



SITUATION ANALYSIS OF THE SIMPLE RECYCLE FACILITY ROLE IN SOLID WASTE MANAGEMENT

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ABSTRACT

The simple recycle facility named TPST 3R Dadaprejo Mandiri was established at March 2016, located at the Dadaprejo Village, Batu Municipality, Indonesia. The facility was conducting the collecting the waste from the villager as the member of the waste management system and separate the waste to the valuable material and the residual of waste that transported to the landfill site. This facility was reduced around 60% of the waste that produced from the society. This facility was operated by the non-government, non-profit and self-financial organization that the committee member was came from the village society as the social activity. There were several constrain that faced when operating this facility. Constrains were came from the management of the facility; financial aspect; the society's social and culture; and the municipality agency coordination. As the self-financial organization, this facility committee needs the supporting from the entire member of the society and the municipality government to continuing the waste management system of this village. The SWOT analysis was conducted to analyze the possibility to increase the performance of this facility operation to maintain the waste management system. This analysis was shown the role of the society member, facility committee board, and the agency of municipality government. The synergy of these parties to collaborate can increase the performance of the facility and to minimize the waste production that will collect to the landfill site.

Keywords: Recycle Facility, Batu Municipality, Non-government organization.

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1. INTRODUCTION

In case of the solid waste management, the high population growth rate and increase of economic activities in the urban areas of developing countries combined with the lack of training in modern solid waste management practices complicate the efforts to improve the solid waste management services. (Ahsan, 2014) [3]. The wastes generated by human settlements and the associated problems are similar in the developing nations with variances between regions and locations based on geographic, sociocultural, industrial, infrastructural, legal, and environmental factors (Tchobanoglous, 2002) [16].

The integrated management and safe disposal system to handle MSW, continuous and effective support from city authority, city dwellers, and the concerned stakeholders should be extended and support by the community that involved in this sector. Community-based organizations should be given support to organize co-operatives and micro enterprises to effectively handle small scale waste recycling, and provides an opportunity for the community to participate in the wider solid-waste management process. (Ahsan, 2012; Mongkolnchaiarunya, 2005; Zahur, 2007) [2, 11, 17].

The one difficulty to including the community in the waste management was to change the culture of managing their waste such as the properly waste segregation. In some community the willingness to segregate was very low and it was compound the burden of the solid waste management in their community. (Banga, 2011; Malika, 2015; Mukama, 2016; Nabegu, 2014) [4, 10, 12, 13].

One of the activities to minimize the waste that dumped to the landfill site was decrease the amount of waste that transported to the landfill site. The composition of the waste that transported was mix between the organic and an-organic material. The minimizing the waste activities were conducted with shorting the waste before it transported to the landfill. The purpose of the activity was not only minimizing the waste that transported to the landfill site, but also recycling the valuable material that containing in the waste. The activity to collecting and segregating the waste was conducted in the recycle facility plant before tthe was transported to the landfill site. The simple recycling facility was called as TPST (Tempat Pembuangan Sampah Sementara Terpadu = Integreted Temporary Landfill Site). This facility recently was one part of the solid waste management sysytem in several municipality in Indonesia. (Hardianto, 2016; Raharjo, 2017; Sudiby, 2017) [8, 14, 15]

2. MATERIAL AND METHOD

2.1. Exisiting Condition of Solid Waste Management

Batu Municipality was one of Municipality in East Java Indonesia. This municipality was laid geographically at 122°17' to 122°57' East Longitude and 7°44' to 8°26' South Latitude, with the width of area 19.909 hectares or 0,42% of East Java total width. The map location of the municipality was shown at Figure 1 below. This municipality was consisting of with 3 District (Batu, Bumiaji and Junrejo) and 23 Villages. The population of this municipality was 203.997 (BPS, 2018) [5].

The amount of waste generation from this municipality was around 620 m³ per days; with the service level of the waste management system was 60%. The lower service condition was because of the limitation of capacity of the Municipality Agencies that handled solid waste management, as well as the low of awareness of the habitant about the importance of properly disposing of garbage.

