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Eco-Brick Utilization as a Solution to Environmental Problems and Utilization of Plastic Waste in Jawisari Village

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Abstract: *The plastic waste problem in Indonesia, which is the second largest contributor in the world, prompts the need for innovative and sustainable solutions. One proposed solution is the utilization of plastic waste into ecobricks, which are eco-friendly bricks made from compacted plastic waste. The training program in Jawisari Village involved socialization and practice of ecobricking, aiming to raise community awareness about plastic waste management and provide practical skills. The activity successfully engaged the community, produced ecobricks, and is expected to create a cleaner and healthier environment.*

Keyword : *plastic waste, ecobricks, waste management, clean environment, community, training, innovation*

1. INTRODUCTION

The issue of plastic waste has become a global concern, including in Indonesia, where plastic is one of the biggest contributors to environmental pollution. According to data from the Ministry of Environment and Forestry (KLHK, 2020), Indonesia is listed as the second largest contributor to plastic waste in the world after China, with more than 3 million tons of plastic waste generated annually. Poorly managed plastic waste often ends up polluting rivers, seas, and even damaging ecosystems. The decomposition process of plastic waste takes a very long time, which causes the accumulation of plastic waste in various places. This condition encourages the need for innovative and sustainable solutions to the plastic waste problem.

Waste, in terms of quantity and type, can be a problem that is increasing day by day along with the increasing population, activity levels, lifestyles, socio-economic levels and technological advances (Frankson, 2016). Plastic waste, which is dangerous and difficult to manage, is still one of the factors causing environmental damage which remains a major problem for the people of Indonesia (Wardani & Khotimah, 2021).

Global plastic production has increased rapidly in recent years as plastic has become an essential product in daily life. The main polymer types used for packaging materials include low-density polyethylene (LDPE), high-density polyethylene (HDPE), polypropylene (PP), and polyethylene terephthalate (PET) (Ongpeng, et all. 2021).

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Plastic waste is becoming an unparalleled environmental problem globally and requires urgent attention. Single-use plastics with various salient properties such as being cheap, flexible, and durable end up becoming a huge amount of waste. Plastic has become an almost indispensable part of modern society due to its versatility, low cost, and durability. The current method of managing plastic waste is by landfilling or incineration, while only 10% is recycled (Subhashini & Mondal, 2024).

Plastic is a hard waste that naturally decomposes, and over the years it has become a dilemma. Scientists, environmentalists and ecologists have tried to solve the plastic waste problem in various ways. Ecobricking is one of the most creative ways of handling plastic waste. It does not serve to destroy plastic waste, but instead extends the life of the plastic and makes it useful for society in general (Wardani & Khotimah, 2021).

One solution that is becoming increasingly popular is the utilization of plastic waste to produce useful products, such as *ecobricks*. *Ecobricks* are environmentally friendly bricks made from plastic waste that is compacted and organized to produce a strong and durable construction product. By utilizing non-biodegradable plastic, ecobricks not only help reduce the volume of plastic waste, but also provide benefits in the development sector. Eco-bricks have proven to be an effective alternative in plastic waste management that not only serves as a practical and efficient building material, but also as a first step to encourage people to be more concerned about environmental issues (Ariani, 2021).

Jawisari Village is one of the villages that has a plastic waste management problem that is not optimal, so the use of eco-bricks can be the right solution. The village has great potential to adopt eco-brick technology, given the amount of plastic waste that has not been properly managed. With the training program and implementation of ecobrick utilization, the village community will not only benefit from the reduction of plastic waste, but also be able to utilize ecobrick products in their daily lives. In addition, the utilization of eco-bricks can increase community awareness of the importance of efficient waste management and contribute to creating a cleaner and healthier environment.

2. METHOD

The plastic waste management training was carried out through a series of stages including preparation, socialization, and hands-on practice at Jawisari Village Hall, Limbangan District, Kendal Regency. The preparation stage began with coordination with the village to ensure that the activity was in accordance with the needs of the community. In addition, initial socialization was also conducted to the women's group during the routine tahlilan event per

RT. In this socialization, participants were given an understanding of the importance of plastic waste management and asked to start sorting and collecting plastic waste at the household level as the main material for making ecobricks.

After the preparation stage, the main socialization activity was continued at the village hall using the lecture method. Participants were given an in-depth explanation of the meaning, benefits, and steps of making ecobricks. In addition, participants also obtained information related to the concept of plastic waste, problems arising from plastic waste, its adverse effects on the environment, and the application of the 4R-based waste management method (Reduce, Reuse, Recycle, and Replace). The final stage was hands-on practice, where participants were invited to utilize the plastic waste that had been collected previously in the process of making ecobricks. This activity aims to increase participants' understanding and practical skills in processing plastic waste in a sustainable manner.

After the socialization activity was completed, the process of making ecobricks was carried out through the following stages:

a. Prepare the required equipment and materials.
b. Cut plastic waste into small pieces.
c. Insert the small pieces of plastic into the bottle.
d. Compact the plastic waste in the bottle using a small stick.
e. Weighing the ecobricks to reach a weight of 200 grams.

3. RESULT AND DISCUSSION

Community Service activities tin KKN Regular 83 Posko 16 Walisongo State Islamic University Semarang, namely Ecobrick Workshop as a Plastic Waste Processing Solution in Jawisari Village, went smoothly. This training activity includes three stages, namely the socialization stage, preparation and manufacturing practice. Before the socialization process is held to the women, KKN students must explain the objectives, benefits and series of activities to one of the village governments as an initial step of coordination. This discussion with the government aims to gain support and ensure activities are in line with the needs of the local community. Support from the village government is key to mobilizing the community and facilitating the activities.

