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Utilization of Plastic Waste with The Ecobrick Method as an Effort to Reduce Plastic Waste in Sukarami Village Bengkulu City

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Abstract. This community service aims to provide insight into knowledge and solutions that can be applied to reduce plastic waste and recycle it so that it becomes more useful to the community in Sukarami Village, Bengkulu City. The processing of plastic waste, can reduce the negative impact of environmental pollution and increase public awareness of the importance of protecting the surrounding environment. In this era of a creative economy that intensifies information and creativity by relying on ideas and knowledge, one of them is processing plastic waste into eco-bricks that can reduce plastic waste from environmental pollution and can improve the economy of the community in Sukarami Village, Bengkulu City. Bengkulu. Based on the results of these activities, the community is beginning to realize the importance and dangers of waste to the environment and health. In addition, the community was very enthusiastic about this activity and participated in it until it was completed.

Keywords: Community Service, Ecobricks, Plastic Waste

1 Introduction

Waste is a residual material that is no longer used after the consumption or production process, and is discarded because it is considered worthless. Waste can be in the form of food waste, paper, metal, plastic, and other materials that are often found in everyday life. Based on the chemical substances contained in it, waste can be divided into organic and inorganic waste. Organic waste is waste that can be decomposed by microorganisms or that can rot such as food waste, leaves, vegetables, and fruit. Inorganic waste is waste that takes a very long time to decompose and tends to be difficult to decompose by microorganisms, such as plastic, glass, and cans. According to Purwaningrum [1] stated that Indonesia is ranked second in the world after China. Data on waste generation in Indonesia in 2021 based on the report on waste management performance of the Ministry of Environment and Forestry (KLHK) reached 30.88 million tons. The data is a recapitulation of data from 248 cities/regencies throughout Indonesia. Of the total, 17.5% is plastic waste. Plastic waste is one of the inorganic wastes that come from non-biological materials and is most commonly found in Indonesia [2]. Plastic waste has become one of the most pressing environmental issues worldwide. The increasing consumption of single-use plastic products, such as plastic bags, bottles, and packaging, has led to a surge in the amount of plastic waste ending up in landfills, rivers, and oceans.

Much of this plastic waste ends up in rivers, beaches, and seas, making Indonesia one of the largest contributors of plastic waste in the ocean. Breaking down plastic waste into small particles takes hundreds of years, so if there is an accumulation of plastic waste, it has the potential to pollute the environment and endanger the health of living things[2]. If these plastic wastes are carried into rivers or the sea, they will cause damage to the ecosystem in the area. In Indonesia, the problem of plastic waste is increasingly complex along with the lack of public awareness about proper waste management and limited recycling infrastructure.

This condition is also felt in Sukarami Village, Bengkulu City, which is located close to the Final Disposal Site (TPA). This TPA is the center for collecting waste from various regions in Bengkulu, including plastic waste which continues to increase in quantity. The proximity of Sukarami Village to the TPA causes the community to often feel the direct impact of waste problems, such as environmental pollution, unpleasant odors, and the emergence of health problems due to piles of waste that are not managed properly. The lack of awareness of the

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importance of sustainable waste management worsens this situation, so innovative steps are needed to address the problem.

The management can be done with the 3 R approach (Reduce, Reuse, Recycle). Reduce means an effort that focuses more on reducing consumptive lifestyles and always using environmentally friendly "non-disposable" and preventing waste generation. Reuse means an effort to utilize waste materials through repeated use so that they do not immediately become waste, without processing means reusing waste that is suitable for use for the same or other functions. Recycling means that after the waste has left the home environment, it is necessary to sort and utilize it from the home environment, it is necessary to sort and process it locally into new products[3].

One solution that is starting to be introduced is eco-bricks. Ecobricks are plastic bottles that are densely filled with non-biological waste, namely plastic[4]. In line with the opinion Herlina [5] Ecobrick is a plastic bottle packed by inserting used plastic pieces in clean and dry conditions with a certain density that can be used to create a work of art or a building that is highly functional. The technique is simple and very easy, therefore it can spread quickly through social networks (communities, villages, schools, etc.). The purpose of eco brick itself is to reduce plastic waste and recycle it with plastic bottles to make something useful[6]. Community projects with eco-bricks, whether in the form of social gatherings, exhibitions, making tables, chairs, benches, and play equipment, or building school gardens or vegetable gardens in residential areas, will bring the community together to clean and green the environment[4].

In Indonesia, the ecobrick movement is growing, especially among communities, schools, and environmental activists. This movement is not only a waste reduction program but also a means of education and community empowerment. Making eco-bricks teaches people about the importance of sorting waste and reducing the use of single-use plastics. Furthermore, eco-bricks open up opportunities for the community to contribute directly to sustainable waste management solutions. Through the use of eco-bricks, it is hoped that greater awareness of the importance of protecting the environment can be created and encourage the community to be involved in collective efforts to reduce the negative impacts of plastic waste.

The use of eco-bricks in Sukarami Village has great potential, especially in reducing plastic waste produced by the community and reducing the burden on landfills. By involving the community in this process, it is hoped that awareness will be created of the importance of recycling and collective responsibility in protecting the surrounding environment. In addition, the ecobrick project can also provide added value to the community, both in terms of economy through the manufacture of useful products, and in terms of education through awareness of the importance of sustainable waste management. Through the ecobrick method, it is hoped that Sukarami Village can be an example of reducing the negative impacts of plastic waste and creating a cleaner environment and a community that cares more about environmental sustainability. Some of the community's works in waste management that have been carried out are by processing plastic waste into bags and other works.