The process of the solid waste management in this municipality was following the old method. The municipality collecting the waste from the village, school, road, market and other area and transporting the waste to dumped in the landfill site. Some recycle activities was conducted, but in general, the all of the waste will be transported directly to the landfill site. According to the system and the coverage of service of solid waste management in Batu Municipality, this area needs some supporting activities to manage and minimize the waste that produced from the area and that transported to the landfill site.

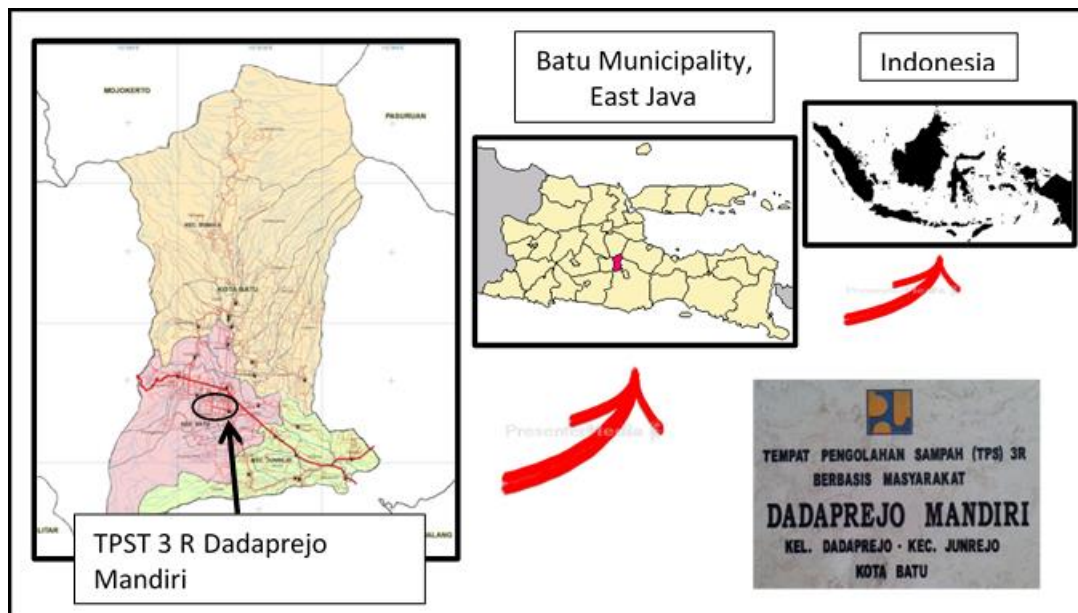


Figure 1 The Batu Municipality Map

2.2. Data Collecting and SWOT Analysis

The data was collect of the from TPST 3R Dadaprejo Mandiri recycling facility and Dadaprejo Village Office with interview activities. Interview was conduct with the leader of Dadaprejo Village Office and the committee board of TPST 3R Dadaprejo Mandiri recycling facility. The field survey was conduct to emphasize the real condition of the solid waste management system in this village and municipality.

In the case of TPST 3R Dadaprejo Mandiri recycling facility organization performance, SWOT analysis was developed to produce the strategic for increasing the performance of the organization. SWOT analysis is not a new idea in the business practice. This model originated from the Harvard Business School (Delahaye, 2000) [7], and has dominated strategic plans since the 1950s (Lerner, 1999) [9]. A SWOT analysis is one from many tools that can be used in an organization's strategic planning process for environmental scanning. SWOT stands for Strengths, Weaknesses, Opportunities, and Threats.

3. RESULT AND DISSCUSSION

3.1. Existing Condition of the TPST 3R Dadaprejo Mandiri Recycling facility

3.1.1. The Purpose of Organization

TPST 3R Dadaprejo Mandiri recycling facility was one organization that conducted the shorting activities for minimize the waste transported. This TPST was located at Dadaprejo Village, Junrejo District, Batu Municipality. This recycle facility was substitute the task of

municipality agencies to handle the solid waste management in this village as shown at Fig 2 below.

