life, livelihoods and public health (Jing & Sutikno, 2020; Maskun et al., 2022). Only about 60% of waste in major cities in Indonesia can be transported to landfills, where it is destroyed by landfilling (Damanhuri, 2012).

The largest source of waste in DKI Jakarta comes from household waste as much as 854.94 tonnes, while the second largest comes from the office sector as much as 430.73 tonnes. This data states that waste management at the household scale is not optimal, so it is the main source of waste in DKI Jakarta. Socio-culture is also an important factor in understanding the challenges faced by urban communities in managing waste. Behaviour and social norms that develop in society, such as indifference to the environment, are important factors in understanding the dynamics of waste management at the household level and in society as a whole. The Central Bureau of Statistics through the Environmental Indifference Survey in 2018 produced an Environmental Indifference Index which states that Indonesians' indifference to the environment is most prevalent in the dimension of waste management, compared to the dimensions of indifference to energy management, water saving, or the use of public transport. The high level of indifference towards waste management is evidenced by the behaviour of Indonesian households in terms of waste handling. More than half of Indonesian households use environmentally unfriendly methods to manage waste. The survey results show that as many as 53% of respondents burn waste, 5% throw waste into the river and 2.7% throw waste in any place. Public ignorance is also reflected in the behaviour towards plastic waste, as many as 81.4% of people do not care about plastic waste (Badan Pusat Statistik, 2018).

Law No. 18/2008 on Waste Management mandates the need for fundamental changes in waste management, namely changing the paradigm of waste management from collect-transport-dispose to reduce at source and recycle resources. This is implemented through

the 3R principle (Reduce, Reuse, Recycle), extended producer responsibility not only being a technical strategy, but also reflecting changes in socio-cultural values in urban communities. In addition, the active involvement of communities, businesses, and informal sectors through the implementation of circular economy and extended producer responsibility (EPR) schemes also shows a paradigm shift in managing waste that is more inclusive and based on socio-cultural values.

Waste management financing in Indonesia still relies on the Regional Budget (APBD). The allocation of funds for waste management ranges from 1-4%, with waste retribution usually collected from residents for the transfer of waste from the source to temporary shelters. There is no waste retribution levied by local governments for waste management services. However, the waste problem is not the responsibility of the government alone, but also requires the cooperation of many parties including communities, businesses, and informal sectors through the implementation of a circular economy and partnerships with the private sector through the Extended Producer Responsibility (EPR) scheme. Through the EPR scheme, companies can take responsibility for their products and product packaging (Aprilia, 2021). The concept of EPR is an environmental protection policy principle to reduce environmental impacts stemming from the product life cycle by extending the producer's responsibility for the product life cycle by recalling and final destruction of the remaining products after sale (Lindhqvist, 2006).

Presidential Regulation No. 97/2017 National Policy and Strategy (Jakstranas) for the Management of Household Waste and Waste Similar to Household Waste mandates a target of one hundred per cent waste management by 2025. This regulation is strengthened by the issuance of Regional Policies and Strategies (Jakstrada). This step significantly encourages behavioural change among the public, as well as producers. The plastic waste collection system can be carried out by involving consumers, retailers as distributors of plastic-packaged products and recycling actors in the informal sector (Dahlbo et al, 2018; Septiani et al., 2019). Minister of Environment and Forestry Regulation (PermenLHK) Number 75 of 2019 concerning Roadmap for Waste Reduction by Producers. The regulation is a legal basis that regulates waste reduction by producers, especially waste that is difficult to decompose and cannot be reused, such as plastic packaging. This regulation regulates the responsibility of producers for their products, starting from waste reduction planning, implementation, evaluation and reporting (MenLHK, 2019; Wang & Karasik, 2022). Through the Roadmap for Waste Reduction by Producers, the government aims to reduce waste by 30 per cent by 2030. The Minister of Environment and Forestry Regulation (PermenLHK) Number 75 of 2019 is not only a legal instrument, but also reflects the socio-cultural dynamics in society. These measures actively encourage changes in the behaviour of the public and producers in waste management, which in turn also influence the socio-cultural norms and values that develop in urban communities.

