

ECOBRIKES: PLASTIC WASTE MANAGEMENT STRATEGY IN "KAMPUNG KURANG SAMPAH", KERTAWANGI VILLAGE, CISARUA, WEST BANDUNG REGENCY

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Abstract : *Garbage is one of the big problems in Indonesia because it can have a negative impact on the environment and public health. It is necessary to provide an alternative to help control plastic waste by applying the 3R principles, devotional activities offer another alternative in the form of Ecobrick. The purpose of this study is to describe the efforts of waste management strategies through the manufacture of ecobrick as a continuation of the "Kampung Kurang Sampah" program in Kertawang Village, Cisarua, West Bandung Regency. The method in this study used a descriptive qualitative method. The data collection techniques were carried out by observing, interviewing and conducting participatory methods in the form of counseling activities, demonstrations, and the implementation of making ecobrick. The subjects and limitations of this research are the people in RW 09 of Village 3. The results can be declared successful based on the stages of preparation, implementation, enjoying the results and evaluation of making ecobrick that have been carried out according to procedures. Therefore, with the activity of making ecobrick in the form of counseling, demonstrations and implementation of making this ecobrick to the community, it is hoped that it will raise awareness to process plastic waste that is commonly found to reduce environmental pollution and increase creativity also productivity from making this ecobrick.*

Keywords: *waste management, ecobrick, waste problems.*

1. INTRODUCTION

Garbage is one of the big problems in Indonesia because it can have a negative impact on the environment and public health. Garbage is closely related to population growth which tends to increase every year. The increase in the volume & type of waste is also related to the lifestyle of the community. Related to the increase in the volume of waste is the type and variety, specifications and characteristics of waste that increase from time to time along with the emergence of new materials and materials. According to research data conducted by the Ministry of Environment and Forestry (KLHK) in (Nugraha, Sutjahjo, & Amin, 2018) explained that the amount of waste generated in Indonesia has reached 175,000 tons/day and 64 million tons/year with the following management, transported and 69% is buried in landfill, 10% is buried, 7% is composted and recycled, 5% is burned, and the remaining 7% is not managed.

Judging from the composition, the waste contribution is divided into 60% organic waste, 15% plastic, 10% paper, and 15% metal, glass, cloth, leather. The amount of waste production is expected to continue to increase in line with population growth to reach 2.2 billion tons of waste in 2025 (Oktaverina, Anwar, & Ifroh, 2020). According to Adharsyah (2019) of the total waste, plastic waste is one of the many contributing factors to ecosystem damage in the environment. Data shows that the amount of plastic waste in Indonesia, which is around 7.2 million tons per year, does not include the amount of waste that is buried and spread throughout Indonesia. According to Hendiarti (2018) that in Indonesia, which reaches 38 million tons/year, 30% of the waste is plastic. (Septiani, Arianie, Risman, Handayani, & Kawuryan, 2019).

According to Jabarekspres.com, one of the contributors to waste in Indonesia is West Java Province, precisely in Kertawangi Village, Cisarua, West Bandung Regency, every day reaching 2 tons of waste from a total of 4000 families. Where the types of waste produced are household waste and plastic waste. Previously, this waste was usually disposed of in the Sarimukti landfill/final management site. So that the TPA will receive more waste in line with people's consumption patterns. Waste that is sent to the landfill when it is not balanced with the processing of the waste will cause many problems and tend to have a negative impact.

According to Kahfi (2017) the imbalance between waste (waste produced), transportation and management in general makes this problem more complex and piling up. This is because: (1) the volume of waste is large and is not matched by the capacity of the TPA so that it exceeds its capacity, (2) the waste transportation facilities are limited and unable to transport all the waste, (3) the remaining waste in the TPS has the potential to become a pile of unmanaged waste, (4) waste processing technology is not optimal so it is slow to decompose, (5) not all environments have garbage collection locations so that people often throw garbage in any places (6) lack of socialization and government support regarding waste management and processing and its products, (7) lack of education and good self-management regarding proper waste management, ineffective waste management

and according to Setyo Purwendo and Nurhidayat in (Kahfi, 2017) that community culture is reflected in the lack of discipline and low awareness of protecting the environment and according to (Kahfi, 2017) Riswan, Sunoko, & Hadiyanto, 2011) that low education is related to self-awareness in protecting the environment.

Suwerda in (Kahfi, 2017) mentions that the impact of piling up unmanaged waste can be a source of disease, the environment becomes dirty, becomes a fertile place for pathogenic microorganisms that are harmful to human health and also becomes a nest for flies, mice and other wild animals. Decomposition of garbage can cause unpleasant odors and is harmful to health, the liquid released can seep into the ground and can cause pollution of wells, ground water and what is dumped into water bodies will pollute rivers, disposal of garbage in rivers or water bodies can cause river silting, so that can trigger flooding. Garbage that is not handled properly can also interfere with environmental aesthetics (Saputro, Kismartini, & Syafrudin, 2015).

