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Ecobrick: A Solution for plastic Waste to Establish Zero Waste Village in Pamekasan Regency

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ABSTRACT

The Covid-19 pandemic that is continuing to spread around the world has shifted and changed people lifestyle. On the other hand, waste volume is increasing because many people massively throw garbage into water sources or rivers which results in water and soil pollution. This research applied descriptive qualitative method with demonstration techniques. The residents were taught to make Ecobrick for reducing the amount of plastic waste. Ecobrick is very effective in empowering the community to cope with the increasing amount of inorganic waste. Ecobrick can increase the creativity and productivity of the community especially in terms of transforming inorganic waste to goods with economic value. The results indicated that the amount of plastic waste which was previously thrown to the rivers could be reduced by implementing Ecobrick program. This program reflected community innovation and creativity in utilizing unused items at home. At the end, Bunder village can be a zero-waste area and makes goods economical and valuable to be used by all society elements.
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1. Introduction

Inorganic waste is a type of waste that is very difficult to decompose and causes water and soil pollution. Community service activities with a mutual cooperation and co-management can transform inorganic waste into useful products. In terms of circular economy, the activities can be a main key to the government program especially for reducing the amount of inorganic waste pollution and public ignorance to waste management. Ecobrick is a new innovation in reducing many kinds of inorganic waste and soil pollution. Community empowerment through Ecobrick system can reduce community dependency on cement products and other materials. The use of Ecobrick has created circular economy and green space for producing oxygen and hydrologic cycle (Al Aziz , Meyke Erlianda , Putri Ayuni Agustina , Irfan Mubarok, 2022).

Ecobrick is a part of government program aimed to reduce soil pollution and to support water needs and air cycle so that the contours of the land overlap with the Ecobrick. Ecobrick made by Bunder villagers consisted of plastic waste that is difficult to decompose including non-PET plastic (Ayuningtyas, 2019). Non-PET plastic is a type of plastic that commonly used by the villagers in the form of plastic shopping bags and food wrappers. During the Covid-19 pandemic, Bunder villagers are in attempt to reduce plastic waste. In fact, plastic waste has become a major problem worldwide. Due to the pandemic, people around the world including in Indonesia experience self-quarantine (staying at home) to suppress the spread of the disease. This has made people neglect inorganic waste treatment and management (Nurilma et al., 2020).

People tend to buy food online and consume fast food which is wrapped by plastic. Indonesia is the world second-largest plastic polluter amounting to 187.2 tons. In the Covid-19 pandemic, plastic waste in Indonesia is increasing significantly. Plastic needs about 400 years to decompose. Thus, there must be a solution for overcoming plastic waste problem. One of which is by utilizing Ecobrick (Hadi et al., 2019).

Considering the current plastic waste problem, Bunder villagers developed a strategic plan by producing Ecobrick to reduce plastic waste especially in Kajurajah Hamlet, Bunder Village, Pademawu Subdistrict, Pamekasan Regency. The amount of plastic waste in the area was increasing particularly when the public activity restrictions (PPKM) was carried out due to Omicron variant attack.

2. Method

This research applied qualitative method with analytic, verificative, and explorative approaches. The primary data were obtained by unstructured interviews with the informants. (key informants and informants) (Kiswantono et al., n.d.). The data were analyzed by descriptive qualitative in terms of data collection, data reduction, and conclusion. The instruments were online interviews via WhatsApp. Online interviews were chosen because they were easy, simple, and helpful. To support the data accuracy, the researchers used many references which were related to the research title through various media sources (Utami & Fitria Ningrum, 2020).

Besides, demonstration method was used to teach the participants. This method allowed the researchers to share the procedures, events, rules, activities, and practices. In this research, inorganic plastic waste management through Ecobrick system was demonstrated (Rohita & Asnawiyah, 2021). Table 1 shows the process of Ecobrick Production by Bunder villagers.

