

Management Strategies of Household Solid Waste in Sintang District of West Kalimantan

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Abstract

The practice of throwing household solid waste anywhere was currently becoming a community habit which caused several environmental-based diseases. For that matter, it needs a study of the household solid waste management based on the aspect of operational technique, institutional, financing, law/regulations, and community participation. This research aimed to (1) Explain the activity of household solid waste management in Sintang Sub-district. (2) Explain community participation to manage household solid waste, and (3) Arrange a strategy of environmental-based household solid waste management which could be conducted in Sintang Sub-district. This was a descriptive research with a qualitative approach. The research result showed that : (1) The practice of household solid waste management in Sintang District was paying cleanliness retribution but it had no influence on the scattered solid waste management. (2) There was no community participation except to pay cleanliness retribution. (3) The strategy of community-based household solid waste management was conducted by increasing community awareness to pay cleanliness retribution. Community-based integrated solid waste management through sorting organic and inorganic waste starts from the household as the source of waste. Sintang Local Government was suggested to perform community-based integrated solid waste management through a sorting of organic and inorganic waste from the household.

Keywords: Community participation, household solid waste, management, strategy

INTRODUCTION

Soild waste is something that is always produced in a daily activity and cannot be avoided because of dirty and grunge [1]. The rate of solid waste production is not in line with population and the increase of Sintang's community activity that is currently bringing a problem for the environment. Solid waste generation in Sintang District reaches up to 360 m³/day and always increase all the time. The rubbish comprises 56% of organic solid waste and 44% of inorganic solid waste. On the other hand, solid waste management from the government, Service Office of Environtment and the society itself is not optimum. Solid waste generation not managed well will become a media for bacteria, parasite, and pathogens to grow as well as cockroaches, rats, and mosquitoes which can cause health issue [2].

Most of Sintang District area is passed by Kapuas River; almost all of people commonly throw rubbish anyway into the river or the surrounding area. Trash is a consequence of all human activities. If there is no community capacity in waste management, waste can cause environmental

problems. Sintang Local government in an operational technique way through the Service Office of Environment of Cleanliness Department only manages market solid waste in Tanjung Puri and Kanan Hulu village of Sintang District even tough not optimum yet, while the management of household solid waste is not conducted specifically. Soild waste management is a control process to the heap of solid waste, trash can, collecting process, transportation process, transportation facility, and end-processing of the solid waste related to the putting forward healthy, economic, technical, conservation, environment and community habit [3]. In the area of that market has been provided 1 unit of contemporary waste management facility for each market with an opened condition. Market solid waste transportation process from temporary shelter to the landfill facility is conducted every day under the 2 retention of transportation. With the number of current retention, a heap of solid waste is frequently beyond the capacity of temporary shelter. Institutional provided authority and responsibility to manage and handle solid waste is only Service Office of Environment of Cleanliness Department, but until today there is not yet an NGO that care for the environment, there is no one interested to handle solid waste. Solid waste management financing provided by Local Government through the Local Budget. Community financing refers to the regulation of Sintang Public Service Works Number 4 Year 2012 regarding Levy

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of General but its implementation is not optimum yet.

Generally, there are 5 important aspects of solid waste management, i.e. technology, institution, law/regulations, financing and community participation [4]. According to the field observation, those 5 aspects are not community-based yet. Current solid waste management is only conducted by Service Office of Environment of Cleanliness Department. Community-based solid waste management is important to do to handle household solid waste. Community-based management lied on active community participation. Community participation can determine the success of community-based solid waste management [5]. The success of household solid waste management truly depends on the supporting factors, such as the role of the local government in determining key policy in the solid waste management, community participation, and community involvement, as well as initiative and cooperation with private sector [6].

The major problem is household solid waste management is not community-based yet. In order to solve the existing problem, the researchers conducted a study of the strategy of household solid waste management in Sintang District. The objectives of this research are: (1) Explaining household solid waste management activity in Sintang Sub-district. (2) Explaining community involvement in the management of household in Sintang District. (3) Arranging a strategy of environmental-based household solid waste management that can be used in Sintang Sub-district.

