Plastic Waste Management in Jakarta, Indonesia: Evaluation of Material Flow and Recycling Scheme

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1. RESEARCH BACKGROUND

Indonesia manages plastic waste mostly through recycling market that involves informal sectors. In Jakarta city, formal recycling effort is conducted mainly through a community-based waste management called a waste bank, while the collection service by the municipality goes directly to the landfill. The recovery of plastic waste, both by informal sectors and waste bank, is hardly ever evaluated as it is considered difficult to obtain the data. Therefore, despite the recovery efforts that have been conducted, the amount of plastic recycled and residue in Jakarta is unidentified.

This research aims to evaluate the amount of plastic recovered at source, to identify the amount of plastic waste recycled and plastic waste residue through a material flow, and to propose alternative solutions to current plastic waste management in Jakarta with reference from the good practice of Japan.

2. METHODOLOGY

The study started with a comparative study of plastic waste management practice in Japan and Indonesia. The data for this study is collected through literature review, site visits, and interview to relevant stakeholders. Then the study became more specific, as it took Jakarta as a case study. Semi-structured interviews were conducted to 48 waste banks, 42 scavengers, and 4 representatives of recycling actors from Association of Indonesian Plastic Recyclers (APDUPI). The result then analyzed using descriptive statistic analysis and Material Flow Analysis (MFA). Finally, evaluation of Jakarta system and lesson learned from Japan is mentioned and suggestion for future plastic waste management in Jakarta is drawn.

3. RESULTS AND DISCUSSION

Jakarta recovers 34-43% of plastic waste at source through scavengers and waste bank. Based on the descriptive statistic analysis conducted to the result of semi-structured interviews, the amount of plastic waste recovered by scavengers is 239 kg/scavenger/month and by waste bank is 260 kg/waste bank/month. At a glance this does not look like having significant difference. However, plastic waste at waste bank recovered collectively by 10-800 clients, while plastic waste at scavengers recovered by one person. This shows that the amount of plastic waste recovered per person per month achieved much higher by scavengers compared to waste bank.

The amount of plastic recovered by scavengers and waste bank then analyzed through MFA. It is predicted that around 80-100% of plastic waste enters the waste management system. Considering this, two material flows were made to estimate the range of plastic recycling rate of in Jakarta. The result shows that plastic waste recycled in Jakarta is 24-29% of total plastic waste generated, and plastic waste residue that goes to landfill or managed by informal sectors is 71-76% of total plastic waste generated.

Learning from Japanese practice, there are three aspects that Jakarta may improve to recover more plastic waste and apply a better plastic waste management: 1) integrate waste bank practice and scavengers sorting activity in a sorted curbside collection, 2) use a sorting facility with a mix of manual and automated sorting in final disposal, and 3) apply chemical recycling for plastic waste residue from mechanical recycling. Application of this suggestion to the current state of Jakarta with 42% source separation level of plastic waste is predicted to reduce up to 44% of plastic waste goes to landfill.