

INTEGRATED WASTE TREATMENT: Solutions and Utilization of Waste with Economic Value

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ABSTRACT

Garbage is one of the old problems that has not been resolved, the poor awareness of the Indonesian people is one of the causes. However, along with the magnitude of the negative impact of waste on human life, it requires the attention and efforts of all parties. In this regard, as an educated society, it has contributed to the problem. Therefore, this service activity is carried out, in the form of counseling and waste processing practices. This is done in order to raise public awareness of the waste problem, which must be solved together. This activity was carried out in the waste processing community in the city of South Tangerang which is part of the Ganespa organization. There were 20 participants in the activity, and it was carried out on Saturday, May 21, 2022. This activity was packaged in the form of socialization, discussion, question and answer, and practice of sorting waste based on groups and their benefits. As a result of this activity, it turns out that waste with economic value is more responsive than other types of waste. Waste with economic value is generally in the form of plastic, paper, and iron. However, the participants were also enthusiastic about processing organic waste which can be processed into fertilizer or compost for plants. Even organic waste from vegetable and fruit waste can be used as livestock feed, such as maggot food, catfish, and so on.

Keywords: Garbage, Processing, Economic Value, Governance, Community Role

INTRODUCTION

Population growth in big cities has a positive trend, with increasing population, the greater the challenges/dynamics faced by the community (Malik, 2018). This condition is also linear with the growth of real estate and new settlements, which will directly cause environmental problems in terms of the amount of waste volume which continues to increase every day (Suhandi, et al., 2018). In the news published in the Kompas mass media (2021), it is explained that the amount of waste in big cities reaches 800 tons every day, most of which is sent to landfills.

This amount of waste comes from household waste (Solihin, et al., 2019), educational sites, industry, markets, restaurants, entertainment venues, and tourism, and so on. Ganespa Educational Park as a social organization engaged in the field of environmental

concern is used as a forum for delivering information and education to the public regarding a number of environmental issues. One of them concerns the management of domestic and environmental waste. This is important in order to create an environment in the South Tangerang area as a clean and comfortable city area. The second provides insight into waste management that can bring added value. And in the end this waste management is expected to become a waste management industry that is able to solve waste problems on a larger scale (Gatta, et al., 2022), thus bringing higher added value.

Without serious handling, waste will cause various environmental problems, such as the spread of disease (Septiani, et al., 2019), unpleasant odors, an eyesore, clogged drains, silting of rivers, overflowing rivers in the rainy season, and so on (Andriansyah, et al., 2022; Mahyudin, 2017). Various efforts from the government and some people who care about waste have been made, but in reality these efforts have not solved the problem, they are still inferior to the rate of waste that appears every day and continues to increase from time to time. Currently, household waste is taken from the settlement using a garbage cart and collected at the final landfill site. The limited number of landfills will not be able to accommodate all the waste (Ikhsan & Tonra, 2021).

The paradigm about trash as something dirty and disgusting needs to be changed at least. This is because not all waste is useless, there is waste that can be managed and has added value (Mubarok, et al., 2022), but there are also several types of waste that are useless and have no economic value that must be destroyed immediately, and even then by means of which is correct and does not cause other impacts (Safitri & Alvin, 2020). Waste that can still be used needs to be managed properly so that it brings benefits. It is very important to raise public awareness, especially the younger generation, so that they can become motors in the community in terms of waste management. It is also necessary to know some of the benefits that can be drawn from waste management (Setiadi, 2015). The estuary of waste management is to provide direction so that waste is no longer an environmental problem, but a commodity that needs to be processed and utilized (Wibowo & Izzuddin, 2021), and can even go further into the waste management industry. The jargon of zero waste will be realized by creating a clean and healthy environment, driving community economic and industrial activities and encouraging the resolution of environmental problems with large-scale industrial activities.

Plastic and Styrofoam are currently the dominant waste (Yona, et al., 2020). The impacts of plastic waste are quite a lot, including disturbing human health, polluting water and soil, and others (Rahmayani & Aminah, 2021). Plastic that is carried into the sea can disrupt the survival of marine animals, can poison the food chain and harm the tourism, business, residential sectors, etc. It takes at least 200 years to decompose into soil (Kholidah, 2018). There are several types of plastic, including Polyethylene Terephthalate for beverage bottles, High Density Polyethylene for detergent bottles, Polyvinyl Chloride usually found in pipes and other furniture, Low Density Polyethylene for food packaging, Polypropylene for beverage bottle caps, straws, and types of toys, PS (Polystyrene) is commonly found in food boxes, meat packaging boxes, cups, and other kitchen utensils.

