Waste Management Based on 3R (Reduce, Reuse, and Recycle) on the Scale of Household and Communal in the District of Meuraxa Banda Aceh City

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ABSTRACT-- *The Reduce, Reuse, and Recycle (3R) Program is a waste management program which starts from upstream to downstream through reduction, reusing, and recycle. To conduct the program in the scale of the area in the Subdistrict of Meuraxa, the Ministry of Public Works and Housing through labor-intensive cash has built the facilities for 3R waste processing in the Village of Lambung and Surien. This program focuses on the involvement of the society and the local government to gain the success of its management. Is is necessary to do the evaluation in order to find out the level of success of the aplication of this program. This research aims to identify the level of community participation in household waste management based on 3R in sub-District Meuraxa and to evaluate the level of success of 3R waste management in the Village of Lambung and Surien. This research uses quantitative method through questionnaires and a qualitative method through observation and interviews. The identification of the level of community participation in household waste management based on 3R is conducted through distributing questionnaires to the residents of the District of Meuraxa. The evaluation of 3R waste management is conducted through observation and interview with the Chairman of the Group of non-Governmental organizations in the Village of Lambung and Surien. Data analysis using descriptive analysis Method through the software Statistical Product and Service Solution (SPSS) 22 and scoring analysis through Technical Guidance of the Directorate General of Cipta Karya (2017). The results showed that the people of the District of Meuraxa rarely participate in the management of household waste based on 3R with a mean of 2.954. The Efforts to reduce and reuse community only occasionally participated with a mean of 3.260 and 2.835, while efforts to recycle society rarely participate with the mean of 2.416. The management of waste 3R in the Village of Lambung has a good success rate with the relative value of 20.95, whereas the management of waste 3R in the Village of Surien has a success rate which the relative value of 18.45.*

Keywords— management based, reduce, reuse, recycle, household, communal,district meuraxa

I.   INTRODUCTION

Garbage is waste material from an activity that has been used by human and no longer desired after the end of the process. The Household is the biggest producer of waste to the date. More than 60% of the trash which is sent to the place of the final processing place is generated by households waste (Basriyanta, 2007). The waste will have an impact for human health, the environment, and social economy. Basically, almost everyone is already aware of the impact that is caused by the waste when it is not managed correctly. But in fact, there are still

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households that ignore it and throw away trash carelessly. The midden in an urban area will be increased in line with the economic level, lifestyle, and population growth rate.

One of the efforts that society can do, to reduce the amount of household waste which is likely to increase is by managing whit the Reduce, Reuse, and Recycle (3R) Method. Reduce is an effort to reduce the amount of waste from source, reuse is an effort to utilize more of the garbage, and recycle is an effort to recycle waste. The 3R is a program of waste management which starts from upstream to downstream through reduction, reusing, and recycle. For the passage of the 3R program, the partisipation of the local society is highly needed because the society is one of the biggest garbage producer and the waste management can be conducted through the core of the problem.

The District of Meuraxa already have 2 3R waste management facilities which is located in the Village of Lambung and Surien. 3R waste proceing facilities was built by the Ministry of Public works and Housing programs through labor-intensive cash. The 3R of Lambung Village was built in the year of 2015 which has been running for $\pm$ 4 years, while the Surien's was built in the year 2017 which has been running for $\pm$ 2 years. 3R waste is built to reduce the quantity or improve the characteristics of the waste, which will be further processed in the final place. The activities of 3R waste focusses on community involvement and local government to gain success in its management. Is is necessary to do the evaluation in order to find out the level of success of the aplication of this program. The results of the evaluation of 3R waste management can be the basis of continuous improvement, so that the objective of the program is reached.

II.   RESEARCH METHODS

This study uses quantitative and qualitative methods. The quantitative method used for examining a sample, through the data collection instruments of questionnaire, then analyze the data statistically. Qualitative Method used for examining the condition of the object naturally through observation and interview. The research methodology includes a technique of determining the population and sample, data collection techniques, and data analysis techniques.

