

Implementation of School Community-Based Waste Management Policy in Makassar City Elementary School

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Abstract— One of the causes of environmental degradation in urban areas is the waste problem. Waste problem arises because of improper human behavior in managing waste. The trigger of this behavior is the lack of awareness in waste management. Waste management education should be given at an early age in school. One of the policies concerning waste management that has been implemented in schools in Makassar City is Local Government Regulation Number 4 of 2011 about Waste Management through 3R (Reuse, Reduce, and Recycle) Principles. This study, used descriptive qualitative approach, aimed to find out the process of implementing this policy in Elementary Schools. The informants were taken from the school community, Environmental Office and Education and Culture Office. Data were collected through interviews, observations and documentation technique and analyzed using qualitative descriptive. The study showed that the implementation of waste management policy in this school was conducted and organized systematically through School Waste Bank Program. The existence of this program has an important role in raising awareness of the school community, especially that of students, and motivating them to implement 3R in solid waste management.

Keywords— *implementation, policy, management, waste, school*

I. INTRODUCTION

The quality of the environment has experienced severe degradation and one of the causes is waste problem. Waste has already become one of the crucial environmental problems faced by almost all cities in the world [1,2]. This condition also occurs in Indonesia where waste has become a national problem, especially in urban areas. In 2016, the amount of waste generation in Indonesia, with a population of 261,115,456 people, had reached 65.2 million tons per year. Solid waste production per day was particularly high in Java, where Surabaya produced 9,896.78 m³ of waste per day and Jakarta produced 7,164.53 m³. Outside of Java, city such as Makassar produced 6,485.65 m³ waste per day, followed sequentially by Denpasar, Manado and Medan each of which produced 3,657.20; 2,064.00; and 1,892.00 m³ of waste per day [3]. The same data also explained that of the total waste produced nationally, only 60% were managed to be collected, while the rest was wasted polluting the environment.

Population growth and level of economic progress in a city directly affect the increase in the amount of waste generation. If the waste is not handled properly, it will affect the level of cleanliness and pollute the city environment, which in turn will reduce the level of public health. Waste

accumulation is a problem that can lead to other problems if not addressed [4]. Waste or solid waste is one of the most dangerous pollutants. If not accommodated, it will potentially become the main cause of flooding, global warming, and water, soil and air pollution [5]. The problem will even become more crucial if it is related to the location of waste management infrastructure and facilities [6], especially concerning the final storage site due to the increasing scarcity of land in urban areas [7].

The volume of solid waste in Makassar City reaches around 700 tons per day. However, the increasing volume of solid waste every year in Makassar City is not accompanied by good waste management. The waste management system in Makassar City still follows a conventional paradigm which includes collection, transportation and ending at the Tamangapa Landfill. The volume of waste in Makassar in 2019 is 1,130,617.51 m³. This volume has reached the threshold of the landfill capacity which is 1,144,800 m³ [8]. The waste management in Makassar still refers to the final approach paradigm (collection and transportation) without experiencing a handling process at the source through the 3R pattern, namely reduce, reuse, recycle. As a result, the burden of the landfill becomes heavy and the landfill lifespan is getting shorter.

The declining quality of the environment, the occurrence of water, soil and air pollution, and the destruction of ecosystems in rivers are examples of environmental problems caused by improper handling of waste. The problems caused by waste arise due to undisciplined human behavior in managing waste. Disposing trash inappropriately are practiced by almost all age groups, both children and adults. This is due to the lack of mindset and awareness in waste management. Environmental awareness needs to be started early and conducted in a community scale. School is one of the communities where young people spend most of their time. Therefore, the school is the right target to build awareness for the environment [9]. School-based waste management is necessary to foster student awareness of the environment [10]. Education in waste management is an important tool to solve environmental pollution problems caused by waste [11,12]. In addition, fostering correct behavior to children in schools often has a positive impact on the attitudes of families and their communities towards waste disposal [13].