METHODOLOGY

This research used descriptive analysis with a qualitative approach. Qualitative descriptive was chosen to describe the activity of solid waste management and community participation in the management of household solid waste in Sintang district. In addition is arranging a strategy of community-based household solid waste management using SWOT analysis. Aspects studied in this research was operational technique, financing, institutional, regulations/law and community involvement. The number of informants in this study were 90 people using sample random sampling technique from the population without considering the strata of the population [7]. In qualitative research, the researcher examines the validity of the data by means of triangulation to obtain more accurate data. Triangulation includes: source triangulation, method triangulation, data triangulation [8].

Data Collection Method

Data collecting method was done through several ways, i.e. (1) Observation, this stage was conducted by the researchers to observe and examine the condition of the location which includes household rubbish management activity done by society. (2) Interview, this stage was performed to know the information relating to the community participation in managing household waste. (3) Document review, the material was collected from information in form of literature studies, reports, regulations, and other information derived from official sources such as Service Office of Environment of Cleanliness department, the internet and relevant previous studies. (4) Questionnaire, this stage was conducted to determine the value aspect strengths, weaknesses, opportunities, and threats in the SWOT analysis. SWOT analysis was used to develop the strategies of household solid waste management by grouping internal factors (IFAS) and external factors (EFAS).

The position of household solid waste management in SWOT diagram was determined by giving weight and rating on each factor. The ways to know the position of household solid waste management in the SWOT diagram was by determining X-axis value and Y-axis value. The X-axis can be known by $X = S - W$ (strengths subtracted from weaknesses) and Y-axis by $Y = O - T$ (opportunities subtracted from threats), that diagram result was subsequently used to develop a community-based household solid waste management strategy.

RESULTS AND DISCUSSION

According to the research results and the existing data that have been analyzed regarding the methods and the objectives of the study, the results are described below:

1. Household Solid Waste Management in Sintang Sub-district

According to Sintang Local Regulation Number. 4 year 2015 regarding household solid waste management and that similar one, it is a systematic, comprehensive and continuous activity which covers solid waste reduction and handling. Solid waste management is an activity undertaken by society in handling solid waste generated in daily activities. Solid waste management aspect includes operational technique, institutional, financing, regulations/law and public participation:

1.1 Operational Technique

The research results showed that the community in Sintang District has not conducted an optimum household rubbish management yet, i.e encapsulation, collection, transportation and end-processing.

Based on the results of interviews with informants, from 26 informants interviewed

there were 19 informants who already have containers of garbage at home. Solid waste encapsulation provided by citizens was bin bags, a sack, and waste container. Citizens also throw rubbish around the neighborhood by putting it in a particular place. This proves that people have not realized yet the bad impact of throwing solid waste anywhere.

Results of interview with informants at the study site, the majority of the informants stated that the residents of the community are still collecting the waste generated independently and the community was required to throw it to the garbage collection provided by Service Office of Environment. However, the community did not follow the rule of the time to throw the solid waste that was determined at 5 p.m - 6 a.m. This indicated that the society was not aware yet of the applicable regulations. That habit becomes an obstacle in the process of garbage collection by the Service Office of Environment. That bad habit should be changed for a better future.

Household solid waste transportation from source of waste to the temporary shelter is carried out by the community independently. However, not all society does that. Solid waste transportation from temporary shelter to landfill in Sintang District still becomes the responsibility of Service Office of Environment using 7 units of a dump truck with 3 times/day rotation, while arm-roll operates only 3 units with rotation 4 times/day. The limitation of the means of transportation has a negative impact on the garbage service. It is known from the total waste in Sintang Sub-district which reaches 179 m³/day, but only 120 m³/day or approximately 65% of waste service already implemented. The solid waste is transported to the temporary shelter.

The end-processing of household solid waste produced by the community in Sintang District is managed by the final approach of collecting, transporting and disposing. People still throw garbage anywhere and the end-processing of the garbage carried out by society is being burnt. In terms of overcoming the bad culture and behavior of the society in managing the waste, an intensive and special approach is needed by socializing waste management, embracing community leaders, cutting generations and taking firm action. It is recommended that the regional leaders in Sintang District also play a role in changing the culture and bad behavior of the community in managing household solid waste.