2.1 The technique of Determining the Population and Sample

The population is intended to the residents of the District of Meuraxa in terms of the household. Based on the data of Central Bureau of Statistics Banda Aceh City 2018, the number of population District Of Meuraxa is as much as 5,653 households. Furthermore, the research sample can be determined by using the Slovin formula, which is as follows:

$$\text{n} \; = \; \frac{N}{1 + (N \; x \; e^2)} \; = \; \frac{5,653}{1 + (5,653 \; x \; 0,1^2)} \; = \; 98 \text{ soul/household}$$

The sampling technique used was simple random sampling. This technique is random sampling without notice the population level. In another sense, it does not notice the background of Meuraxa society while spreaded the questionnaire

2.2 Data Collection Techniques

Data collection techniques in this research are as follows:

1. Questionnaire

The questionnaire aims to determine the level of community participation in household waste management based on 3R in the District of Meuraxa. Measurement of the answers using the Likert scale. The first step of data collection is by preparing 98 copies of questionnaire. Then finding information about the right time to distribute the questionnaires to the respondents. The respondent is the head of the family, of can be represented by the wife if unable to, or one of the family members who are willing and able to answer the questions of the questionnaire. The questionnaire that has been filled by the respondents subsequently collected back.

2. Observation

Observation aims to determine the conditions of 3R waste management in the Village of Lambung and Surien. The 3R waste management which are observed include aspects of the product settings support, technical, technology, institutional management, financial, and aspects of participation. Each of these aspects has several indicators that performed the assessment with signed by the symbol (√) on the column parameter. The tools used in the observation is the Global Positioning System, digital camera, meter rolls, and a ballpoint pen.

3. Interview

The interview aims to determine the assessment indicators on every aspect of 3R waste management which cannot be observed visually, but require additional information from the speaker. The interviewees in this study is the Chairman of the Group of non-Governmental organizations as the manager of 3R waste management in the Village of Lambung and Surien.

2.3 Data Analysis Techniques

Data analysis is the process of simplification of the data into a form that is easy to read, to understood and to be interpreted. Data analysis is using the descriptive analysis and scoring analysis. The Descriptive Analysis aims to describe the characteristics of respondents and the perception of the respondents regarding the level of community participation in household waste management based on 3R in the Village of Lambung and Surien. Scoring analysis is used to evaluate the level of success of the 3R waste management in the Village of Lambung and Surien.

III.   RESULTS AND DISCUSSION

3.1 The Level of Community Participation

Community participation in sub-District Meuraxa have been identified with the descriptive statistics, the obtained output of the mean value. The mean value ranges from 1 to 5 which is a representation of the Likert scale on the questionnaire. Mean value of 1 indicates never, mean 2 shows rarely, mean 3 shows sometimes, the mean of 4 indicates often, and the mean 5 indicates always. The perception of the respondents on the level of community participation in waste management based on 3R can be seen in Table 1.

Table 1: The perception of the respondents on the level of community participation

No.	Statement	Mean	The Interpretation Of The Mean
1	Reduce		
a	Avoid the use and purchase of products that producing waste in large quantities	2.531	Rarely
b	Using products which can be replenished	3.255	Sometimes
c	Reduce the use of disposable	2.806	Sometimes
d	Sell the garbage that has been disaggregated to the parties that require	2.316	Rarely
e	Give waste that has been disaggregated to the parties that require	2.776	Sometimes
f	Determine priority before buying the goods	4.112	Often
g	Buy durable products	3.980	Often
h	Use the product for as long as possible, not fashion addict	3.796	Often
i	Repair the goods before throw it away without consideration	3.765	Often
	Mean reduce	3.260	Sometimes
2	Reuse		
a	Re-using the container/ packaging for the same function or other functions	3.082	Sometimes
b	Use a container/bag that can be used repeatedly	3.286	Sometimes
c	Use a battery or other items that can be recharged	3.122	Sometimes
d	Utilize organic waste such as leftover vegetables and leftovers of food for livestock	2.582	Sometimes
e	Using the stem of the plant into charcoal briquettes as fuel for cooking	2.102	Rarely
	Mean reuse	2.835	Sometimes
3	Recycle		
a	Choose products and packaging that can be recycled easily	2.214	Rarely
b	decompose	2.429	Rarely
c	Handling for organic waste into compost with a variety of ways that have been there	2.398	Rarely
d	Do the handling of organic waste (wet waste) into useful goods	2.622	Sometimes
	Mean recycle	2.416	Rarely
	Mean Community Participation	2.954	Sometimes