This increasing plastic waste generation has not been matched by an increase in management infrastructure and the quality of waste management services due to limited costs, human resources, facilities and infrastructure (Chaerul et al., 2007; Ayu et al., 2011). In addition, waste management is also influenced by socio-cultural factors such as the behaviour and participation of urban communities in managing plastic waste, as well as the involvement of businesses that have not been optimal in implementing their responsibilities as producers of plastic packaging products. For this reason, it is necessary to study the perception and level of community participation to support the scheme of expanding producer responsibility and the role of the informal sector to support the reduction of plastic waste by producers. A deep understanding of these socio-cultural dynamics is key to designing a more effective and sustainable waste management strategy in the future.

2. Methods

2.1 Research approach

The method used in this research is a combination method (mix method) with the aim of getting better results. Quantitative methods were used to collect questionnaire data to analyse community perceptions and business perceptions. Qualitative methods were used to analyse the social and economic aspects of the community and government policies, through interviews with relevant parties.

2.2 Study Area

This research was conducted in five areas of DKI Jakarta, namely North Jakarta, South Jakarta, Central Jakarta, East Jakarta, and West Jakarta, without including the Thousand Islands Regency area.

2.3 Data collection and Analysis

This research uses two types of data: primary data and secondary data. The primary data in question is data from direct observation and the results of respondents' answers. Secondary data used is data obtained from the literature study process, company data, and informal sector data. Data collection, processing and analysis methods are shown in the following table:

Table 1. Data collection, processing and analysis methods

No	Data	Data Type	Data Collection	Basic Method	Data Analysis
1	Community Perception	Primary	Observation, Survey and Questionnaire	Summing up the most frequencies and processing the data with descriptive statistical analysis.	Descriptive Statistical Analysis
2	Level of Community Participation	Primary	Observation, Survey and Questionnaire	Summing up the most frequencies and processing the data with descriptive statistical analysis.	Descriptive Statistical Analysis
3	The Role of the Informal Sector	Secondary	Observation, literature study, relevant agency or institution data	Analyse data on the informal waste management sector	Descriptive Analysis

The resulting data were analysed with descriptive statistics to achieve the research objectives. Descriptive analysis was carried out to explain the results of questionnaire answers to obtain information about public perceptions as consumers.

3. Results and Discussion

3.1 Level of community participation in plastic waste management

Field observations using the assessment form SNI 8152: 2015 People's Market and the Environmental Health Inspection (IKL) form from the DKI Jakarta Provincial Health Office. Based on the results of observations in the field, comparison data is made, namely the

weighting of the suitability of the condition of the people's market in the 4 markets that are the research locations in terms of SNI People's Market criteria. The results of the calculation of the suitability of the conditions of the people's market at the research location show that Koja Baru Market in the technical requirements section, the percentage value of the main suitability is 100%, the supporting suitability is 60% and in the management requirements section the percentage value of suitability is 100% so that this market is categorized as meeting Quality 1 because this market has SNI. The other three markets have not met the criteria listed, meaning that there are still many facilities in Pasar Johar Baru, Pasar Lenteng Agung, and Pasar Slipi that must be met if they are to achieve SNI certification.

The results show that community participation in plastic waste management is not only a technical aspect, but also influenced by complex socio-cultural factors. In this context, an in-depth understanding of community perceptions, attitudes and behaviour in waste management. Community participation in sorting waste from the source is one form of community-based waste management. The level of participation referred to in this study is the participation of the community to sort waste, especially plastic waste, and deposit it through the available plastic packaging waste collection service facilities.

In the question about how waste is handled in the home environment, 44% of respondents stated that they only rely on waste collection officers without sorting it first. This shows the lack of public awareness of the importance of waste segregation at the household level. Meanwhile, 23.2% of respondents sorted their waste first before it was transported by the waste picker. This is a positive hope for the potential to increase community participation in waste management. Meanwhile, there are 19.8% of respondents who do not use collective waste collection services, but dispose of their waste directly to the nearest waste disposal site. The remaining 12.3% of respondents stated that their household waste was disposed of by burning.

