Plastic Waste Reduction Strategy in Bogor City, Indonesia

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Abstract. Plastic waste is a problem in the city/district. Plastic waste cannot be decomposed so it needs special efforts in plastic waste management. The purpose of this study was to determine the plastic waste management strategy in Bogor City. The research was conducted in Bogor City from September to November 2022. Research data were obtained from interviews with waste managers and direct measurement of waste for 8 consecutive days. The data obtained were analyzed descriptively and quantitatively. From the results of waste measurement, it was found that plastic waste generated in Bogor City is around 2-29%. Plastic waste reduction strategies are the existence of regulations from the government, waste reduction using reuse, reduce, and recycle.

1 Introduction

An increase in waste production always follows a district's population growth and economic expansion [1]. More than 50% of the waste generated will be transported and processed at the final waste processing center [2]. The waste generated will be emptied or disposed of at the final waste processing site [3]. Waste management needs to be done to maintain and preserve the environment. Waste, especially plastic waste, is still a big problem that needs to be addressed by all parties [4]. Based on waste data from the Ministry of Environment and Forestry in 2022, the amount of waste generated in Indonesia is 33 million metric tons per year. Based on this data, 17.9% is plastic waste. Bogor City, as one of the major cities in Indonesia, experiences an increase in population every year. The increase in population will be accompanied by an increase in waste. Community involvement in reducing the amount of waste, especially plastic, is needed. The form of community involvement can apply to the waste management hierarchy, namely prevention, reuse, recycling, recovery, and landfill [5]. This involvement is in the form of using bags when

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buying. Plastic waste management is the subject of research to identify the amount of plastic waste in Indonesia and determine plastic waste management strategies that can be applied. Scavengers have so far picked up plastic waste, so they contribute to reducing the amount of waste produced. Plastic waste will continue to exist in the environment even after many years. Plastic waste can pollute the environment, even if it is in the soil. Even plastic waste can be found in the stomachs of fish, causing the animal to die. This underlies the importance of plastic waste management. The need for a plastic waste management strategy that can be applied in Bogor City.

2 Material and methods

The research was conducted in Bogor City. The research location was at the reuse, reduce, and recycle (TPS 3R) landfills in Bogor City. The 3R TPS are TPS 3R Asri Bubulak, TPS 3R Kencana, TPS 3R Cibadak, TPS 3R Cipaku, TPS 3R Mutiara Bogor Raya, and TPS 3R Kertamaya. Primary data was obtained from in-depth interviews with TPS 3R administrators and measurements of the weight and volume of waste entering the TPS. Measurements were carried out for 8 days using SNI 19-3964-1994 on methods of taking and measuring samples of urban waste generation and composition. The research was conducted from September to November 2022. The research stages start from the problem until the plastic waste management strategy is obtained (Fig. 1).

![Fig. 1. Research stage in this study](image)

Sampling data from the measurement results were analysed using Equation (1) to calculate the percentage of plastic waste.

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\text{plastic waste percentage} = \frac{\text{plastic waste weight}}{\text{total waste generation}} \times 100\%
\] (1)
3 Results and Discussion

3.1. Plastic waste generation

The waste generated consists of organic waste in the form of food waste in the form of vegetable and fruit scraps, plastic, paper, cloth, and metal. From the measurement results, it was found that the plastic waste generation in the reuse, reduce, and recycle waste management sites (TPS 3 R) was between 2 and 29% (Fig. 2). This shows that plastic waste is among the most found in TPS 3R. Plastic waste can pollute the environment, especially soil and water. Plastic waste that is often found in TPS 3 R is plastic packaging waste and plastic bottles from bottled water.

![Percentage of Plastic generation from TPS](image)

Fig. 2. Percentage of Plastic generation from TPS

3.2. Plastic waste management

Waste management consists of containerization, transport, processing, and landfilling. Waste originating from the source is transported to the TPS. The waste is transported to the municipal waste management center for landfilling. In addition to being transported to the TPS, some people burn plastic waste openly. The burning pollutes the environment, including water, air, and soil. The burning can also produce emissions. Plastic waste needs to be processed so that it does not pollute the environment (Fig. 3).
3.3. **Management strategy**

The plastic waste management strategy that can be applied in Bogor City is to sort plastic waste. Plastic waste is sorted to be used as crafts or transported to plastic processing to be used as raw material for plastic material producers. The plastic is later crushed to form plastic seeds. Waste reduction is not only done downstream but also upstream. Reduction of plastic waste from the source with regulations governing the prohibition of providing plastic bags by shops or supermarkets (Fig. 4), which can reduce the use of people who use plastic bags. Plastic waste reduction can reduce 5–20% of the waste generated in Bogor City.
Conclusion

Plastic waste, with an amount of 3-29% produced by the City of Bogor, is in the form of plastic packaging waste and plastic bottles. Plastic packaging waste is processed into examples of bag and tablecloth crafts. Waste reduction is also supported by the government by implementing regulations, namely a ban on the use of plastic packaging in large shops or supermarkets. This regulation reduces plastic waste produced in Bogor City.

References