Figure 1 Coordination with Jawisari Village Officials

Socialization of Ecobricking Training Activities

The socialization stage was carried out by involving mothers in routine tahlil events in each RT in two hamlets, namely Krajan and Lebari hamlets. Through this familial socialization activity, students introduced the concept of ecobricks in a language that was easy to understand. This socialization activity aims to provide a basic understanding of the impact of plastic waste on the environment and the importance of creative and sustainable waste management. In the socialization, mothers were asked to start collecting household plastic waste. The collected plastic waste was then taken on a scheduled basis by KKN students to be utilized in ecobricking activities. This socialization activity not only provides education about waste management, but also builds collective awareness about the importance of keeping the village environment clean.

Figure 2 Socialization at the Tahlilan Rutin Event

In the socialization activities at each regular tahlilan event, the women showed great enthusiasm during the socialization process by listening carefully as the KKN students explained the health and environmental impacts of plastic waste and the benefits of ecobricks as an innovative solution. Many of them seemed interested and asked critical questions, such

as what types of plastic are used, how to ensure the cleanliness of plastic waste, and how ecobricks can be utilized in everyday life. Some women even began to discuss strategies for collecting plastic waste in their neighborhoods. This enthusiasm was also shown through their commitment to immediately collect household plastic waste as a form of support for the activity.

Utilizing plastic waste into ecobricks offered in this activity, mothers can tackle the growing problem of plastic waste in a simple yet successful way. By ecobricking from household waste, they will not only reduce environmental pollution but will also produce a useful product for their daily needs.

Plastic Waste Cleaning and Cutting

After the socialization activities, the preparation process was then carried out. At this stage, the plastic waste that has been collected by the mothers is then collected by KKN students for further cleaning and cutting processes. The collection process is carried out by visiting the waste collection posts that have been determined in each RT. The collected plastic is then sorted according to the plastic criteria needed in making ecobricks. After the collection process, the plastic that has been sorted is then cleaned from dirt and food scraps. This is done so that the resulting ecobricks are free from the risk of odor or decay. The clean plastic is then cut into small pieces to make it easier to insert into the bottle during the ecobricking process.

Figure 3 Plastic waste cutting process

Ecobricking Training and Procedure

Training is a short educational process that follows systematic and organized procedures to learn technical skills and knowledge with specific objectives, which focus more on practice than theory (Rohmah, 2018). According to Setyowati (2021), research shows an increase in participants' knowledge by 12.5% after attending training and counseling. Ecobricking training is carried out by explaining the steps of ecobricking and how to make it

solid. The thing that needs to be considered is to ensure that the plastic waste used in making ecobricks is clean and dry, so as not to cause odors (Purwandito, M., Mutia, E., & Lydia, 2020). The ecobricking activity took place on Saturday, November 23, 2024, attended by 16 people. They brought plastic waste that had been collected for one week, which was then distributed to five groups, each of which was accompanied by a KKN member from Jawisari Village, Limbangan District, Kendal Regency. Each group was responsible for making several ecobricks, with the division of tasks including cutting the plastic, inserting the plastic pieces into the bottle, and compacting them. The activity went smoothly and produced around 20 ecobricks. Afterwards, the finished ecobricks were assembled into chairs by the women assisted by KKN students. The women were very enthusiastic and immediately practiced how to make ecobricks that had been explained earlier.

It is hoped that through this socialization and ecobricking training, the knowledge of the people of Jawisari Village, Limbangan Sub-district, Kendal Regency about plastic waste management can increase. This will help them to no longer just throw away or burn household waste, but to process it into useful items with a higher selling value. In addition, this activity is also expected to increase public awareness of the adverse effects of plastic waste on the environment.

Sustainable Benefits of Ecobrick Products

The impact and sustainability efforts of the implementation of this ecobrick making demonstration activity in the form of a chair is the application of the use of ecobricks as a way of utilizing plastic waste starting to be used during the ecobrick making process itself. In addition, the sustainability efforts resulting from the implementation of this demonstration activity are an increase in public awareness to better protect the environment in order to create a clean and healthy environment. This aims to stimulate the community to be more sensitive to a less clean environment. The sustainability of the ecobricking demonstration extension activities will continue to be carried out as the schedule that has been given for the community to follow up on community activities in terms of managing and utilizing plastic waste to create more creativity for the community.

Training on the utilization of plastic waste into ecobrick products to create an innovative community in waste management by introducing in Jawisari Village, Limbangan Sub-district, Kendal Regency is very beneficial for the community which is reflected in the increasing knowledge of the community about sustainable waste management. The training on the utilization of plastic waste into ecobrick products that are environmentally friendly by using

waste generated daily in order to be utilized into ecobricks and can reduce plastic waste in Jawisari village.

Ecobrick utilization of plastic waste is the first step in reducing waste and promoting a clean environment. Involving the participation of the entire community and the support of the local government, the utilization of ecobricks can be an effective movement in keeping the environment clean and creating products that have a high use value such as chairs and others.

4. CONCLUSION

The problem of plastic waste in Indonesia requires serious attention given its significant impact on the environment. The ecobricking training program in Jawisari Village proves that plastic waste management can be done effectively through innovative approaches, community education and hands-on practice. By involving the community in this process, not only is there a reduction in the volume of plastic waste, but also the creation of valuable eco-friendly products.

The implementation of this program provides sustainable benefits, including increased community awareness of the importance of creative and sustainable waste management. With the support of the village government and the active participation of the community, ecobricking can be an effective solution in creating a cleaner, healthier environment and supporting long-term sustainability.

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