The Facility collecting the waste from the household and shorting the waste before transported to the landfill site. In the past system the waste was collected twice a week, but in this system the waste was collecting every day and transported to the facility and shorted before send to the landfill. The result of shorting was organic material for compost raw material, un-organic material that still have valuable component, kitchen waste for the livestock feed and residue that will transfer to the landfill.

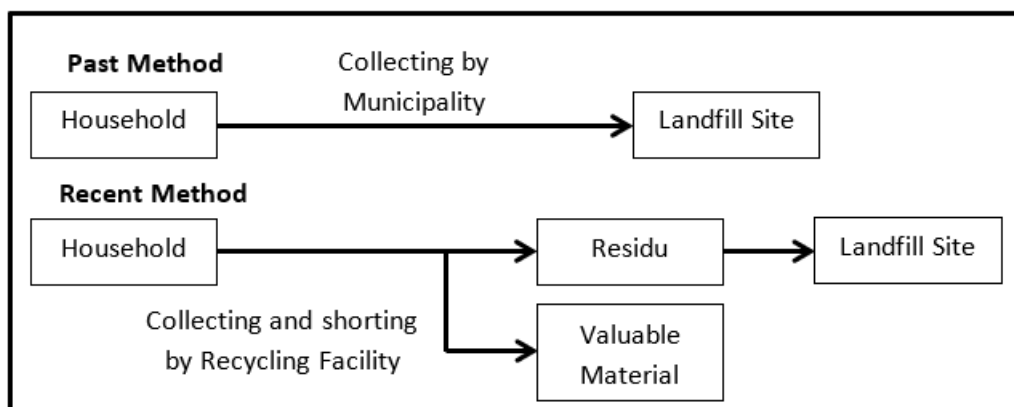


Figure 2 Method of Collecting the Waste

3.1.2. Performance of the Organization

TPST 3R Dadaprejo Mandiri recycling facility was serving the entire Dadaprejo Village. The Dadaprejo Village was consisting of with 4 sub-districts (Areng-areng, Karangmloko, Dadaptulis Dalam and Dadaptulis Utara). According to the Junrejo District in Figures 2018 the numbers of villagers were 6.542, around 1.243 household. (BPS, 2018) [6].

The facility supported by three small vehicle and one pick-up car. During the operation since this facility established, the amount of the waste that collected from the household was increasing. Recently the facility was collecting the waste from the household around 9 to 12 m³ per day depending on waste produce in the day. The amount that can be shorted from the waste was around 62% became valuable material, compost and livestock food. And the 37% of waste was transported to the landfill site (Dadaprejo Mandiri, 2018) [1].

The coverage of the service for waste management was not increased after the entire village covered. The level of service was not increased to the other village because the capacity of management and operation this facility was designed for area village. Further focus of this facility was increasing the capacity to minimize the waste that transported to the landfill site with increasing the management and capability of the workers to shorting the waste and producing the recycle and valuable material.

3.1.3. The Other Activities of Facility

Beside collecting and sorting the waste, this facility has the other activities that connected with the solid waste management. The activities were purpose to empowering and educate the villager to involve in the solid waste management.

The activity to empowering the villager was with encourages the villager, especially the housewife, to establish the group of waste bank. This group was consisting with 20 – 30 household to collect the valuable material from their own waste and the group sell this valuable

material to the recycle facility with the agreed price. The group of waste bank will have account from the facility to collect the money from the selling the valuable material. The raised money will be return to the group of waste bank once a year. With this activity the facility encourages the villagers to separate their waste from the source of the waste and the household have collecting some benefit from the waste.

The other purpose of this facility was to educate the villager about the importance to include in the solid waste management. This purpose was implemented with the activities such as invited the kindergarten and elementary school student regularly to visit the facility. With this activity the recycling facility introduce to the student about separating the waste activity. The purpose was to educate the young generation to care about the waste problem and willing to include in the solid waste management and its importance's.

