

## Socialization of the 4R Concept and Training on Making Ecobricks as an Effort for Plastic Waste Management

Lasmi

Prodi Pemanfaatan Sumberdaya Perikanan, Universitas Muhammadiyah Kupang. Jln. KH. Ahmad Dahlan No. 17 Walikota Kupang NTT. Kode Pos 85111  
Email: [lasmi-perikanan92@gmail.com](mailto:lasmi-perikanan92@gmail.com)

### ABSTRACT

Garbage is a problem that is quite difficult to solve. The low level of public awareness of the environment is one of the factors causing the waste problem. Plastic waste is a type of waste that is still a threat to environmental pollution. This community service activity focused on socializing plastic waste processing and training on making ecobricks. The method used is lecture, ecobrick making simulation, and evaluation. The number of participants who attended this activity was 50 students. Based on the assessment, the level of student understanding is quite good as evidenced by the change in grades during the test. After the community service activities, it is hoped that students and teachers at SMK Negeri 7 Kupang City will be able to manage plastic waste wisely.

**Keywords:** Plastic Waste, 4R Concept, Ecobric

### PRELIMINARY

Garbage is an environmental problem that cannot be avoided. The increasing population growth is followed by a higher amount of waste generated. Sources of waste are generated from various elements of industrial and household activities. The main factor causing environmental damage is the low level of public awareness of the environment. According to (Suminto, 2017) that the main problem with plastic is that plastic cannot decompose naturally and takes a long time to clean up waste, increasing air temperature. Furthermore, this statement is also supported by (Andriastuti et al., 2019) who say that environmental pollution is caused by the difficulty of plastic waste degradation.

The problem of waste identified at the service location is the increase in the volume of plastic waste as the population increases and the handling of waste has not been carried out optimally, resulting in environmental pollution. Law Number 18 of 2008 concerning Waste Management mandates that the paradigm of waste management must be changed from collect-transport-dispose to reduction in source and recycling of resources. According to (Luluk Kusminah, 2018), waste processing by transporting waste to the TPA (Final Disposal Site) is not an effective solution because it still causes environmental pollution in the TPA.

Waste management is not the responsibility of a particular agency or institution, but is carried out together or collaboratively. By Law No. 18 of 2008 concerning Waste Management that waste

management is carried out based on the principle of responsibility, the principle of sustainability, the principle of benefit, the principle of justice, the principle of awareness, the principle of togetherness, the principle of safety, the principle of security, and the principle of economic value. Therefore, it is necessary to the responsibility of each individual or institution to manage plastic waste.

The type of waste is currently dominated by plastic waste, rubber, Styrofoam, metal, glass, and others. Plastic is one source of environmental damage. Plastic is used to make drink bottles, cutlery, food or beverage packaging, and household appliances. Therefore it is necessary to the responsibility of each individual or institution to manage plastic waste. This condition must of course be supported by knowledge about good plastic waste management so that it has an impact on reducing waste globally and improving the community's economy.

One way to manage plastic waste is to utilize plastic waste with the Ecobrick technique. Ecobrick is one of the creative efforts for handling plastic waste where ecobrick itself is handling plastic waste by trapping plastic so it doesn't roam in the environment. The function of the ecobrick itself is not to destroy plastic waste, but to extend the life of these plastics and process them into something useful, which can be used for the benefit of humans in general (Suminto, 2017)

The purpose of this service activity is to educate students, especially students and teachers of SMK Negeri 7 Kupang City so that they can manage waste properly so that the amount of waste in the environment can be reduced and not pollute the environment. The approach that was originally the end of the pipe was replaced with the 3R principle (reduce, reuse, recycle). The 3R principle, namely Reduce, Reuse, and Recycle is a paradigm that has been running for the past few years. The principle of plastic waste management has not stopped at the 3R concept but has developed into 5R.

Educational activities The concept of 5R (Reduce, Reuse, Recycle, Replant, Replace) can be defined as Reduce (reduction of use that is not environmentally friendly), Reuse (reuse used goods) and Recycle (recycle plastic waste), Replant (replant waste) organic), Replace (replace plastic). So far, plastic waste management has implemented the 4R concept (Reduce, Reuse, Recycle, Replace).

This activity is expected to be useful to suppress the growth rate of the amount of waste, especially in Kupang City.

## METHOD

The targets for community service activities are 50 students and teachers at SMK Negeri 7 Kupang City. The selection of these respondents is an attempt to educate teenagers who can then educate the wider community.

The flow of methods used in community service activities is the lecture method and direct practice and an evaluation of the achievement of activities is carried out using achievement measurement tools. The flow of methods carried out are:

### 1. Lecture Method

The lecture method was chosen to convey the concept of plastic waste, the dangers of plastic waste pollution for life, and the management of plastic waste through the 4R concept. The use of the lecture method is combined with using a laptop and LCD to display PowerPoint material equipped with pictures. Utilization of laptops and LCDs to help trainees understand more about the dangers of plastic waste pollution, considering the relatively large amount of material and limited training time.

### 2. Practice/Simulation

After the lecture method, it was followed by direct practice of making ecobricks. By doing this direct practice of making ecobricks, students and teachers are expected to have the skills to make ecobricks so that they can make their own ricks.