The increase in waste generation each day will reduce space and interfere with human activities, furthermore, inadequate waste management will trigger social problems, such as mass riots, clashes between residents, blocking of landfill facilities. (Sulistiyorini, Darwis, & Gutama, 2015). Apart from plastic waste which has a greater impact on the environment and humans, according to Thompson (2009), in addition to disturbing aesthetics, the risk of the emergence of plastic waste is transferring toxic compounds to the ecosystem and disturbing the living things in it. Plastic crumbs contain PCBs (Polychlorinated biphenyl), aromatic hydrocarbons, organochlorine pesticides, phthalates, and other substances that are added during production, but also become adhering materials from the environment.

Furthermore, Setyowati & Mulasari (2013) revealed that plastic waste is still difficult to manage, and it takes hundreds of years for it to be decomposed by microorganisms, so that good waste management is needed so that it does not have a negative impact on public health (Septiani, Arianie, Risman, Handayani, & Kawuryan, 2019). In solving the waste problem, waste management can be carried out using the 3R principle (reduce, reuse, and recycle). This 3R is the main principle of managing waste from the source, through various steps that can reduce the amount of waste that is disposed of to the TPA (Final Disposal Site) (Sulistiyorini, Darwis, & Gutama, 2015). Thus, the West Bandung Regency Government held a "Kampung Kurang Sampah" or Less Waste Village program to minimize waste in the Sarimukti TPA, the program aims to create a waste-friendly environment by involving all villages in West Bandung Regency so that people are required to manage waste from home.

In 2020, Kertawangi Village, Cisarua, West Bandung Regency was selected and named the Less Waste Village, where the village contributed the least amount of waste to the Sarimukti TPA compared to other areas. The strategy carried out by the Kertawangi Village Government is to manage waste to the RW level where organic waste in the form of household waste such as vegetables, fruit, food scraps

can be used as biogas or compost and for inorganic waste in the form of plastic by burning.

The strategy of destroying inorganic or plastic waste by burning it still creates contradictions where the impact tends to be dangerous. According to (Kahfi, 2017) burning of waste can result in air pollution that can interfere with public health, and trigger global warming. Meanwhile, according to Fitriana & Soedirham (2013), it is stated that the burning of plastic waste can cause, among others, unpleasant odors, dust, toxic gases from the combustion of waste, even the smoke generated from burning plastic waste which is carcinogenic causing cancer, discoloration and odor river water, as well as the spread of microorganisms that can contaminate water sources (Oktaverina, Anwar, & Ifroh, 2020).

The strategy carried out by Kertawangi Village, Cisarua, West Bandung Regency in controlling the impact of burning waste is by planting trees in the rainy season, by planting trees, all forms of air pollution including burning plastic waste can be controlled. Although planting trees is not the only alternative in controlling plastic waste because it takes a long time in the tree growth process, it is necessary to provide other alternatives to help control plastic waste by applying the 3R principles, namely Reduce, Reuse, and Recycle which should be able to be applied in overcoming plastic waste in a simple but effective way, in this case this community service activity offers another alternative in the form of Ecobrick, according to Fatchurrahman (2018) in (Zuhri, Cahyanti, Alifa, & Asyfiradayati, 2020) Ecobrick comes from two words in English, namely "ecology" and "brick".

Ecology according to the KBBI is defined as the science of the reciprocal relationship between living things and (conditions) of their natural surroundings (environment). The brick means brick, stone, red stone/wall, also mean a good person. Ecobrick which means environmentally friendly brick. Ecobrick is a method of processing waste by means of plastic bottles filled densely with inorganic waste, namely plastic. Ecobrick can be used as a solution to overcome plastic waste into new products that have useful values and selling points by empowering individuals to be responsible for their waste from the source (Leria, Febrianto, Astari, Fitriasari, & Syarifuddin, 2020).

The research conducted by Muhammad Fauzi et al (2020) entitled community empowerment through training in making ecobricks as an effort to reduce plastic waste in the Bunga Raya sub-district. The method used in this study uses the extension method in the form of lectures and direct practice and evaluation of activity achievements is carried out. So the results of this study after carrying out community service activities can be seen that the community has been able to make seats from ecobricks. Research conducted by Dwi Rizky Oktaverina et al (2020) entitled Analysis of Differences in Plastic Waste Management Skills Levels Through the Demonstration Method for Making Ecobricks on PKK Mothers in the Air Putih Village. The method used in this study uses teaching methods in the form of lectures and demonstrations which are specifically studied and carried out repeatedly in order to assess skills in making ecobricks. The results of this study were that most

of the PKK women became skilled in making Ecobrick. Although there are still some who have less skills, the respondents have the desire to continue making their own ecobricks.