3.2. THE FACILITY OPERATING CONSTRAINS

There were several constrain that faced when operating this facility. Constrains were came from the management of the facility; financial aspect; the society's social and culture; and the municipality agency coordination. As the self-financial organization, this facility committee needs the supporting from the entire member of the society and the municipality government to continuing the waste management system of this village.

3.2.1. Management of Facility

One of the difficulties to operate the facility was to manage the people that work in the facility. The workers were including the collecting waste workers, the waste sorting workers and the worker for administration affairs. The number of workers was 6 mans of collecting waste workers, 6 women of waste shorting workers and 1 woman for the administration affairs.

As the almost entirety workers were a lower educated worker, it was some difficulty to maintain the role and the rhythm of the facility works. Some difficulty of the carry out the work discipline and to increase their knowledge about the waste management and shorting the waste was faced in the managing of this facility.

The lower educated workers sometimes disregard with the regulation that applied in the facility. The regulation of time works, the route of waste collecting, the way to shorting the waste was some problem that dealing with the workers. And it was difficult to reach the target of work in facility because of the passiveness of the worker to the regulation.

Oppositely, it was very difficult to encourage the workers to work with the fix regulation that applied in the facility. One of the reasons was difficult to find the worker to work in the facility. As the assumption that works that dealing with the waste was the improper work for the society, there were only several persons that still want to work dealing with the waste. The society assumes that work with the waste was the health high risk and dirty work. Only few persons want to deal with this profession. And that few persons usually were the an-educated person.

In the side for shorting the waste, the difficulty was faced to increasing the knowledge the waste shorting workers to separate the waste properly. The workers sometimes still refuse the valuable material that containing in the residue of waste that will dumped to the landfill site. This reason will decrease the income that received from the valuable material that could short from the waste. The separating method was the other problem for the shorting the waste. The workers separating the waste method was inappropriate with the method that that introduced by the facility. The lag of knowledge that causing the ways and method for shorting the waste was little bit difficult to increase because of the low educated workers. That in the end will slow process in the facility and decreasing the income of the facility.

The other reason that person did not want to work as the facility workers was the salary problems. The salary that provide from the facility was very low for remunerate the workers. Comparing with the workers that working as the labor for construction works, the salary from the facility was lower. Because of that, it was very difficult to increase the performance of the workers. In the other hand, if the worker's salary will be increased, it will be disturbing the cash flow of the facility. If the salary was not increased, the process and performance in the facility will be low.

Actually, the facility was managed by the Recycle Facility Committee Board that consists with 5 members of the voluntaries from the villagers. Because of the committee members were the volunteers that have another job, not only managing the facility but also have official job, the time that provide to manage the facility was limited. The members can only attend the meeting at Saturday or in the holidays because of their activities outside the facility. The managing activity in the facility was only handled by the administrative worker that has low ability to handle the management in the facility. Sometimes conflict that occurred during the operation, was became prolonged, because the administrative workers could not make some decisions, waiting the decision from the committee members. This management difficulty made the operation of the facility performance became lower and lower.

3.2.2. Financial Aspect

The operation of the facility needs some support of financial. The recycle plant facility needs the workers to collect the waste from the household and to sorting the waste, to pick up the valuable material and trashing the residue of waste. The facility was preparing the salary monthly. As the men workers have different task with the women workers, the salary for both of men and women was different.

The other needing of financial support was the necessity to support the operation of the recycle facility. The operation financial support was covered the items such as the collecting vehicle fuel, maintenance of the vehicle, workers work equipment (glove, masker, safety equipment, etc.), material to supporting the operation (basket, plastic bag, shovel, etc.) and basic needs of the workers (some food and drinks).

Beside to support the worker's salary and the operation financial support, the facility has the other expenditure in every month. The expenditure was the debt from the village's financial institution to buy the vehicle by buying on credit. The facility has the other burden of financial with paying some obligation money to the municipality that collecting the residue of waste ant dumped to the landfill area.

