

Upgrading Mekarsari TPS to TPST by Using a Waste Processing Machine for Ngingas Makmur Abadi BUMDes Products

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Abstract—Environmentally friendly waste processing is the process of separating waste with categories of hazardous, toxic, economic value to non-economic value. Meanwhile, the community-based management system involves community participation in the process of sorting, reducing, utilizing and handling the waste. Until 2019, the waste production of the people of Sidoarjo Regency reached around 4,700 m³ per day. However, the ability to transport waste to the Final Disposal Site is only capable of 25%. As a result of the remaining waste that is not transported, the community manages the waste by ignoring environmental procedures, such as throwing it into the river, burning it, putting it in a hole in the ground and so on. In fact, it is possible that the waste contains materials that cannot be decomposed by the environment and even toxic and hazardous materials (B3). Sidoarjo Regency has one of the Integrated Waste Disposal Sites (TPST) named Mekarsari. TPST Mekarsari has 1 unit of plastic waste sorting machine, 1 unit of organic waste chopper and 1 unit of incinerator. However, the current management of the Mekarsari TPST is still not optimal. Some of the things that cause this include the lack of equipment for waste management. Some of the handling of waste that has not been realized include the management of plastic waste mixed with other waste such as packaging plastic bags and small plastics and the handling of organic waste using BSF (Black Soldier Fly) maggots. The solution provided by the ITS Abdimas Team with BUMDes Ngingas Makmur Abadi is to make a study document on the potential development of waste management, study the need for tools/machines for waste management, and procure tools/machines for waste management at the Mekarsari TPST.

Keywords—Integrated Waste Disposal Sites (TPST), Incinerator, Organic Waste Chopper, Plastic Waste Sorting Machine.

I. INTRODUCTION

WASTE processing is a way to keep the environment clean and avoid many negative impacts. The negative impact of waste processing can be in the form of a slum environment, becoming a hotbed of disease and pollution [1]. The greater the economic turnover of an area, the greater the amount of waste disposed of [2]. Sidoarjo Regency is a regency in East Java that has a fairly large economic turnover and is followed by problems related to waste management and the environment. Until 2019, the amount of waste produced by the people of Kab. Sidoarjo reaches about 4,700 m³ per day. Meanwhile, the ability to transport waste to the landfill is only a maximum of about 25%. Thus, about 3,500 m³ of waste per day cannot be transported [3]. Thus, the waste that is not transported is at risk of being managed by the community in an inappropriate way. The improper processing is dumped into the river, burned, put in a hole in



Figure 1. TPST Mekarsari.

the ground and so on. Whereas the waste may contain materials that cannot be decomposed by the environment and even toxic and hazardous materials (B3) [4].

Based on this phenomenon, it can be concluded that waste is a very serious problem in Sidoarjo Regency today. In addition, the large area of Sidoarjo requires effective and sustainable handling. Because the waste problem is not only related to people's understanding of how to dispose of waste properly and correctly, but also concerns the mindset and behavior of the community. In addition, the condition of the Jabon Garbage Place (TPA) (one of the TPAs in Sidoarjo Regency) has reached a bad value with the height of the garbage mountain reaching 25 meters [5]. To deal with this, a strong and continuous effort is needed to reduce and manage waste in an integrated manner.

Law no. 18 of 2008 provides direction on how to manage waste in accordance with the law, namely how to handle and reduce the amount of waste. In waste management, the government sets a strategy to reduce waste accumulation by reducing, reusing and recycling (3R) as much as possible starting from the source of the waste. Waste management using the 3R concept is an environmentally friendly and community-based waste management system [6]. It is said to be environmentally friendly because in the process, hazardous, toxic, economic value and non-economic waste will be sorted so that from the beginning the waste types mentioned above will be separated. It is said to be community based because the 3R concept above really involves



Figure 2. (a) Condition of waste processing at Mekarsari TPST; (b) Some tools/machines for BUMDes Ngingas used in TPST Mekarsari.

community participation in the process of sorting, reducing, utilizing and handling the waste.