The 5R method is believed to be able to reduce the rate of waste volume, (Nisak, et al., 2019) including Reuse, namely reusing plastic without processing it first. Recycle, namely utilizing plastic by processing it for further use. In this section, waste is simply collected and sold to collectors, from collectors it will be taken to the factory to be reprocessed and an economic value is obtained. Reduce, namely all activities that can reduce waste production, for example shopping with shopping bags from home. Replace, namely replacing plastic with materials that easily decompose, for example wrapping a cake using banana leaves. Refill, namely refilling plastic product containers, for example: refilling empty perfume bottles with perfume. Repair, namely carrying out maintenance so as not to increase waste production. For example, sandals whose straps are broken can be repaired with new straps, without the need to buy new sandals. Plastic that has no economic value and use value should be destroyed in an incinerator.

Paper waste also includes high-volume waste. The activities of schools, campuses, companies and offices contribute quite a lot of paper waste. Paper waste has negative impacts if it is not handled properly, including reducing soil fertility because it kills soil-fertilizing microbes (Tobroni & Gayatri, 2018), when the rainy season arrives it will cause an unpleasant odor, even worse if it is thrown carelessly into the river it will shallow the river. Efforts to reduce paper waste include saving paper use (Napid, et al., 2021), using paper for handicraft materials, collecting paper for sale, recycling paper so it can be made into new products.

A lot of leaf, twig, grass and tree trunk waste is also generated in our environment, considering that our tropical country makes the growth rate of plants and grass quite fast. If only burning twigs and tree waste will disturb the comfort of the environment because of the smoke, but if it is piled up, it will require a large area and it will be ineffective. Then this wet leaf and grass waste can be utilized by chopping it then fermenting it and making it into animal feed such as goats and cows (Febriadi, 2019). Meanwhile, dry leaves and twigs that are not eaten by livestock can be chopped and made into compost (Desromi, et al., 2022). Logs can be burned in an incinerator to produce charcoal that can be used or sold (Ruslinda, et al., 2017). The management of leaf, twig and grass waste can be synergized with the livestock, agriculture and industrial sectors. Vegetable and fruit waste is the most common in the market. Every day this waste is disposed of at TPSA without being utilized. Garbage in the form of food leftovers from housing and restaurants is also quite a lot. In fact, fruit, vegetable and food waste has high use and economic value. Eliminating the paradigm of disgust and dirty, it is necessary to handle vegetable, fruit and food waste. This waste can be used as feed for catfish, chickens, ducks, eels and maggot/larvae cultivation of the black soldier fly (Sunarjo & Yuniarti, 2017). Maggot has a high protein content so it is very suitable for fish, chicken and duck feed supplements. Ideally, the management of fruit and leaf waste is synergized with the cultivation of maggot, catfish, chicken, wild ducks and ducks so that their utilization is higher.

Garbage that has no use value and economic value such as dirty rags, sanitary napkins, baby diapers is also dangerous for the environment and health. This type of waste needs to be destroyed, it's not enough to just landfill it because it will take a very long time to decompose. The best way is to destroy it using an incinerator (Pungut, et al., 2022). Waste sorting should be done from households by grouping waste according to type so that it is easy to sort it at temporary waste collection points.

To reduce the volume of waste going to landfills, it is better if a waste treatment site is made at the RT or RW level. The calculation is, if every household processes waste it will actually create new problems with scattered waste, both of which are difficult to do in a densely populated environment. What is possible is the provision of waste processing at the RT or RW level by providing a special area that can accommodate at least 10-20 tons of waste per day. Collaboration between residents, government, and investors is

needed to create an independent environmental waste management system without leaving waste behind or sending it to landfills.

METHOD

The beautiful location of the Ganespa Educational Park on the edge of Setu Pamulang reflects the beauty of a well-maintained environment without waste. This can be a motivation in terms of protecting the environment on a wider scale in the neighborhood where each member lives. The stages of socialization delivered during the PKM implementation this time are as follows:

1. Introduction to Types of Waste. Provide information about the types of waste and their dangers to the environment, animals and human health.
2. Introduction to Waste Processing and Utilization Flow, Education about waste processing flow in general
3. Introduction to Waste Processing Methods in RT and RW Protection, Education on how to reduce the amount of waste going to landfills through waste processing in Temporary Waste Collection Sites in RT or RW.
4. Introduction of Business Units Integrated with Waste Management. Introduced to business units such as agriculture, animal husbandry and fisheries that can be integrated with waste management systems
5. Introduction of Incinerator as a Tool for Destroying Worthless Waste Education on the need for an incinerator as a tool capable of destroying waste until nothing remains and reducing the volume of waste to landfills
6. Stakeholder introduction. Insight into the correlation of environmental management with stakeholders related to waste management regarding government regulations and capital, including the government from the RT, RW, District to City levels.