The income of this facility was come from the household monthly contribution and the proceeds of the valuable material that collected from the waste. The household monthly contribution was vary regarding to the type of the household and the distance of the household from the facility. The contribution was varying from 6.000 to 12.500 Indonesian Rupiahs (from 0,45 to 0,85 US Dollars). As this facility was covering service around 1.400 households, the monthly household contribution was reaching the around 9 million Indonesia Rupiahs (around 620 US Dollars). While the proceeds of the valuable material were vary depending on the amount of the valuable material that collected in the facility and the variation of the valuable material price from the collector that buying that material.

As the variation of the expenditure and the income of this facility, the balance cash flow has negative trend every month, because the income that received was not sufficient to fulfill the requirement of the facility operation. The burden of the cash flow deficit was occurred when the variation of amount and the price the proceeded material was high. The deficit of the

cash flow was encumbering the facility operation because the deficit wills accumulate and getting bigger as time was going on.

3.2.3. *The Society's Social and Culture*

NIMBY culture and not shorted waste was the culture of society in this village. The habit to throw the garbage without properly separated and put the garbage at the collection place was the culture of the villagers. As the garbage truck from the municipality taken the garbage twice a week before the recycle facility establish, the garbage pile in the collection place that near with the residential neighborhood causing some problem such as bad odor and flies.

Since the recycle facility operated, the problem such as bad odor and flies was eliminated because the garbage was taken every day from household. But, the culture of un-separated garbage was still continuing in the society. The facility encourages the villagers to separate their waste minimally in the different plastic bag of organic and non-organic garbage when the household throw their garbage. It will be making easier to the collection the waste and separated in the recycle facility. The other reason was for the esthetic reason.

Basically, the facility encourages the villagers and household to separate the waste in the different plastic bag was the method of the facility to educate the villagers to include into the waste management system. Step by step the facility encourages the villagers have responsibility to their garbage that produced every day.

Some difficulties that faced were the financial ability of the villagers to support the monthly contribution for operating the facility. It was very difficult to increasing the contribution to support the facility, because in the last method for collecting the waste, the villagers only paying 3.000 to 5.000 rupiahs per household. Recently, the facility was increasing the contribution to 6.000 to 12.500 Indonesian Rupiahs according the type of the household and distance from the facility. The villagers were assuming that the increasing of the contribution was not necessary even though the facility increasing the service of the collecting the waste. The villager said that the solid waste management was the government responsibility, and they do not want to include into that system. The facility encourages the villager to have small responsibility to their waste with increasing he contribution as the small step of education in the solid waste management. Facilitating meeting and empowering activity was conducted by the facility committee board to encourage the villager supporting by the Dadaprejo Village Office.

3.2.4. *Municipality Agency Coordination*

Even though this recycles facility was the independent and self-financing organization and as the part of the Batu Municipality Solid Waste Management system, the support from the Municipality was necessary to implemented. The support such as coordination to organize the solid waste management system in the village level, coordination to transporting the residue to the landfill site, technical guidance for shorting the waste and operation, supporting for subsidy for eliminating the deficit of operational cost, and coordination between institution or agency in the municipality that connected with the solid waste management system, were the supporting activity that can conducted by the municipality to ensure the operation of facility running well.

The support from the agencies in the municipality was necessary because some assumption from the community that the solid waste management was the responsibility of the municipality government. That responsibility could not directly transfer to the community, in this case the organization that operated the recycling facility. The task of the municipality agencies was to

develop and empowered the community to establish the recycle facilities until it operated well and independent in the term of operation and financial.

As the facility establish, the role of the municipality agencies was not sufficient to support the facility become running well and independent in operation and financial. The lack of communication and coordination between agencies connecting with the solid waste management was some of difficulties to give the support for the facilities. Besides that, the bureaucracy for budgeting submission for financial subsidy for example, requires a long time and process. The technical guidance was not routinely implemented from the municipality agencies. This guidance should increase the performance of the facility in operation and human resources condition. The management of workers and operation should be guided by the municipality agencies before this facility can run independently. Coordination and communication between municipality agencies and the recycle facility operator should be increasing performance of the facility to become well operated and independent.