1.2. Institutional

Institutional forms are based on the city category [9]. Based on that opinion, Sintang District is categorized medium cities where the population is between 100.00-250.000 inhabitants. Based on the results of interviews with the control section and waste management of the environmental department of the Sintang district. The institution authorized and fully responsible for handling and performing solid waste management is Service Office of Environment or Cleanliness Department. The establishment of that institution is according to the Regent's Decree as stipulated in the Sintang Regent Regulation Number 47 of 2008 regarding organizational structure and working procedures of Service Office of Environment.

Sintang District still has not tried yet to organize civil society to form a non-governmental organization (NGO) that has the authority and responsibility in managing household solid waste generated in daily activities. Therefore, in the effort to handle the problem of household solid waste, organizing is necessary to establish a community institution in order to play a role in managing household solid waste generated by the community.

1.3. Financing

Waste management fees are calculated on the basis of operational and maintenance costs as well as replacement of equipment. Comparison of management cost and total cost of waste management is: (1) collection fee of 20% -40%, (2) Transportation costs by 40% - 60%, and (3) final disposal costs of 10% - 30%. The cost of waste management is obtained from the community (80%) and the Local Government (20%) [10]. A municipal waste management fee is required 10% from APBD. Resource that affect the effectiveness of the implementation of an activity, in addition to human resource is an adequate budget in an effort to buy the necessary equipment and finance all operational activities [11]. Financing source of household solid waste management in Sintang District is divided into 2 (two), they are:

1) Costs allocated by the Government

Source of costs of waste management is from the government from the regional income and expenditure budgets. Costs incurred by Sintang district government to manage waste in 2016 with a value of Rp 467,000,000 and always increase every year. However, the budget issued by the Local Government from regional income and expenditure budgets is still lacking in the waste management operations.

2) The Cost from Sintang's society

Source of costs collected from the community is the cost of cleanliness retribution. The withdrawal of cleanliness retribution refers to Sintang Public Works Regulation Number 4 of 2012 concerning a Levy of General with the total cost of Rp 5,000 (\$0.36) per month for each household. Costs obtained from the community through the withdrawal of cleanliness levy with a value of Rp 286,000,000 the amount of withdrawal fees increased every year but retribution revenue is still small. It needs proper budgeting from the authorities in making policies in order to maximize solid waste management in Sintang District.

1.4. Regulations/Law

The principal aspect of waste management regulation in form of local regulations being the legal basis of waste management is: (a) local regulations associated with the general provisions of cleanliness management; (b) local regulations on the formal institution of cleanliness management; (c) local regulations that specify the fare structure and basic rate of the cleaners [12]. The existing garbage management in Sintang District refers to Sintang Regional Regulation Number. 4 year 2015 on the Management of household waste and that similar to the household solid waste one. Under that regulation, waste management has a legal certainty, clarity in the responsibility and authority of the government as well as the entire community participation.

The regulation of Sintang Public Works Number. 4 year 2012 on a levy of general explains by involving the entire community participation in the management of household waste generated in daily activities. The current regulations have not yet been applied to strict legal sanctions for communities that violate these laws.

2. Community Participation In Solid Waste Household Management

The role is a set of norms that serve to organize a person in a certain position or social function and they have a duty to be able to behave certainly [13]. Community participation is important because firstly, community participation is a tool to obtain information about the condition, needs and attitudes of the local community; secondly, society trusts project or development if they feel involved in the preparation and planning process and

thirdly, assumption is a democratic right when society is involved in the development of their own environment [14]. One way that is needed in reducing waste is by citizen participation in its management. Waste management because if not managed properly can cause problems which are more complex such as environmental pollution and health problems [Mega Novita]. According to that opinion, there is no public role in Sintang District except the following ones:

2.1 The Role Cleanliness Retribution Field

Solid waste management produced by households cannot run well without community participation and the small amount of cost in waste management. Therefore, to maximize the management of household rubbish in Sintang district, community members are required to participate through cleanliness retribution which refers to the Regulation of Public Works Service of Sintang Number. 4 of 2012 on a levy of general. The regulation states that every household will be charged a retribution fee of Rp 5,000 (\$0.36) per month for each household. However, not all communities are currently involved in paying retribution. Retribution equality is important for citizens to have the same responsibility.