Furthermore, in Kab. Sidoarjo there are several TPAs other than TPA Jabon. There is another TPA, namely the Mekarsari Integrated Waste Management Site (TPST) located in Kureksari Village, Kec. Waru, Kab. Sidoarjo (Figure 1). So far, Mekarsari TPST manages domestic waste generated from Delta Sari Housing in Sidoarjo and its surroundings. The number of heads of families who dispose of garbage at the Mekarsari TPST is around 3000 households (KK). Initially, the Mekarsari TPST was only one of several Temporary Disposal Sites (TPS) in the Regency. Sidoarjo. However, since 2020, TPS Mekarsari has adopted the TPST concept. This means that 2020 will be the beginning of the management of waste originating from the Delta Sari Housing in Sidoarjo and its surroundings of 3000 families to be more organized (Figure 2a). Based on the explanation that has been given, this study has a research question "Has Mekarsari TPST has carried out waste management optimally?"

II. METHOD

Based on the previous explanation, the right method in analyzing the problems in TPST Mekarsari is descriptive qualitative. Descriptive qualitative method is an approach used to find out the problem in depth through direct

observation and interviews with several subjects [7]. This method is used to obtain more information and provide a new view of the solution to be given. Several steps that must be taken in this research are in-depth interviews, triangulation of sources and forming conclusions through flowcharts.

III. RESULT AND DISCUSSION

Based on direct observation and descriptive qualitative methods, there is some information obtained. This information includes BUMDes Ngingas Makmur Abadi, which is a party that has collaborated with TPST Mekarsari since 2020 (Figure 2b). BUMDes (Village Owned Enterprises) Ngingas Makmur Abadi, Ngingas Village, Kec. Waru, Kab. Sidoarjo is one of the BUMDes that has received assistance from the Center for Public Policy Studies, Business and Industry (PKKPBI) – Institut Teknologi Sepuluh Nopember (ITS) Surabaya since 2020. The assistance in question is becoming a member in the leverage capability process through a series of webinars organized by PKKPBI – ITS which focuses on strengthening capacity in the management of BUMDes towards independent BUMDes. BUMDes Ngingas Makmur Abadi deserves assistance from PKKPBI – ITS as one of the winners of the BUMDes Award 2020 organized by PKKPBI – ITS. In addition, BUMDes Ngingas Makmur Abadi during 2020 and 2021 has received several programs from the Center for the Study of Public

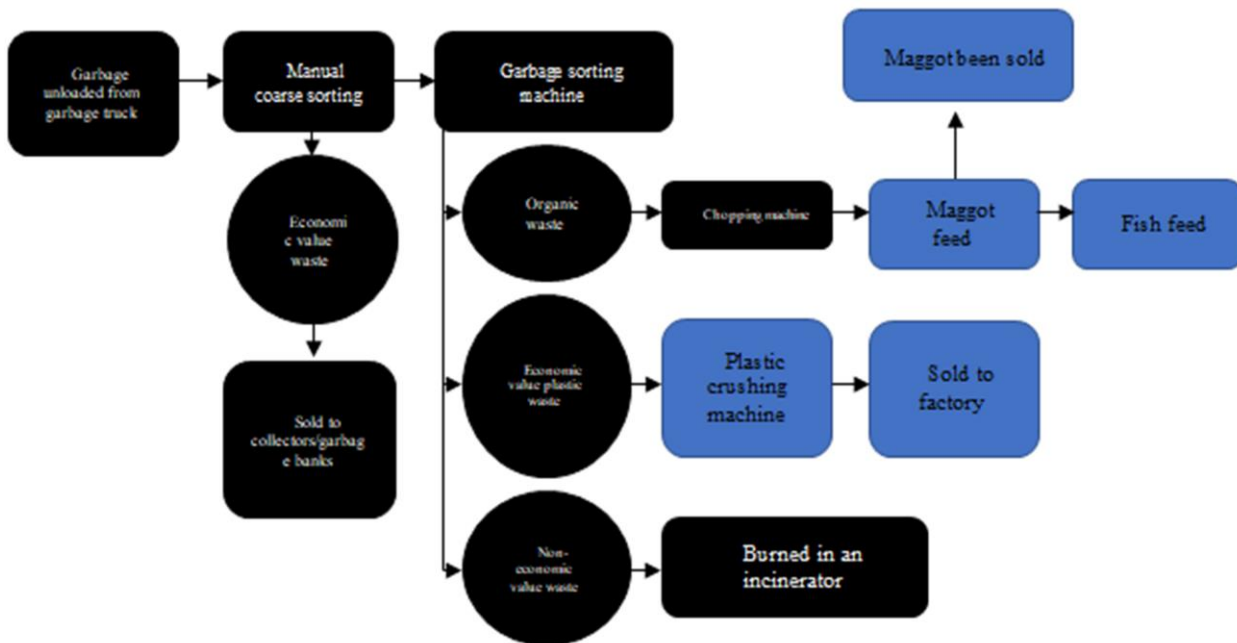


Figure 3. Waste management process at Mekarsari TPST.