Various attempts have been made by Indonesian government to overcome waste problem. For example, the government has issued Law No. 18 of 2008 concerning Waste

Management, which becomes the umbrella of waste management in all regions in Indonesia. Since waste management policy is an autonomy of regional authority, Makassar City Government issued Regional Regulation No. 4 of 2011 concerning Waste Management. This policy stipulates that waste management should be handled through 3R-based-principles and community-based approach and waste management started from the source. 3R is an effort which includes activities to reduce, reuse and recycle solid waste.

As an effort to formally develop environmental awareness character, starting from basic education to secondary education, Regional Regulation Policy number 4 of 2011 regarding waste management, mentioned previously, is introduced into the waste management activities in schools. This policy supports the joint policy between the State Minister of the Environment and the Minister of National Education No.03/MenLH /02/2010, No.01 / II / K B / 2010 dated February 1, 2010 regarding Environmental Education at the level of primary and secondary education through the *Adiwiyata* program. The objective of the *Adiwiyata* Program is to make school communities responsible for protecting and managing the environment through good school governance to support sustainable development [14].

The objectives of this study are: (1) to find out the process of implementing waste management policies in elementary schools; and (2) to find out the factors that support and hinder the implementation of waste management policies at the elementary school level.

II. MATERIALS AND METHODS

This research was conducted at *BTN PEMDA* Elementary School, Makassar City. This school was chosen as a research location because it was selected as the *Adiwiyata* School at the national level in 2018 and has implemented an organized 3R-based-waste management policy through Waste Bank Program. Data were obtained through observation, interviews, focused group discussions and documentation analysis. Informants, selected using purposive sampling, were the Makassar City Environment Office, Makassar City Education and Culture Office, Principal of *BTN PEMDA* Elementary School, Director of *Acil* Waste Bank, Head of School Committee and five head students from each level except grade 1 and Chairperson of *SINDIR* Non-Government Organization (NGO) who is concerned with environmental activities and provides assistance in waste bank management at *BTN PEMDA* Elementary School. The data were analyzed using descriptive qualitative which employed interactive models from Miles and Huberman, namely data reduction, data display and conclusion drawing/verification. Data were validated using source and time triangulation techniques.

III. RESULT AND DISCUSSION

A. *The Process of Implementing Waste Management Policy at Makassar City BTN PEMDA Elementary School*

The process of implementing waste management policies in *BTN PEMDA* Elementary School, Makassar City, is through Waste Bank Program, which involves the following stages:

1. Socialization activities; It was carried out to explain to the school community about the importance of preserving the environment by managing waste. Beside that, in these activities, it was also explained the types of waste that still has economic value (worth selling) and the types of waste

that has to be disposed because they can no longer be recycled. The socialization activities were conducted by *SINDIR* NGO as a partner that assist the school in managing the school's waste bank.

2. Establishing a school waste bank, called *ACIL* Waste Bank. *ACIL* is abbreviation for "aku cinta lingkungan" (I love environment). *ACIL* was formed based on School Principal Decree Number 021/SKKS/SD-BTN PEMDA/IX/2016, with a structure of organization consist of director of the Waste Bank, secretary, treasurer and four sections, namely the collection/sorting, weighing/packing, sales and recycling section. These are the team that manage the school waste bank.
3. Waste Bank Management Training; at this stage, training is given to the managers of the waste bank. Explanations are given about the structure of waste bank organization, the functions and responsibilities of each of management team, types of solid waste that are accepted, and the administration and bookkeeping management of the waste bank.
4. Organic and inorganic waste management training; This waste management training are given based on the type of solid waste. Organic waste are processed into compost fertilizer which will be used as fertilizer and planting media while inorganic waste management is conducted by making various accessories and other handicrafts made from inorganic waste such as shopping bags from instant coffee wrappers and place mats from plastic cups of mineral water. This training involve the management team of waste bank and students.
5. Operational stage of School Waste Bank using 3R concept (reduce, reuse and recycle). The operational stage include the following process:
 - a. Waste collection; Waste collection is done by the customers. The customers of the school waste bank in *BTN PEMDA* Elementary School are school communities consisting of teachers, students and administrative staff. Costumers are formed in groups which are based on their respective classes. This means that the customer is not individual but on behalf of every class which is coordinated by each class teacher. The waste collected is still limited to the rubbish produced in the school environment although sometimes there are also students who bring it from their houses.
 - b. Waste sorting based on the type of the waste; The waste collected by the customer is grouped based on its type and then put in a different sack of sorting, for example a specific sorting paper sack for paper waste and a specific sack for plastic glass waste. However, in this sorting process there are still customers who have not sorted out the waste based on its type. The reason is they find it too much of a hassle. In this case, waste bank staff will then sort out this unsorted waste before selling it to collectors/vendors.
 - c. Depositing waste to the waste bank officer; garbage that have been collected and sorted based on its type is brought and given to the waste bank officer. Depositing waste is only done once a week, which is every Friday. Waste that has been sorted according to its type is valued more highly by the waste bank staff