The data on Ecobrick production method need some additions in terms of observation and displaying the data descriptively. The complete data can be used as preliminary observation data on this qualitative research. During the process of making Ecobrick, villagers were working together. This community empowerment is divided into several concepts. During demonstration, the community

practiced making Ecobrick from non-PET plastic waste to create clean and clean environment. Ecobrickis very suitable for independent villages (Darnetti et al., 2021).

Table 1. Ecobrick production by Bunder Villagers

No.	Activities	Output
1.	Ecobrick production	Non-PET plastic
2.	Ecobrick production for reducing plastic waste in the surrounding area	The villagers collected non-PET plastic
3.	FGD (Focused Group Discussion) with APB chairman	Types of Ecobrick which can be utilized
4.	Making Hydroponic	Buffer Garden
5.	Ecobrick area on a minimalist scale	Designing Ecobrick

Source: Bunder villagers documents

3. Results and Discussions

3.1 Ecobrick Production in reducing plastic waste

Community plays an important role in reducing plastic waste by fostering technology innovation. Besides, the community must also learn the danger of plastic waste and the importance of healthy environment. The community will give contribution to the non-biodegradable waste. By understanding plastic waste management, the community will not throw, burn, and burry the garbage anymore, instead, they will be able to make use of Ecobrick. Later, Bunder villagers are able to reduce the plastic waste and produce Ecobrick individually (Fitri et al., 2020).

Ecobrick production though one-month demonstration method has resulted one reused product namely mini table made from plastic bottles, glass, glue, and other materials near the waste management location. The ability to make Ecobrick will encourage the community to make other products and gradually change their littering habit. Eventually, Bunder area will look leaner and more beautiful (Oktaverina et al., 2020).

People's lack of awareness becomes one of the obstacles in this community empowerment. The community tend to ignore the protocols that must be performed during the pandemic. They belittle government's rules and prohibitions regarding Covid-19 pandemic which actually can be harmful for themselves and others. The biggest challenge is paying attention to personal and environmental hygiene and health (Asih et al., 2019).

Community must understand the danger of plastic waste for the environment and health during the pandemic. Many people do not wash their hands before eating or after doing activity. They also do not keep the environment clean, ignore social distancing, still greet or shake hands, and do not wear face shields. Socialization, education, and mask distribution will not easily influence the community to obey the rules and protocols. It absolutely needs time and patience (Yusa et al., 2018).

Some challenges related to economy were also found. Some people refuse to learn and grow. They do not keep up with the latest technology and have difficulty in socializing and having direct communication. In terms of education, many parents do not care of their children's education so it makes difficult for the researchers to inform them that early education is so much important. (Immy Suci Rohyani et al., 2021).

3.2 Ecobrickas a solution for reducing inorganic waste

Ecobrick production was started at 8:00 AM in the village meeting hall. The idea of making Ecobrick was coming after the community saw the amount of plastic waste in Bunder Village. They wanted to reduce the amount of plastic waste and change it into more useful products (As et al., 2021).

First, we discussed the program in groups. Then, we started to collect plastic waste at our respective house. We also searched for the waste in the neighbourhood. This activity was welcomed by the community (Afriza, 2018). Ecobrick is hoped to reduce the amount of plastic waste in Bunder village and to prevent flood. The waste can also be changed into useful products. The process of making Ecobrick can be perceived in Figure 1 in which the community is enthusiastic during the process (Fauzi et al., 2020).

Various kinds of waste that have been collected from local residents, then sorted to be used as materials in the manufacture of ecobricks whose purpose is to recycle plastic waste that is no longer used to become items that can be used by the surrounding community so that they can become goods that can be reused. This activity is a good solution in reducing the level of waste disposal and also changing the mindset and behavior of the community to be able to reduce the volume of waste that clogs the flow of water which can cause annual flooding and jammed waterways. Pollution of water and soil due to the accumulation of plastic waste must take into account (Pradhanawati, 2019).