2.2 Household Solid Waste Separation Efforts

Sorting means an attempt to separate the same kind of waste according to the type or group to reduce the adverse impacts of waste for health and the environment and in facilitating waste management operations. Communities in Sintang District attempt to separate household solid waste that they produce as what community in Menyabung and Kapuas Kanan Hulu village does. However, waste sorting efforts have not been carried out by all households in Sintang sub-district and the solid waste sorting is carried out only at the time of socialization by Service Office of Environment of Cleanliness Department. This is caused by the lack of existing facilities and infrastructure, public awareness, as well as their knowledge about the sorting, is still lacking. It is necessary to increase community participation through the level education, technology development and waste management model is an alternative effort to maintain a healthy environment and can provide other benefits. The existence of cleanliness action, existence regulation on waste and law enforcement [15]

2.3 Environmental Cleanliness Activities

The effort of the Service Office of Environment of Cleanliness Department to spur the

community participation is by holding environmental cleanliness contest at neighborhood and community units (RT/RW) level. The winner of the contest will get prizes in the form of coaching money and charter. That competition is expected able to encourage society to play a role in household waste management. The community is also involved with environmental cleanup activities led by RT/RW directly. However, environmental cleaning activities have not been maximally implemented by the people. In addition to hygiene activities undertaken by the community in the home environment, the existence of scavengers who move and scavenge garbage provides enormous benefits of reduction the impact of pollution and economically beneficial [16].

3. Community-Based Household Solid Waste Management Strategy

Strategy is a unity of comprehensive and integrated corporate plan that is used to achieve company goals [13]. Based on that opinion, a strategy is a way that is planned, implemented and evaluated in achieving the goal. In order to determine the strategy of household solid waste management, it must know the position of household solid waste management in the SWOT diagram by analyzing the internal factors and external factors that give positive and negative influence. Internal factor comprises strengths and opportunities while external factor consists of weaknesses and threats.

Table 3.1 indicates that those becoming the main force in solid waste management are the presence of institution that handles waste and the existence of support from the local government. In addition, the strengths of household solid waste management are the presence of cleanliness retribution, the existence of solid waste regulation, having the spirit to maintain Adipura. The strengths had must be maximized to overcome the problems in solid waste management.

Table 3.1 IFAS Analysis of Strengths / S Factors

No.	Strength/S	B	R	T
1.	The presence of agencies that handle waste	22	4	88
2.	The existence of a cleanliness retribution	20	4	80
3.	The Existence of Local Government Support	20	3	60
4.	The existence of solid waste regulations	20	3	60
5.	Having the spirit to maintain Adipura (clean-and-green-city environment award)	18	3	54
Total		100		342

Desc: B (weight), R (rating), T (total)

Table 3.2. IFAS Analysis of Weaknesses (W) Factor

No.	Weaknesses/W	B	R	T
1.	There is not yet adequate facilities and infrastructure	18	4	72
2.	Lack of operational costs	18	3	54
3.	Rubbish management by applying <i>open dumping</i>	17	3	51
4.	Law enforcement is still low	16	3	48
5.	The quality of human resources in managing solid waste is still low	15	3	45
6.	There is no solid waste utilization alternative yet	16	2	32
Total		100		302

Desc: B (weight), R (rating), T (total)

Based on Table 3.2 above, the one being the weaknesses in household solid waste management is the lack of adequate facilities and infrastructure and the minimum operational costs. In order to overcome those problems, it requires appropriate budgeting and increases garbage facilities and infrastructure.