3.3. SWOT Analysis

In the case of TPST 3R Dadaprejo Mandiri recycling facility organization performance, SWOT analysis was developed to produce the strategic for increasing the performance of the organization. The description of SWOT analysis was describe below;

3.3.1. Strength

The Strength factor was the internal factor of the organization. The Strength of this organization was:

1. This village has voluntaries that willing to working with solid waste management by non-government organization.
2. The Dadaprejo Village Office supporting the TPST 3R Dadaprejo Mandiri recycling facility to manage the solid waste management in this village.
3. This facility can establish the collecting system for everyday collecting, better than collecting in past system that collect the waste twice a week.
4. This facility has ability to minimize more than 60% waste that produce from the household and
5. only not more than 40% become residue that transported to landfill site.
6. The organization was not only for manage the waste from the village but also used for the place for encourage the villager to willing include in the solid waste management system.

3.3.2. Weakness

1. This organization have deficit of cash flow in every month because the income from household contribution and selling the valuable material was not sufficient to fulfill the operation and maintenance cost.
2. Lack of communication and coordination between organization and Municipal Agencies to manage the solid waste management.
3. The sorting process was not optimal because the level of education the workers in this facility were low in average.
4. The household contribution every month was low, and there was some difficulty for increasing the contribution because of the villager perception that solid waste management was the municipality responsibility.

3.3.3. Opportunities

1. This facility can be increasing their capacity to minimize the waste that sending to the landfill site more than recently performance of 30%.
2. The facility can collaborate with the group of villagers to enhance the sorting the waste from the source of waste and encourage the villager to include in the solid waste management system.
3. The facility can be implemented as the center education for solid waste management by educated the student and the village about the importance of sorting the waste.
4. The model of this recycle facility with community base can be used as the role model for the solid waste management system in municipality.

3.3.4. Threats

1. The numbers of the household that increasing every year can contribute the increasing of the amount of waste produced.
2. The awareness of villager for the solid waste management and for their waste was cannot increasing directly.
3. The worker that willing to work in the facility was decrease because the villager view that work in the facility was the lower level worker compare to the other work.
4. The Bureaucracy for getting support from the municipality was more complicated.

3.4. Strategy for Development

The strategy for developing the facility can be formulated from the SWOT Analysis by using pairing between the elements of it.

3.4.1. Strategy S – O:

- Collaboration with the village office and the facility must improve to maintain the villager to minimize their waste by educating and empowering activity.
- The facility can introduce the method to decreasing the residue that will transported to the landfill site.

3.4.2. Strategy S – T:

- The Municipality must increasing their awareness to the facility by shorten the bureaucracy to support the facility
- The municipality can encourage the facility to minimize the residue that transported to the landfill by enhancing the technical guidance and introducing the technology.

3.4.3. Strategy W – O:

- The facility supporting by the Village Office can encourage and empowering the villagers to increasing the household contribution gradually.
- The knowledge of the worker can be improved to sort the waste properly by Municipality technical guidance.
- Communication and coordination between facility and Municipality Agencies must increase to make the facility become the model of solid waste management with community base.

3.4.4. Strategy W – T:

- The facility find the other sources funding such as the subsidy from the municipality or collaborated with the other partner to increase the salary of the workers.
- The facility can enhance their management capability to maintain the operation of the facility by making collaboration with the village office and the villager.

4. CONCLUSION

The situation analysis of the TPST 3R Dadaprejo Mandiri recycling facility was shown the role of the society member, facility committee board, the Dadaprejo Village Office and the agency of municipality government. The synergy of these parties to collaborate can increase the performance of the facility, to increasing the awareness of the villager about solid waste management system and to minimize the waste production that will collect to the landfill site.

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