Reduce is an effort that can be done by society to reduce the amount of the household waste starting from the source. The results of the identification of the mean value of the variable reduce show that of the 9 indicators that were reviewed, there are 2 indicators rarely, 3 indicators sometimes, and 4 indicators often applied in the management of household waste. The rarely indicator which is applied by the community is to sell the garbage that has been disaggregated to the parties that need with a mean 2.320, and avoid the use and purchase of products that generate waste in large quantities with a mean of 2.530. Indicators that are sometimes applied by the community is to give waste that has been disaggregated to the parties that need with a mean of 2.780, reduce the use of disposable with a mean of 2.810, and use products that can be recharged with a mean of 3.260. Indicators which is frequently applied by the society are making efforts to repair the damaged goods before dispose them without the consideration with a mean of 3.770, use the product for as long as possible, not fashion addict with a mean of 3.800, buy a durable product with a mean of 3.980, and determine priorities before buying the goods with a mean of 4.110. The Variable reduce obtained the mean value of 3.260. This means that the people of the District of Meuraxa only occasionally participate in efforts to reduce waste from the source.

Reuse is an effort that can be done by the community to make use of household waste into something that has economic value. The results of the identification of the mean value on the variable reuse shows that out of 5 indicators that were reviewed, there was 1 indicator shows rarely, and 4 indicators are sometimes applied in the management of household waste. The indicators that are rarely applied by the public is using the stem of the plant as a charcoal briquettes as a fuel to cook with a mean of 2.100. Indicators that are sometimes applied by the community was to utilize organic waste such as leftover vegetables and leftovers of food for livestock with a mean of 2.580, re-using the container/packaging for the same function or other functions with mean 3.080, using batteries or other items that can be recharged with a mean 3.120, and use the container/bag that can be used repeatedly with mean 3.290. Variable reuce this obtained mean value of 2.835. This means that the people of the District of Meuraxa only occasionally participate in efforts to utilize household waste into something that has economic value.

Recycle is an effort that can be done by the community to recycle garbage into something useful. The results of the identification of the mean value on the variable recycle shows that out of the 4 indicators that were reviewed, there are 3 indicators is rarely, and 1 the indicator is sometimes applied in the management of household waste. Indicators are rarely applied by society is to choose products and packaging that can be recycled and easy to decompose with a mean of 2.210, handling organic waste (wet waste) into a useful item with a mean of 2.400, and handling for organic waste into compost with a variety of ways that have been there with a mean 2.430. Indicators that are sometimes applied by the community is handling inorganic waste (dry waste) into a useful item with a mean 2.620. Variable recycle this obtained mean value amounted to 2.416. This means that the people of the District of Meuraxa rarely participate in efforts to recycle garbage into something useful.

Variable participation of the community obtained mean value amounted to 2.954. This means that the people of the District of Meuraxa only sometimes participate in the management of household waste based on 3R. The existence of 3R waste proceing facilities in the Village of Lambung and Surien, should be able to raise participation of the people of the District of Meuraxa in waste management based on 3R in the household scale. The socialization of the 3R concept perceived importance given to a resident of the Subdistrict of Meuraxa, so that household garbage can be properly managed. Household waste management based on 3R when applied properly

by the community, then it can reduce the volume of waste that is subsequently brought to the processing place trash 3R. The Volume of household waste excessive waste 3R, of course, also can pose new problems. The problem that arises is the spread of the smell of household waste from the 3R proceing place to residents environment because the 3R proceing waste facility are close to them.

3.2 The level of Success of the Management of Waste 3R

Waste management is an activity to handle the waste from the arising to final disposal. To manage the garbage then it takes the facility of garbage proceing. The management of 3R waste is a program of waste management on the scale of the communal or district by involving the role activity of the government and the community. The purpose of the 3R waste management is to reduce the quantity of waste communal scale that will be processed further at the place of final processing. In line with these objectives, the Ministry of Public works and Housing programs through labor-intensive cash has built 2 3R waste facilities in the Village of Lambung and Surien, District of Meuraxa Banda Aceh City, Aceh Province.

