The Identification of City Solid Waste Management Based on the Active Participation of Families and Trash Pickers

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ABSTRACT

Waste and its management had become an increasingly urgent problem in cities in Indonesia because if it was not well handled, it would result in adverse or unexpected environmental changes that could pollute the environment, either on land, water, or air. This study was a descriptive qualitative study on the waste management in the city of Boyolali, both by the government and the habit of the residents that was based on the observation, in-depth interview, and documentation. The sampling technique used was purposive sampling and maximum variation. In this study, the informants were those who knew and directly involved in the research object and the data were analyzed using interactive process. It was known that the mechanism of solid waste management in Boyolali was good enough but it was too depended on the 3P process, which consists of collecting, transporting, and disposing, as well as the process of piling, composing, and landfilling. The main target locations of the 3P mechanism conducted by the janitors were the city center and economic center in Boyolali city.

Keywords: Management, solid waste, direct observation

INTRODUCTION

Problems regarding to waste seemed like a simple problem which could be easily handled. However, in fact, waste problem was a problem that needed special attention. It was because waste was related to all humans, animals, plants, and nature activities. As the time went, the number of waste was increasing. The compositions were also becoming more various. If it was not appropriately handled, the waste would not only be useless piles but also cause acute health problems for the people around it. It would be worse when it contained toxic substance.

It was what happened in the Boyolali Regency that was in a danger of solid waste overloaded. It was due to the volume of waste produced that could not be covered by the space of garbage dumps provided. Tempat Pembuangan Akhir (TPA) Winong, a garbage dump in the sub district of Boyolali city, was predicted to be fully loaded in two years by 60 tons of residential solid waste per day. In 2009, the percentage of solid waste composition in Boyolali Regency was as follows: 0.50% pepper, 4% wood, 0.50% fabric, 0.50% rubber/ leather, 13.50% plastic, 0.50% metal, 1% glass, 75.50% organic, and 4% others (Boyolali Dalam Angka, 2009). Everyday less than 60-63 m3 of solid waste was loaded to the garbage dump. However, only 1-3 m3 of it that could be processed into organic fertilizer.

The problem was getting worse with an inadequate number of solid waste collection facilities. Recently, Boyolali Regency had 4 units of garbage trucks, 3 units of container

trucks, 29 units of container, 41 units garbage cart, 66 units garbage disposer, 2 units depot transfer, and 1 garbage dump (Boyolali Dalam Angka, 2009).

The wide of TPA Winong today was up to four hectares. It was not an adequate condition for solid waste processing so that TPA space widening was needed to increase the capacity of solid waste accumulation in Boyolali. Solid waste management in the future would be more complex due to the success in technology engineering of solid waste management. In 2010, DPU ESDM had provided 60 units of garbage carts for society. Solid waste management in Boyolali Regency nowadays still utilized traditional technology (Tutut Indrawati, 2011).

Until recently, the government still used end of pipe solution approach for conducting solid waste management. This approach emphasized on solid waste management after the solid waste was produced, that included the activities of collecting, transferring, and removing the solid waste to the garbage dumps. There were several main problems faced in conducting solid waste management in several cities. They were problems regarding to high operational costs and appropriate space for development which was getting rare every day. As the effect of the high operational costs, most cities in Indonesia were only able to collect and remove ±60% of the total solid waste produced. From the 60%, most of it were processed and removed in an insanitary, wasteful, and polluting way (Daniel et al, 1985).

The solid waste management system used nowadays was that the Hygiene Department containing the solid waste from TPS (temporary garbage dumps) to TPA (final garbage dumps). The society had to pay some amount of money to the janitor or the one who carried the garbage cart to collect the solid waste from several houses to the TPS or depot. This system was considered as not optimal since the limited carrying capacity of the Hygiene Department. Besides, the society or the community's participation was required in managing the solid waste in the city.

The participatory method that was very popular in Indonesia nowadays was Participatory Rural Appraisal (PRA) method. Participatory Rural Appraisal (PRA) was proved to be very effective in engaging the society in all stages of the program; which were from identifying the problems to planning, from organizing and conducting to monitoring and evaluating. Other than ideological reason that was the compatibility with musyawarah untuk mufakat (deliberation for consensus), gotong royong (collaboration), and society empowerment, the disappointment towards the top-down approach widely used in many ways also rose the popularity of PRA (Moeliono, 1997). The participation in decision making through open forum that enabled the society to actively and directly participate in making decision about the development programs in local region.