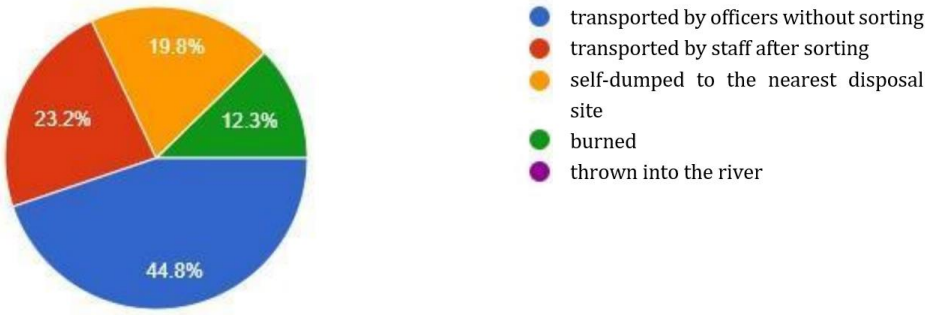

Fig 1. Percentage of Household Waste Handling

Public perceptions of waste reduction policies by producers also reflect the socio-cultural dynamics in society. Public perception of waste reduction policies through producer responsibility was obtained by 73% of respondents who agreed and supported government regulations related to packaging waste management, including the issuance of PermenLHK Number 75 of 2019 concerning Roadmap for Waste Reduction by Producers. The majority of respondents support government regulations related to packaging waste management, indicating an awareness of the important role of producers in reducing plastic waste. As many as 70% of respondents thought that the responsibility of post-consumption waste management should be the responsibility of producers, because so far they have stated that they are burdened by the increasing prices of consumer goods products, while the waste handling system in settlements is not optimal. The move to expand producer responsibility is expected to be a solution to the problem of plastic packaging waste, which is almost daily consumed by everyone.

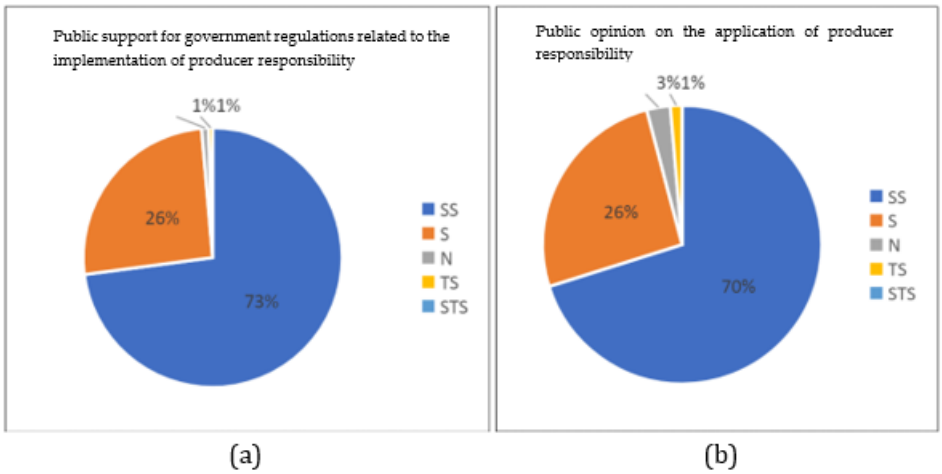

Fig 2. Results of Analysis (a) Public Support for Government Regulation related to Producer Responsibility;
(b) Public Opinions on the Implementation of Producer Responsibility

The public response regarding waste reduction schemes by producers, such as the plastic packaging waste recall programme, was mostly positive, as evidenced by the survey results where 77% of respondents strongly agreed that producers have the initiative to expand their responsibilities by implementing a post-consumption plastic packaging waste recall programme. Regarding the willingness of the community in collecting post-consumption plastic waste, 65% of respondents stated that they were ready to participate in the collection of plastic packaging waste and only 1% stated that they did not want to be involved in post-consumption plastic waste collection activities.