Table 3.3 EFAS Analysis of Opportunities (Opportunities/O) Factor

No.	Opportunities/O	B	R	T
1.	Organic waste can be processed into compost	20	4	80
2.	Sophisticated waste management technology	21	3	63
3.	Opportunities for the creative one to use of waste or sell directly	20	3	60
4.	Trash has economic value	20	3	60
5.	The increase of public education	19	2	38
Total		100		301

Desc: B (weight), R (rating), T (total)

Table 3.3 above indicates that the main opportunities in household solid waste management are organic waste which can be processed into compost and the potential retribution garbage. The existing opportunities should be utilized in managing household solid waste to overcome environmental problems caused by household solid waste,

Table 3.4 EFAS Analysis of Threats Factor (Threats/T)

No.	Threats/T	B	R	T
1.	The Increase of population	20	4	80
2.	Community's awareness and concern about the environment is still low	19	3	57
3.	Waste not managed well will cause a negative impact on health and the environment.	17	3	51
4.	The development of the city	16	3	48
5.	The increase in consumption patterns or society's lifestyles.	15	3	45
6.	Bad behavior in throwing waste	13	3	39
Total		100		320

Desc: B (weight), R (rating), T (total)

Table 3.4 above indicates that the main threats in household solid waste management are the increase in population and society's awareness and concern about the environment is still low. The threats should be minimized to avoid negative impact.

The position of solid waste household management on the SWOT diagram can be determined after the X and Y-axes are obtained. The x-axis is derived from the subtraction of the total strengths factor (S) from weaknesses (W). X-axis value = S - W. Whereas Y axis results from the total subtraction of the value of opportunity factor (O) with threats factor (T). Y-axis value = O-T. From the calculation of IFAS analysis can be known S value = 342 and W value= 302 then the value of the X-axis value = 342 - 302 = 40. Meanwhile, the calculation of EFAS analysis shows the value of O = 301 and value T = 320, then the value of Y-axis = 301 - 320 = - 19. According to the IFA analysis calculation and EFAS analysis, it can be seen that X-axis value is positive and Y axis value is negative. Having known the value of X axis and Y axis then the position of household solid waste management is in quadrant II on SWOT analysis. To be more clear about the position of household waste management in Sintang Districts in the SWOT diagram can be seen in the following Figure 3.1.

Figure 3.1 Illustrates that household solid waste management in Sintang District is in quadrant II with a coordinate point at S-T (40, -19). Quadrant II (diversification) shows that waste management has good organizational strengths. However, that position also has threats from the external organization.

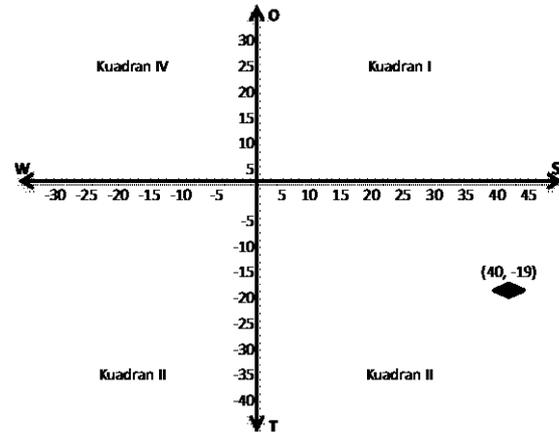


Figure 3.1 Waste Management Position

After knowing the position of household waste management in Sintang Sub-district, the next step was arranging strategy alternatives based on SWOT matrix analysis. In the strategy arrangement of SWOT matrix, it can be found strategy alternative of household solid waste management which become the priority to be used in household waste management. Recommended strategy alternative is expected able to solve the problems in the solid waste household management in Sintang District. For more clear information related to the arrangement of strategy alternative based on SWOT matrix can be seen in Table 3.5.

According to the result, SWOT matrix analysis in table 3.5 and the position of household solid waste management in the SWOT diagram has a great strength but also great threat as well; the position of the organization in the SWOT analysis diagram is in quadrant II (diversification). Therefore, the strategy that can be recommended in the management of household solid waste is the strategy of ST (*Strength-Threats*), that is using the power to deal with existing threats, under the following strategy:

1. The increase of community participation to manage household solid waste in order to realize clean and healthy environment.
2. Community-based waste management using 3R concepts (*reduce, reuse and recycle*).
3. Giving strict sanction to the people who throw rubbish anywhere.

Planning strategies are recommended to change waste management activities to be better. A strategic alternative being recommendation priority in planning is household waste management with 3R concepts (*reduce, reuse, recycle*).

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