Policy, Business and Industry (PKKPBI) – Institut Teknologi Sepuluh Nopember (ITS) Surabaya such as community service, Real Work Lectures (KKN) to the Kedaireka Matching Fund. In 2021, BUMDes Ngingas Makmur Abadi was named the Center for the Study of Public Policy, Business and Industry (PKKPBI) – Institut Teknologi Sepuluh Nopember (ITS) Surabaya as one of the teaching industry clusters along with 2 other mentors. With the inauguration of BUMDes Ngingas Makmur Abadi, it will open up opportunities for BUMDes Ngingas Makmur Abadi to get other added value from ITS [8].

BUMDes Ngingas Makmur Abadi, Ngingas Village, Kec. Waru, Kab. Sidoarjo was established on December 5, 2017 through a discussion with the residents of Ngingas Village. Then the results of the residents' meeting were ratified through the Decree of the Ngingas Village Head Number 027 of 2017 which contained the appointment of the BUMDes Ngingas Makmur Abadi management for the 2017-2020 term. The purpose of establishing Ngingas Makmur Abadi BUMDes other than as an implementation of Permendagri No. 39 of 2010 is also in its governance based on Permendes No. 5 of 2014 as well as a village-level business entity that seeks to improve the welfare of the Ngingas Village community. Currently, BUMDes Ngingas Makmur Abadi is led by Ir. H. Zainuddin Arifin as Director.

The collaboration between TPST Mekarsari and BUMDes Ngingas Makmur Abadi is in the form of adopting an integrated waste management system using tools/machines. The cooperation is in more detail in the form of purchasing 1 unit of plastic waste sorting machine, 1 unit of organic waste chopping machine and 1 unit of incinerator. In addition, Ngingas Makmur Abadi BUMDes provides assistance in the waste management process at the Mekarsari TPST.

However, the current management of the Mekarsari TPST is still not optimal. The factor that causes non-optimal waste processing work is the insufficient amount of equipment. Furthermore, another problem is that the process of separating plastic bag waste from small plastic has not been realized. In fact, the small plastic is still attached to metal

waste that cannot be decomposed. Based on the results of the study, it was also found that the number of chopping machines, incinerator machines and sorting machines was still lacking in number. The lack of this number of machines is the cause of the non-absorption of waste processing more optimally. In addition, the researcher tries to describe the existing waste processing process (Figure 3) at the Mekarsari TPST so that it is easy to find out other obstacles in finding the right solution.

Furthermore, based on several problems that have been found, the ITS Surabaya research team provides solutions so that waste processing at the Mekarsari TPST becomes more optimal through (1) The ITS community service team together with BUMDes Ngingas Makmur Abadi will make a study document on the potential development of comprehensive waste management at the Mekarsari TPST; (2) The ITS community service team together with BUMDes Ngingas Makmur Abadi will conduct a study on the need for tools/machines for comprehensive waste management at the Mekarsari TPST; (3) The ITS community service team together with BUMDes Ngingas Makmur Abadi will provide tools/machines for comprehensive waste management at the Mekarsari TPST which are adjusted to the public service funds received; (4) The ITS community service team will conduct a performance review of the Mekarsari TPST after the procurement of comprehensive waste management tools/machines at the Mekarsari TPST.

The solutions offered above are concepts outlined by the service team to partners (BUMDes Ngingas Makmur Abadi & TPST Mekarsari). However, intensive communication with partners is still needed to accommodate wants, needs, problems and so on so that the planned process to be implemented can run well. This communication process is called the empowerment process [9–10].

IV. CONCLUSION

Optimizing waste management at Mekarsari TPST is important to improve a clean and sustainable environment.

One way to optimize it is through the assessment and procurement of new machines. The new machine consists of a chopping machine, a sorting machine and an incinerator. If all the new machines can be added, the waste processing process will be more effective. In addition, the service team from ITS Surabaya gave a grant of one chopper machine to TPST Mekarsari to increase work capacity in waste processing.

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