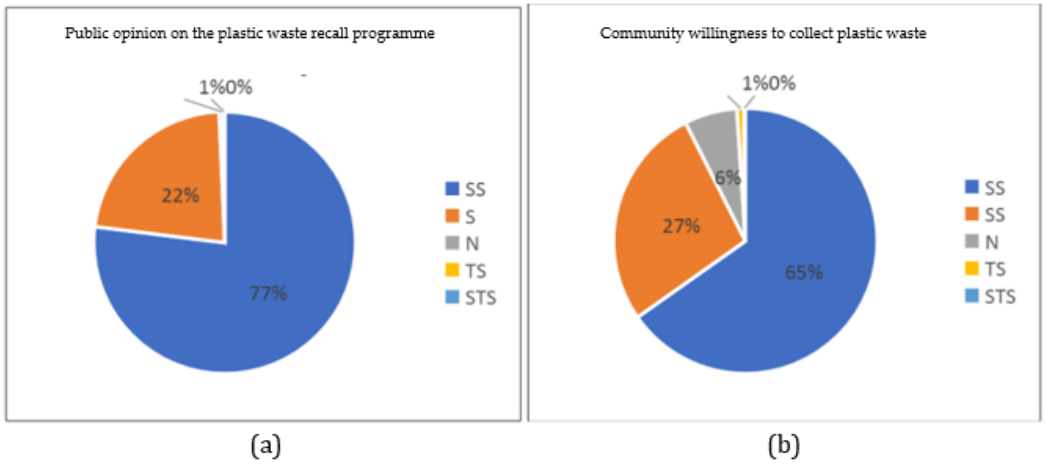

Fig 2. Results of the analysis of (a) Community Opinions on the Plastic Waste Recall Programme Plastic Waste Recall Programme; (b) Community Willingness to Collect Plastic Waste

In supporting waste reduction efforts by producers, the community sees several schemes that can be accepted and implemented in the community, including: (a) development of bulk stores; (b) post-consumption plastic waste recall; (c) plastic waste management training for residents; (d) environmentally friendly packaging design; (e) development of cooperation with neighbourhood waste banks; (f) provision of dropboxes in public areas; (g) improvement of waste pick-up services. The most common scheme selected was the development of neighbourhood waste banks selected by 106 respondents, in second place was the scheme for creating environmentally friendly packaging designs (85 respondents), followed by plastic waste management training for residents selected by 73 respondents.

Those who agreed and supported the implementation of waste reduction by producers were then directed to questions about the motivation and proposed incentives provided by producers for their participation in the plastic waste recall programme. A total of 147 respondents (33%) proposed a direct discount for returning post-consumption plastic waste and 139 respondents (32%) proposed giving shopping vouchers as incentives for consumers who return post-consumption plastic waste. A total of 99 respondents (23%) suggested a post-consumer plastic waste exchange programme with a kind of point reward/savings, and there were 4 respondents who answered cash back as an incentive for the post-consumer plastic waste recall programme. There were 36 respondents (8%) who said that they did not require any incentive from the post-consumption plastic waste recovery programme. The public's response to waste reduction schemes by producers shows a preference for certain schemes. This indicates the need to design waste reduction schemes that are appropriate to the socio-cultural context of the community.

3.2 Role of the informal sector

The informal sector referred to in this research is community institutions/organisations that collect, distribute, and process plastic packaging waste, such as in stalls/bands and in waste banks. Data on the informal sector includes data on plastic waste management activities in waste banks and stallholders in the DKI Jakarta area, obtained through the National Waste Management Information System (SIPSN) and the Waste Bank Management Information System (Simba.id), Ministry of Environment and Forestry in 2022. From the results of this study, it appears that the informal sector, which includes stalls and waste banks, has a significant role in plastic waste management.