2 Method

Community service activities use participatory methods in community empowerment. The participatory method used is environment scanning which is an integral part of the community empowerment process through building independence with the strength of resources and products[7].Based on data from the Indonesian Environmental Statistics in 2018, only 1.2% of plastic is reused, 66.8% is burned, and the rest ends up in landfills, water channels, and on the side of the road, causing environmental pollution[5]. The target of this community service activity is the community in Sukarami Village, Bengkulu City. The stages of the activity include preparation, implementation, and evaluation. The stages of preparation for making eco-bricks are carried out through (1) providing materials to increase partners' insight into eco-bricks and their benefits in daily life and industry; (2) providing insight into how to make eco-bricks; (3) preparing tools for making eco-bricks; (4) training in making eco-bricks

3 Results and Discussion

Community Service Activities begin with program socialization that aims for both parties to understand each other. The community can also understand the activities that will be carried out and the implementation team can understand the current conditions and needs of the community in more detail. Briefly, the community is given insight into the benefits of eco-bricks in everyday life, how to make eco-bricks correctly by explaining the criteria for waste used, the tools and materials needed in the ecobrick-making process, and the minimum weight of the bottle after being filled with waste. Then it is also explained that this activity can be useful for the community

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because it can improve welfare. Documentation of this activity can be seen in Figure 1. Group photo with the community service team in Figure 2 and Activity participants in Figure 3.

Figure 1. Presentation of Material

Figure 2. Group photo with the community service team

Figure 3. Activity participants

The next activity is counseling on waste management which aims for all levels of society, both government, business world, and the wider community, to carry out activities to limit waste generation, recycle and reuse waste better known as Reduce, Reuse, and Recycle (3R) through smart, efficient and programmed efforts. However, this 3R activity still faces a major obstacle, namely the low level of public awareness to sort waste[8]. One of the wastes that causes many problems is plastic waste. There are two types of waste, namely organic waste which comes from agricultural/plantation products, and inorganic waste which is difficult to degrade [9].

Plastic is a type of macromolecule formed by the polymerization process. Polymerization is the process of combining several simple molecules (monomers) through a chemical process into large molecules (macromolecules or polymers). Plastic is a polymer compound whose main components are Carbon and Hydrogen. To make plastic, one of the raw materials often used is Naphta, which is a material produced from the

distillation of petroleum or natural gas. As an illustration, to make 1 kg of plastic requires 1.75 kg of petroleum, to meet the needs of fuel and process energy.

Residential waste management requires the active participation of individuals and community groups in addition to the role of the government as a facilitator. The implementation of this socialization activity increases public understanding of the importance of waste management. Waste management is carried out using the 4R method (Reduce, Reuse, Recycle, Replace). The waste management process begins with waste sorting, namely separating organic waste and inorganic waste. The reduce method is a method with the principle of reducing waste and saving the use of fuel so as not to cause excessive waste. Reuse or reuse, which means reusing waste that can still be used. Recycling waste that can still be recycled, and replaced is a method by appealing to residents to minimize the use of plastic bags by replacing plastic wrap with non-single-use containers. The impact of this waste management outreach activity is that the community understands how to manage waste properly, especially plastic waste.

The next activity is counseling and practical training in making eco-bricks. In this counseling activity, the community is reminded again that waste is still a major problem to this day. Poor waste management will certainly cause many problems for the environment and health. However, building public awareness is not as easy as turning the palm of your hand. It requires cooperation from all parties, both the community, the government, and third parties as supporters. It takes a long time to build that awareness. It also requires positive examples and role models as well as consistency from policymakers in a particular area. In this activity, the Sukarami Village community practiced directly how to make eco-bricks with materials that we had prepared beforehand. The community took turns putting the trash that had been chopped into small pieces into a bottle. We also did not forget to compact it using wood so that the results obtained were solid. The community was very enthusiastic when this simulation was carried out because after they received instructions about this program they were immediately able to implement ecobrick making.

The trash they use is trash scattered in the community, especially around the Sukarami Village office. The community continues to put in the trash until one bottle is full and solid. Then, we also said that to make a craft, several full and solid bottles like that are needed. However, so that the community is not confused by the finished result, we have prepared a craft from ecobrick, namely a chair. The community immediately saw the results of the craft and immediately tried the strength of the chair.

Based on the activities that have been carried out, the community is aware that from a bottle plastic waste can be made into a very useful craft. Some people are also beginning to realize that entrusting trash cans, garbage trucks, and trash bins, will not affect anything, it will even end up more terrible. Even when trying to recycle, it is nothing more than delaying the final arrival of plastic waste to the process of polluting the land, air, water plants, and forests food ourselves and our bodies or pregnant women or newborn babies or those who will be born. Only from household waste, which is used by yourself, starting from there, will be more aware and careful and then reduce our consumption of plastic. The result of this community service activity is that the community has successfully created several creations for managing plastic waste. It is hoped that community service activities like this will continue and can be transmitted to the community in other sub-districts/villages.

3 Conclusion and Suggestion

Community empowerment in Sukarami Village, Bengkulu City begins with providing insight or awareness on how to manage inorganic waste in the environment. This waste management not only has an impact on the environment but also community welfare because it can provide business value for the community. Empowerment is carried out by training on how to make eco-bricks. This activity can be used as a forum for local communities to open business fields to grow the economy and welfare. Based on our community service, we advise that from now on, let us care about plastic waste together, and be aware of the dangers caused by plastic waste. Reduce its use and deal with it properly. Make our future lives better without relying on plastic. Be wise in making decisions and be responsible for ourselves and the people around us.

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