compared to the unsorted one. For example, the value of plastic bottles waste which have been sorted out is 3000 rupiahs per kilogram while the unsorted one will be 1500 rupiahs per kilogram.

- d. Weighing and recording the value of waste in the customer's saving book; the waste brought to the waste bank staff was weighed and recorded in the customer's book by the waste bank staff; The money generated from this selling will usually be taken out by the customers every three months of each school semester before the final examination of each semester. This money is used by the class teacher as a customer coordinator to buy souvenirs or gifts for students as an appreciation for having participating in waste management activities in schools.
- e. Selling waste to garbage vendors or entrepreneurs by waste bank staff; When a large amount of waste has been collected in the waste bank collection room, the waste bank staff will contact a waste recycle vendor or businessman by phone to come to collect the waste. Selling waste to vendors are usually done once a month depending on the capacity of the waste bank storage.
- f. Profit-sharing between customers/savers and waste bank management periodically; Money generated from the sale of waste to the vendors or business people are recorded and deposited by the waste bank staff. Periodically, usually every three months of each school semester, the money will be divided to customers using this term: 75% to the waste bank customers and 25% to the waste bank management.
- g. Making handicrafts from recycled waste and used them as learning media; Organic waste is processed into compost fertilizer which will be used as fertilizer and planting media and inorganic waste is used to make various accessories and other handicrafts such as shopping bags from instant coffee wrappers and place mats from plastic cups of mineral water. The recycling activities are expected to enhance the creative and entrepreneurial spirit of students.

B. Factors that Encourage and Hinder the Implementation of Waste Management Policies in Primary Schools

Factors that serve as benchmarks for the implementation of waste management in Makassar elementary school were examined using the theory of policy implementation from Winter [15], who argued that there were three factors that could measure the success of a policy implementation, namely inter-organizational relationship behavior, behaviour of lower-level staff and behaviour of target group, as explained below:

1. Inter-organizational relationship behavior (organizational and inter-organizational behavior)

The dimension of inter-organizational relations behavior is the existence of commitment and coordination among the organizations. The implementation of waste management policies at Makassar City elementary schools will be achieved if there is an involvement of other organizations that support each other. The success of the waste bank program in schools must involve several related agencies, such as the Makassar City Environment Agency as the leading sector of the implementation of the Waste Management Policy in Makassar City, the Education and Culture office as the leading sector in

the implementation of the Education curriculum from elementary to high school level, Waste Management Unit of Makassar City as a vendor that buys waste production from school waste banks and several non-government organizations that care for the environmental and provide assistance in managing School Waste Bank.