The 3R waste proceing site in Lambung Village was built in 2015 and has been operating for about 4 years, while the one in Surien was built in 2017 and has been operating for about 2 years. For the program sustainability the management of waste 3R in the Subdistrict of Meuraxa, then waste 3R in the Village of Lambung and Surien should have a good success rate. The level of success of the management of waste the 3R, can be known through evaluation with the use of Technical guidance, Directorate General of Cipta Karya (2017). The results of the evaluation show that the management of waste 3R in the Lambung Village has a good success rate, while the Surien's has a success rate of average. In this case the relative value of the management of waste 3R in the Village of Lambung by 20.95 and Village of Surien by 18.45.

A good success rate in the management of waste 3R in the Village of Lambung caused by some aspects which has a high rating on the indicator. Aspects of the product settings that support caused by the presence of local regulations governing waste management and loading settings the implementation of 3R in detail as well as the absence of a program of construction 3R waste in the spatial plan and the revised city sanitation strategy. The technical aspects of the technology caused by the amount of waste that is managed > 80% of the capacity as planned, as well as the type of management done with the sorting process, the processing of organic waste, and inorganic. Institutional aspects of the management caused by the presence of a non-Governmental Group, the absence of a comprehensive organizational structure and management function is active, the manager is competent, operator and labor enough, there is a notary deed, decree of erection signed by the Head of the Village, and is known to Work Unit related Areas, as well as the articles of association and bylaws, the recording of operational waste 3R is done well, and the presence of the facilitation of the institutional routine of the Local Government (at least 1 time/month). The financial aspect caused by the presence of the cash book and funds Self-help Community Groups stored in the bank. Aspects of participation caused by the addition of economic value at the community level (beneficiaries) and the addition of customers ≥ 100%.

The average success rates of 3R waste management in the Village of Surien caused by several aspects with low ratings on the indicator. Aspects of the product settings that support caused by the absence of local regulations governing the implementation of 3R in detail and the absence of the program the construction of a waste processing

3R in the spatial plan. The technical aspects of the technology caused by the amount of waste that is managed only 60%-80% of the capacity of the planned service, compost production < 70% organic waste, and the volume of the residue is transported to the final processing area < 40% of the total waste managed. Institutional aspects of the management caused by the recording of operational waste 3R less good and institutional facilitation by the Local Government only 1 time in 3-6 months. The financial aspect caused by the financial condition of the monthly level is enough and funds Self-help Community Groups held by the treasurer. The aspect of participation is caused by only some people sorting trash, people only 60%-90% pay dues on time, and the addition of customers only 50-99%.

The management of waste 3R in the Village of Surien needs a recommendation on several aspects in order to gain better succes rate. Recommendations on the aspects of the product settings that support is necessary to the existence of local regulations governing the implementation of 3R in detail and need to program the construction of a waste processing 3R in the spatial plan with the revised city sanitation strategy. Recommendations on the technical aspects of the technology is the amount of waste that is managed need to be > 80% of the capacity of the planned service, all organic waste need to be processed into compost, and the volume of residue transported to the place of final processing need to be < 30% of total waste managed. Recommendations on the institutional aspects of the management is the recording of operational waste 3R should be done in a good and institutional facilitation by Local Government need to be done regularly at least 1 time/month. Recommendations on the financial aspects is seeking the financial condition of the monthly in the level of surplus and fund Group non-Governmental organizations need to be stored in the bank. Recommendations on the aspect of participation is the whole community need to sort the trash, people 100% need to pay the dues on time, and need the addition of 100% customer.

IV.   CONCLUSIONS

Based on the results of community participation in household waste management based on 3R (Reduce, Reuse, and Recycle) in the district of Meuraxa Banda Aceh City, the following conlcussions can be drawn:

1.   People of the District of Meuraxa participate rarely in the management of household waste based on 3R with a mean of 2.954. The efforts of society to reduce and reuse only occasionally participated with a mean of 3.260 and 2.835, while efforts to recycle rarely participate with the mean of 2.416.

2.   The 3R waste management in the Village of Lambung has a good success rate with the relative value of 20.95, whereas in the Village of Surien has an average success rate with the relative value of 18.45.

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