Figure 1. Bunder Villages making Ecobrick

Figure 2. Ecobrick products from plastic waste

Various kinds of plastic waste that have been converted into Ecobrick can be used as mini tables and chairs that can be placed around village parks in the Bunder village area, so that it will add to the beauty of Bunder village park in the Pamekasan area. Bunder villagers are now more concerned about their environment. They are cleaner and neater and can empower the surrounding community in managing inorganic waste which is often dumped into rivers and sewers. The pattern of community empowerment by making Ecobrick which has economic and productive value and is able to also make the Bunder village community to be able to continue to hone their creativity. Figure 2 shows the Results of Plastic Waste into Ecobrick Products (Darubekti & Bengkulu, 2020).

Plastic bottles that are thrown into rivers or waterways will clog the water flowing around the area of Bunder village. If the environment of Bunder village is not taken care of, both land, water and air will pollute the village and the community will be attacked by other infectious diseases.

The empowerment activity was carried out for one month, but the most focused on was making ecobricks in order to minimize plastic waste in the environment around Bunder village. Ecobrick production and socialization to the community was carried out 5 times for one month and was deemed sufficient to provide education to the people of Dusun Kajurajah, Bunder Village, Larangan District, Pamekasan Regency (Rachman, 2018).

Ecobrick is an idea that is also used to give the name of the processing of plastic residue into a brick. Ecobrick comes from the word "Eco" which means environment (Afriza, 2018). Ecobricks are plastic bottles filled with solid waste or plastic waste to make something that can be reused (Utami, 2016).

Ecobricks are one of a kind efforts to recycle and to reduce the amount of plastic waste. Ecobricks can also be made from used plastic bottles whose contents can be in the form of a composition in the form of snack wrappers, foam, soil, package, crackle, and other types of plastic waste residue (Benjamin, 2019). Ecobricks are generally made with used bottles and can be filled with plastic waste that is smaller than the volume of the plastic bottle. (Asih et al., 2019) stated that Ecobricks can also be used for building materials. Ecobricks can be made as funiture materials from mini tables, gardens, and building materials such as warehouses, schools and homes. Ecobricks can also be used in making works of art. The artwork uses recycled materials and new designs for making bricks that are minimally polluting and environmentally friendly in the form of Ecobrick (Immy Suci Rohyani et al., 2021).

Ecobrick can be made from all types of plastic that are used daily inlcuding crackle plastic and plastic crackers, snack wrappers, leftovers from soft drinks/sachets, used toothbrushes, old clothes buttons, used children's toys, and other types of plastic. In the face of an unclear pandemic situation, the Global Ecobrick Alliance (GEA), a non-profit earth-initiated movement that is engaged in changing local and global transitional plastics, releases a guide that is capable of transitioning civil action in helping to lower the curve of the Covid-19 virus variant (Rachman, 2018).

Making Ecobricks is basically easy, but it has some tricks and techniques for Ecobricks to be durable and last a long time, as well as dense in content. It doesn't take a short time to make.If the plastic raw materials are available, it can be done quickly. If we want to get more raw materials, we can get them from household residues and also from laundry businesses from the community. Another thing is the condition of the hands must be kept clean. In this case, it is mandatory to maintain cleanliness while making Ecobric, the environment must be in a clean condition and use masks. After

making Ecobricks, we must immediately wash hands with soap to prevent exposure to the deadly virus.

The problems in the form of plastic waste will never end. The problem of plastic is the main problem that causes the increase in waste in the world, especially plastic waste. It is difficult to decompose in a long period of time. Another problemis that if plastic waste has been burned, it can pollute the air.

4. Conclusions

Community service activities are also a form of dedication for educators to the community. Therefore, there is a need for innovation in the application of technology. However, at present, the Indonesian is still experiencing COVID-19 pandemic. Based on the initiative from elements of the Bunder village community with the service theme "Ecobrick, a solution to overcome plastic waste in Bunder village, although it is still experiencing a wave of the covid-19 virus variant". It is recommended people who have received socialization about the dangers of plastic waste and how to handle it by making Ecobrick individually from home. Hopefully, they can really apply it in their lives so as to create a healthy and clean environment.

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