Based on the data obtained from interviews and documentation studies, it can be concluded that the implementation of waste management policies in Makassar City BTN PEMDA Elementary School is good viewed from inter-organizational relationship behavior and has developed well along with the involvement of this school in Adiwiyata school competitions. The Adiwiyata Program is a joint commitment between the Ministry of Environment and the Ministry of Education and Culture stated in the Decree Letter Number 03/MenLH/02/2010 and Number 01/II/KB /2010 concerning the Promotion and Development of Environmental Education through the Adiwiyata Program. The purpose of the Adiwiyata Program is to create good conditions for schools to become a place for school community involving educators, education personnel, students and the community around the school to learn and to raise awareness as an effort to encourage environmental protection and sustainable development that can ultimately materialize schools that care about the environment [16]. One of the assessment indicators of the Adiwiyata school is the existence of school solid waste management that is organized and conducted systematically and participatively involving all school members. School community acts as waste collectors and sorters by applying the 3R principles, Makassar City Waste Management Unit acts as a production buyer of waste from the school waste bank, NGOs who cares for the environment provides assistance in the managing the waste bank by conducting socialization activities on the implementation of 3Rs and giving training on waste recycling. This indicator is found in BTN PEMDA Elementary School.

2. Behavior of Lower Level Staff (street level bureaucratic behavior)

The dimension of lower level staff behavior is the existence of organizational control over activities carried out by staff, both outside and inside the work environment so that staff can carry out their duties properly in accordance with their main duties and functions. In this case, organizational control is performed by the Adiwiyata Assessment Team at both provincial and city level. Adiwiyata assessment team are from the Environment office and Education and Culture office. Aspects assessed are the achievement of standards determined by the central government, namely; schools have environmentally- sound-policies; schools implement environmental-based curriculum; schools have participatory environment-based activities; and schools have environmentally friendly supporting facilities. Based on observation and interview results, it can be concluded that the implementation of waste management policies in BTN PEMDA Elementary School of Makassar city from behavior of lower level staff is good with the appointment of this school to be Adiwiyata School at the National Level in 2018. The school programs of BTN PEMDA Elementary School that received highest score were organic waste activities which process waste to become compost, inorganic waste processing through Waste Bank Program that involves all school community and the existence of life pharmacy.

3. Applicable target group (target group behavior)

Public support or target group not only affects policy, but also affects the performance of the lower level bureaucracy or lower level staff. The dimension of the behavior of the target group is the existence of positive or negative responses from the community in supporting the policy. Without the support of the target group, policy will not be implemented maximally. Based on observational and interview data, it can be concluded that the community in this case the school community as the target group provides positive support for waste management policies in BTN PEMDA Elementary School. The form of support shown by the school community is by managing the waste bank in an organized way as a place to implement the 3R principles in managing waste in accordance with Regional Regulation Number 4 of 2011.

However, apart from receiving positive responses from school community, the implementation of this policy also received a number of negative responses from people outside the school, namely the group of students' parents. Some students' parents think that waste management activities involving students is not natural because students' task at school is merely to study, not to collect and sort waste. The task of collecting waste should be the task of the local government. The existence of such opinions from students' parents causes the school to restrict their waste collection activities where waste collection is limited within the school environment only. If this activity gets full support from the parents, the solid waste management can potentially include waste from students' households.

Despite this negative response, the implementation of waste management policy at BTN PEMDA Elementary School of Makassar City has had a very good impact, both on the school environment and the deepening of environmental awareness character education for students. The school environment looks clean and beautiful, students dump rubbish in rubbish bins and they deposit waste in the waste bank.

IV. CONCLUSIONS

The implementation of waste management policy at *BTN PEMDA* Elementary School of Makassar City is performed through Waste Bank Program and implementation of 3R principle. The factors that support the policy implementation are high commitment from all implementer involved while the factors that hinder the implementation of waste management policies in the school are students' parents and the community around the school have not fully supported the involvement of students in waste management because they consider that waste management activities in schools are only extracurricular activities, not part of the learning curriculum.

Parents involvement in implementing waste management policy is necessary and needs to be encouraged so that the policy implementation as a medium to foster environmental awareness characters for students can continue in the students' family environment.

The local government, in this case Makassar City Government, needs to formulate a policy framework that integrates waste management content into the learning curriculum, not as extra-curricular activities only.

ACKNOWLEDGMENT

The research of implementation waste management in primary school was founded by Ministry of Research and Technology and Higher Education, Republic of Indonesia.

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