How to Make Ecobricks:

- 1) Prepare various types of plastic such as crackles, food or beverage packaging, straws, and others. All plastic must be ensured to be dry. The goal is not to smell. All plastic is cut into smaller sizes.
- 2) Prepare plastic bottles (eg mineral water packaging).
- 3) Prepare a stick or piece of wood to push the plastic into the packaging bottle. The size of the wood is adjusted to the height of the bottle.
- 4) Put the type of plastic that has been cut into the plastic bottle that has been provided. Start by inserting plastic with various colors mixed into one.
- 5) After the plastic is inserted into the bottle, push the plastic slowly a bit until the plastic is filled perfectly or according to what we want.
- 6) The use of bottles with a size of 600 ml can be filled with plastic waste of approximately 200 grams and for bottles of 1,500 ml, approximately 500 ml.

### 3. Achievement measuring tools

The measuring instrument for the achievement of this community service activity is that at least 50% of the training participants have an increased understanding of the dangers of plastic waste which is measured through a pre-test and post-test will be given before and after the material is given.

## RESULTS AND ACHIEVEMENT OF GOALS

This community service activity has been carried out in July 2022. This service activity can provide knowledge benefits for students and teachers of SMK Negeri 7 Kupang City on the problem of plastic waste before this service activity is carried out. Plastic waste management with the 4R concept (Reduce, Reuse, Recycle, Replace) and the manufacture of Ecobricks is an effort that can reduce plastic waste and plastic pollution in the environment.

Reduction is reducing activities that cause a lot of waste, such as reducing the use of

plastic when shopping. The habit of saving the use of plastic materials can indirectly reduce the amount of plastic.

Reuse is the activity of reusing plastic that can still be reused or used repeatedly, such as reusing beverage bottles as containers for storing washing liquid.

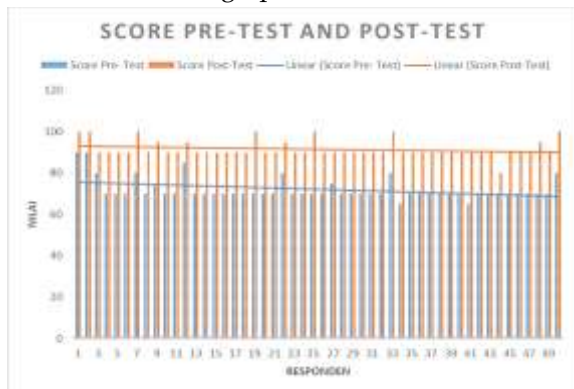
Recycling is the activity or activity of reusing single-use plastic products formed/converted into other products. For example, recycling plastic bottles into plastic pellets which are then used as raw materials for making plastic chairs.

The utilization of waste is an attempt to change waste from non-economic goods become goods of economic value that can indirectly reduce the problem of waste in the environment. Direct reuse of inorganic waste, for example, the manufacture of handicrafts made from used goods. Meanwhile, indirect reuse of inorganic waste, for example by selling used goods such as bottles, cans, and used newspapers to entrepreneurs. Waste processing must apply the use of technology so that the recycling process, both organic and inorganic waste, will become easier. However, to facilitate the processing, waste should be sorted by type.

Ecobrick consists of two words eco which means environment and brick which means brick. Ecobricks are plastic drink bottles that are packed with non-organic waste to make reusable building blocks (Fauzi et al., 2020). The activity of making ecobricks is expected to be able to provide significant changes to the environment, especially in Alak Village, Kupang City. According to (Istirokhatun & Nugraha, 2019) that the higher the public's concern for the waste problem, it will be followed by the decrease in the amount of waste.

This service activity was followed by students enthusiastically starting with their enthusiasm for listening to lectures/materials given by the presenters. Before giving the material, participants do a pre-test to see their knowledge of the participants before being given

material, and after the activity takes place the participants will also be given a post-test to want to see if they have understood the material that has been given. The average score based on the level of knowledge and understanding of students ranges from 65-90. After giving the material, the average score of students rose to 80-100. The following pre-test and post-test scores can be seen in the graph below:



Based on the graph above, it is known that before starting community service activities, many students do not know about waste management properly. Before starting the service, many students did not know how to manage waste properly and wisely. It is known from the results of the Pre-test scores of students who answered correctly ranged from 65-90. However, after being given an explanation, the level of students' understanding of managing plastic waste increased. This can be seen from the results of the Post-test scores of students who answered correctly ranging from 80-100.

After giving the material, student representatives were asked to come forward and do a demo of making ecobricks. Based on observations during this service activity, several positive results were obtained. These positive results include (1) the participants showed high attention to the lectures delivered by the presenters where students and teachers listened carefully to the material presented, (2) the participants showed a positive reaction to the interest in making ecobricks, (3) the participants following the procedure for making the product

and doing team work quite well, (4) participants actively asking if there is a manufacturing procedure that they don't understand, and (5) participants working on making the product well.

At the evaluation stage, the service team gives questions to review the goals of the service by giving questions about the management of plastic waste with the 4R concept. The advantages and disadvantages of activities when viewed in terms of their suitability with the conditions of students at the activity location cannot be separated from the supporting and inhibiting factors. In the implementation of service activities, the supporting factors include (1) the enthusiasm of students and teachers in participating in community service activities is quite good, (2) the attitude of curiosity and desire to try new and useful things from the trainees is good, (3) support from the school towards this service activity is good, (4) the materials used are easy to obtain, and (5) the manufacturing process is by the time allotted.

## CONCLUSION

The high activity of pollution in the land and water environment disrupts the life of the biota that lives in it. The 4R concept and the manufacture of ecobricks is one of the most effective efforts in reducing the amount of plastic waste and the level of environmental pollution. After this service activity, it is hoped that the problems of accumulating plastic waste, lack of awareness to manage plastic waste, and the absence of using plastic waste can be resolved.

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