a. Role of the stalls

Waste management activities carried out at the stalls only include the collection of waste from individual scavengers. The waste collected is only the type of waste that has economic value, namely inorganic waste such as packaging waste in the form of glass and plastic bottles, cardboard, paper or glass. The amount of inorganic waste collected in the stalls in the five regions was 434,894.92 tonnes, while the managed waste was 434,385.41 tonnes, with the rest becoming residue. From this amount, the waste reduction carried out by the stalls and collectors is calculated as follows:

$$\text{Waste Generation Reduction} = \frac{\text{Total inorganic waste managed}}{\text{Total waste generation in the region per year}} \text{ x } 100\%$$
$$= \frac{434{,}385.41}{3{,}077{,}008.37} \text{ x } 100\%$$
$$= 14.12\%$$

b. The role of waste bank

Another informal sector examined in this research is waste banks. Nationally, the number of waste banks continues to increase from year to year. The latest data shows that in 2021, there were 11,552 waste bank units spread throughout Indonesia, and as many as 1,942 waste bank units were in the DKI Jakarta area (KLHK, 2022). The growth in the number of waste banks is accompanied by growth in the number of people who become customers. Nationally, in 2020 there were 419,204 active customers. However, there was a decrease in the number of customers in 2021, namely 377,881 active customers. Meanwhile, for the DKI Jakarta area, there were 51,833 active customers.

Data from waste banks in five areas of DKI Jakarta show that most of the inorganic waste collected in waste banks (95%) can be utilised as raw material for the recycling industry, and only 5% can be utilised as raw material for up-cycling. The total plastic waste

collected in waste banks is 23,995,348.43 kg/year or 23,995.35 tonnes/year. From this amount, the waste reduction carried out by the waste bank is calculated as follows:

$$\text{Waste Generation Reduction} = \frac{\text{Total inorganic waste managed}}{\text{Total waste generation in the region per year}} \text{ x } 100\%$$
$$= \frac{23{,}995.35}{3{,}077{,}008.37} \text{ x } 100\%$$
$$= 0.78\%$$

The waste reduction rate obtained is very small, which means that the collection rate through waste banks is still very small, only able to reduce 0.78% of waste generation in Jakarta. However, from the calculation of waste reduction in the stalls and in the waste bank, it can be seen that the informal sector has an important role in the collection and recall of inorganic waste, especially plastic packaging waste. If the cooperation between producers and the informal sector is optimised, the EPR scheme in the form of packaging waste recall can run more optimally. The results of this research corroborate the results of Kustanti et al.'s research (2020) which stated that informal sector recycling actors in Purwodadi District were able to reduce plastic waste by 10.08%. In the socio-cultural context, the role of the informal sector reflects the existence of social structures and values rooted in society, where informal economic activities are an integral part of daily life. Therefore, to improve the effectiveness of plastic waste management, socio-cultural factors need to be considered.

4. Conclusions

Based on the results obtained in this research, the public supports regulations related to the implementation of producer responsibility in plastic waste management. In addition, the community is willing to participate in the implementation of EPR schemes for post-consumption plastic waste management by providing positive perceptions and showing active involvement in various related initiatives. The informal sector also supports the reduction of plastic waste by contributing to the implementation of EPR such as the collection, distribution, and processing of plastic packaging waste in stalls and waste banks, especially in the post-consumption plastic waste recall scheme. Community support and the role of the informal sector in plastic waste management reflect the existence of social and cultural values that encourage awareness of the importance of environmental conservation. In addition, active involvement in plastic waste reduction initiatives also reflects changes in social attitudes and behaviours that are developing in the community, where concern for the environment is increasingly becoming an integral part of social identity and norms.

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Biographies of Authors

Siti Kardian Pramiati, Environmental Science, School of Environmental Science, University of Indonesia
- Email: dhiankui@gmail.com
- ORCID: N/A
- Web of Science ResearcherID: N/A
- Scopus Author ID: N/A
- Homepage: N/A

Tri Edhi Budhi Soesilo, Environmental Science, School of Environmental Science, University of Indonesia
- Email: tri.edhi@ui.ac.id
- ORCID: 0000-0002-3188-5812
- Web of Science ResearcherID: N/A
- Scopus Author ID: 57193915879
- Homepage: https://sinta.kemdikbud.go.id/authors/profile/6648519

Haruki Agustina, Environmental Science, School of Environmental Science, University of Indonesia
- Email: haruki.agustina11@ui.ac.id
- ORCID: N/A
- Web of Science ResearcherID: N/A
- Scopus Author ID: NA
- Homepage: N/A