Based on the explanation above, the researcher felt obligated to search a design of the model of a society-based solid waste processing management. The purposes of the identification of society-based solid waste management in Boyolali Regency were: (1) reviewing the operating system of solid waste management in Boyolali Regency, (2) reviewing the active participation of the residents in the solid waste management based on the solid waste management policy currently implemented, (3) reviewing the typology and the role of trash pickers for solid waste management attempt in the city, and (4) reviewing the strengths and the weaknesses of the system based on the current solid waste management policy. While the further purpose of this research was to find a model of the Design of Solid Waste Processing

Management Model of the City Based on the Active Participation of the Society in the Residents and the Optimization of the Role of Trash pickers in Boyolali Regency.

LITERATURE REVIEW

The society awareness of hygiene and solid waste management in every village and region was not the same. For example the awareness to sort the solid wastes into organic and inorganic before removing it to the TPS. The level of society awareness in solid waste management in residence area was different from the one in village area. In residence area, residential solid waste produced was sorted then collected to the TPS. While in village area, the solid waste produced was all burned.

The community of *trash pickers* was a community whose economical life was very depended on solid waste produced by the society. There were two types of *trash pickers* in TPA Winong found by the researcher. They were:

a.   The type of *trash pickers* who stayed in the location of TPA Winong and built a tenement in the TPA area. This type of *trash pickers* was from outside Boyolali Regency so that it was easier for him to stay temporarily in the TPA and periodically went back to the place he originally lived in.

b.   The type of *trash pickers* who did not stay in TPA Winong and went back every day to his house which was not far from the location of TPA Winong.

The strategy of the old management system which depended on the system of transferring, removing, and processing the solid waste into piles needed to be changed because it was not economical (cost center). The most suitable approach in the future in managing solid waste would be through integral solid waste management system which could change the paradigm of cost center into profit center by maximizing the participation of the society and utilizing the solid waste into more valuable things. It required the society engagement in managing the solid waste in the city. It started from the process of removing, sorting, utilizing, processing, to funding. Society participation was expected to increase the economic value for the ones utilizing it. It could also increase the level of hygiene and convenience of the city.

Overall it could be concluded that the act of solid waste management in Boyolali Regency had not engaged the society as the main actor in the management process although DPU ESDM and BLH had tried to engage the society in the management of solid waste in Boyolali Regency.

METHOD

The research was conducted by using descriptive qualitative approach. Descriptive research aimed to give a description on social phenomenon researched to get the information about the problems that might emerge from the techniques of managing solid waste using the current system; and also presented the model of solid waste processing management based on the participation of women in the society and optimization of the role of *trash pickers* around the TPS that could be imitated by the society in general.

After collecting the empirical data on the problems on the solid waste management and also the description about *trash pickers* around Boyolali Regency, the researcher could use them

as the basis for constructing the model of society-based solid waste management in Boyolali Regency.

The technique of sampling used was purposive sampling technique. In this study, the researcher chose the informants from all the people and *trash pickers* around the sub district of Boyolali and TPA Winong, and those who were considered to know in-depth information and problems were trusted to be the data sources so that the informants selection could be developed based on the need and the stability of the data of the researcher.

The technique of analyzing data used in this research was interactive model of data analyzing technique, which consisted of three analysis components, such as data reduction, data presentation, and conclusion drawing.

RESULT AND DISCUSSION

The unit of the hygiene and solid waste management of Boyolali Regency was Hygiene Section of Bidang Cipta Karya Dinas Pekerjaan Umum dan Energi Sumber Daya Mineral (DPU ESDM). Solid waste management in Boyolali Regency recently used the 3P method, that included the activity of collecting, tranferring, and removing; and also 3R, that included the activities of reducing, reusing, and recycling. With the increase in residents' activities and also the number of residents, the number of solid waste also increased. The last point of 3P and 3R patterns was TPA. The following was the condition happening in current days that showed that the solid waste production in Boyolali Regency increases every year, as seen in the table below:

Table 1. Waste Production in Boyolali Regency

Year	Volume (m^3/ day)
2002	56
2003	57
2004	60
2005	62
2006	65
2007	64,1
2008	63,8
2009	65,2
2010	66,97
2011	70,39

The management of solid waste that was not transferred to the TPA was as follows:

a.   Sorting and collecting

The activities of sorting and collecting the inorganic solid waste that could be sell (plastic, glass, bottle, paper, etc.) in Boyolali Regency had been done for a long time by *trash pickers* operating in many TPS. However, the activities of sorting and collecting in household level were introduced by Pemkab Boyolali for the last several years in some household communities, such as:

1)   Bhayangkara Residence,

2)   Bumi Singkil Permai I Residence,

3)   Bumi Singkil Permai II Residence, and

4)   Madu Mulyo Residence.

b.   **Composing**

The rise of awareness of several residence communities to do composing program, such as:

1)   Bhayangkara Residence,

2)   Bumi Singkil Permai I Residence,

3)   Bumi Singkil Permai II Residence, and

4)   Madu Mulyo Residence.

While the composing processes conducted by Pemkab Boyolali were in the following locations:

1)   Winong Solid Waste Management Location,

2)   UPTD Usaha Pertamanan,

3)   Bumi Singkil Permai II Residence, and

4)   Madu Mulyo Residence.

c.   **Piling**

For the people in the society who had wide yard, the solid waste management was handled by themselves traditionally that was conducted by making a hole in their house yard, then the solid waste had been sorted from inorganic solid waste was loaded into it. After the hole was fully loaded, it would be covered with soil, while solid waste removal would be done in another hole in another place that had been prepared before. It was done continuously so that the land from the old solid waste piles would be fertile because of the result of the decomposition of organic solid waste.

The stages of solid waste management in Boyolali Regency started from solid waste collection at household level, then it was carried to temporary garbage dumps (TPS), so that, in the end it, would be carried to the final garbage dumps (TPA) which eventually it would be sorted, composed, and dumped. The implementation of this mechanism of course required transportation facilities maintenance and the need for garbage removal increased over years but the allocation would be getting limited.

The weaknesses of this solid waste management mechanism conducted by Boyolali Regency were:

a.   The city solid waste management still depended on DKP as the single fighter.

b.   The low level of society service, either from the width of service area and the number of solid waste that was handled.

c.   The coordination and cooperation mechanism between local governments in managing solid waste was not yet optimal.

d. The limited facility and infrastructure of solid waste management and the low level of maintenance of that facility and infrastructure.

e. The low level of society engagement in solid waste management, either in the form of contract or cooperation, funding support, technical and management, as well as other form of cooperation.

f. The low level of support towards the attempt of people in the society who had succeed in managing solid waste, either in the form of award, funding support, technical and management, and other form of support.

g. The lack of technical rules in local solid waste management area as well as the low level of law enforcement for the lawbreakers.

h. Solid waste was seen as the government responsibility, while the society's responsibility was to pay the solid waste wasted.

i. The increase of the number of solid waste was in line with the increase of the number of the residents.

Therefore, there were some strategies for the solid waste management in Boyolali Regency in the future, such as:

a. Minimalize the number of solid waste right from the source;

b. Sort, recycle, and compose were conducted near the solid waste source location;

c. Improve solid waste containing service, which could be conducted by providing solid waste container that had been sorted; and green solid waste management was conducted by piling or burning the solid waste that was not recycled or not utilized anymore.

CONCLUSION

It was a need to have action plan which consisted of (1) introducing solid waste characteristics and the removal method; (2) planning and implementing integral solid waste management (collecting, transferring, and dumping); (3) parting the regulation and monitoring functions of the existing institutions from service provider operator function, so that they would be firmer in implementing reward and punishment in giving service; (4) emphasizing reduce, reuse, and recycle (3R) program so that zero waste program would be achieved in the future, (5) creating reformation in tariff structure by implementing full cost recovery principal which was different for every different type of customer, and (6) developing solid waste management technology which was more healthy for the environment and gave greater economic value for waste.

The main problem of implementing this model was in how to change the paradigm from removing the solid waste to utilizing it. The role of RT/ RW functionaries was really great in helping create the implementation of the program and create communication between the local government and the society.

ACKNOWLEDGEMENTS

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