Activity Method

1. The activity participants were the community gathered in the Ganespa Pamulang Educational Park, South Tangerang, with a total of 20 people.
2. Activities are packaged with the concept of socialization, discussion, question and answer and hospitality.
3. The activity was carried out on Saturday, May 21, 2022.

4. Socialization material consists of an explanation of waste segregation, processing, and disposal. Then based on this, it is explained about waste that is useful for agriculture/plantation, waste for livestock, industrial waste, and discarded waste.

DISCUSSION

This service activity is a lecture assignment, so that in its implementation it is carried out by students accompanied by two lecturers. This service activity is in the form of an explanation of the waste problem and the solutions offered have been carried out properly. The information obtained about the condition of waste management in South Tangerang is quite a lot, considering that many Ganespa members have directly involved in waste management in South Tangerang. There were many findings and suggestions that were accommodated which were very useful for the continuation of activities into a collaboration in waste management. Information obtained from the implementation of this service, including:

1. Locations that are sources of waste generation include markets, settlements and schools
2. Temporary landfill locations and final waste disposal sites used
3. Several personnel are expected to assist in waste management
4. Achievements and constraints in waste management

Things that can be done to overcome the waste problem:

1. Reactivate inactive trash cans.
2. Establish cooperation and collaboration with local governments, as well as community groups concerned with the environment.

In the discussion session, the discussion progressed to environmental issues which are a problem in South Tangerang, such as the malfunctioning of drains/gutters, the behavior of littering, flooding due to clogged drains with garbage, and so on.

Waste Treatment

In the socialization session, it was explained about waste processing, in this case waste separation or grouping was carried out based on categories, including:

1. Household waste

It explained about the various types of waste generated by households, for example food waste and leftover cooking ingredients. In this case it is explained about how to use food waste for agricultural / plantation activities as organic fertilizer.

2. Environmental trash

It explained about the waste generated from the community environment, such as leaf waste, grass waste, twig and tree waste, and so on. Then explained about the benefits of environmental waste to be used as organic compost from agriculture or plantations. This has the potential to be of economic value, even on a small scale.

3. General trash

It explains the types of waste generated as a result of community activities, such as plastic waste, paper, iron, electronic waste, and so on. In general, this type of waste has economic value, so it needs to be managed separately.

Waste Utilization by Category

After explaining the types and benefits of waste processing, then it is explained in detail about the benefits of separating waste based on its category.

1. The waste generated from household activities, such as food waste and environmental waste, is generally organic or easily recyclable, because these two types of waste are natural, so they are very useful for agriculture and plantations. This shows the existence of economic opportunities, so special skills are needed in processing household and environmental waste into organic fertilizer, planting media, animal feed, and so on. Thus the waste problem is resolved and provides economic added value.
2. General waste such as plastic, iron, paper and cardboard, as well as other wastes have their own economic value. So that good management actions are needed, so that they do not cause problems for the environment, but can become one of the livelihoods for the community.
3. Disposal trash. There is some waste that cannot be recycled and is used for agricultural, plantation, animal husbandry and industrial purposes such as diaper waste, damaged cloth waste, sanitary waste, medical waste and chemical waste. All this waste needs to be destroyed so as not to cause health and environmental problems. In this service activity it is explained how this type of waste is grouped based on the level of risk and how to destroy it. Then it also explains the types of

waste that cannot be decomposed naturally, so that appropriate action is needed, and or waste that cannot be disposed of anywhere, such as medical waste.

CONCLUSION

Based on the results of this service activity, several conclusions can be put forward as follows:

1. In general, waste that is not managed properly will cause problems for the environment, both short and long term. Therefore, waste needs to be managed professionally.
2. One of the simple things that can be done in waste management is the concept of waste sorting/grouping. So that the risk of waste can be minimized.
3. There are some wastes that have economic value, although the results are not significant, they provide benefits. It is necessary to carry out ongoing socialization and campaigns from the government in particular, in order to create public awareness of managing the risks of waste to humans and the environment.
4. Facts prove that waste that is not managed properly will cause various problems, including:
 - a. Health problems
 - b. Flood
 - c. Environmental damage
 - d. Natural extinction

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