Furthermore, research conducted by Apriyani Apriyani, et al (2020) entitled Utilization of Plastic Waste into Ecobricks. The method used in this study uses the extension method by providing an understanding of Ecobricks and the procedures for their manufacture. The results of this activity are by utilizing plastic waste into ecobricks to prevent the accumulation of plastic waste and educate kindergarten students. Furthermore, the research entitled Guerrilla (Innovative Movement for Waste Management and Libraries): Waste Management Through Vermicompost and Ecobrick Activities to Grow Community Roles in Education and Environment to Realize SDGs 2030 written by Lintang Primaturismaa and Yeni Dhokhikah in 2020. This study uses a study method literature by using literature in the form of national journals, international journals, and scientific articles. The results of the research show that the existence of this guerrilla can reduce the accumulation of waste, this activity is very positive because in addition to producing works from ecobricks, we also learn to make compost from worms that can be sold. The next research entitled Plastic Waste Processing Through Ecobrick Product Creativity was written by Patria Sandy Putra Leria, et al in 2020. The research is an observational study of the Baron hamlet community. The result obtained is that there is training and assistance in making ecobricks, the people of Dusun Baron can process waste into a product with useful value and high selling value.

The research from the results of this service entitled Ecobricks: Plastic Waste Management Strategy in “Kampung Kurang Sampah” Kertawangi Village, Cisarua, West Bandung Regency, the issues to be raised are related to strategic efforts in managing plastic waste, and how to use ecobricks as an alternative to plastic waste management. This study aims to describe the efforts of waste management strategies through the manufacture of ecobricks as a continuation of the Less Waste Village program, Kertawangi Village, Cisarua District, West Bandung Regency.

This study uses a qualitative research method with a descriptive research design. The data collection techniques were carried out by observing, interviewing and conducting participatory methods in the form of counseling activities, demonstrations and implementation of ecobrick making in Kertawangi Village. The subjects and limitations of this research are the community in village/hamlet 3 which includes RT 01, RT 02, RT 03, RT 04 in RW 09, both parents and children. Therefore, with the activity of making ecobricks in the form of counseling, demonstrations and implementation of making this ecobrick in the community, it is hoped that it will raise awareness to process plastic bottle waste and household plastic waste which is commonly found to reduce environmental pollution and increase creativity and productivity from making this ecobrick.

2. METHOD

The research method carried out in this study used a qualitative research method with a qualitative-descriptive research design. Data collection techniques are carried out using primary and secondary data sources. The primary data source according to Sugiyono (2015: 193) is in this research, in the form of data from environmental and community observations. Secondary data comes from journals (both nationally and internationally reputed journals), namely by observation, interviews, and participatory methods in the form of extension activities, demonstrations and implementation of ecobric making.

According to Usman (2011) in (Rahmayanti & Pinasti, 2016) observation is a systematic observation and recording of the symptoms studied. According to Moleong (2006) in (Rahmayanti & Pinasti, 2016) an interview is a conversation with a specific purpose. The conversation was carried out by two parties, namely the interviewer who asked the question and the interviewee who gave the answer to the question. The interviews used in this study were semi-structured interviews. This interview was conducted with stakeholders, namely the Head of Kertawangi Village regarding the Less Waste Village program. The participatory method where this method involves direct community participation. According to Uphoff, Cohen, and Goldsmith (1979: 51) divide participation into several stages, namely: planning stage, implementation stage, enjoying the results stage, and evaluation stage. The participatory method or direct community participation is in the form of demonstrations carried out by distributing pamphlets when counseling is carried out.

The time of this research is for one month, starting from July 27, 2021 to August 27, 2021. This activity is carried out by making ecobric from the community service team itself, so that in the counseling and demonstration stages already have examples of results and are able to give a clearer and more real picture. The subjects in this research target are the people in the hamlet/village 3 area which includes RT 01, RT 02, RT 03, RT 04 RW 09, both parents and children. Demonstrations and counseling activities were carried out for mothers who took their children to follow elementary-junior school tutoring, where when conducting demonstrations and counseling the parents of the children received direct guidance from the community service team and saw firsthand the results of the finished ecobricks.

The specific times are every Tuesday, Wednesday and Thursday. Not only parents, children who take tutoring also participate in making ecobric, namely in cheerful classes every Sunday, even some children do it after every tutoring activity. The demonstration and counseling were carried out at the time of the 17 August celebration, this activity was carried out by going door to door by giving pamphlets on waste processing and making ecobricks, besides that the community service team also practiced how to make them and brought samples of finished waste and ecobricks. This activity was carried out with the Karangtaruna of Cibolang hamlet when conducting outreach in preparation for August 17, 2021, this activity was carried out on August 14, 2021. The purpose and output of the counseling and demonstration was holding an ecobric competition on the celebration of August 17,

2021 which was collected on August 22, 2021. in celebration of the independence day of the Republic of Indonesia. People who participate in making ecobricks and collecting them will be given special rewards and rewards for winners of the Ecobrick competition.

3. RESULT DAN DISCUSSION

A. "Kampung Kurang Sampah" Program in Kertawangi Village, Cisarua, West Bandung Regency

According to the Head of the Environmental Service (DLH) of West Bandung Regency, at the beginning, Kertawangi Village became a Less Waste Village, where this village passed the Curug Pelangi tourist attraction. There are lots of piles of garbage on the banks of Perhutani's land, which residents then manage the waste into biogas. In addition, Kertawangi Village contributes the least amount of waste in the Sukamukti TPA, a lot of waste is collected by the community and managed into biogas, and the result is that organic waste is decreasing. If there is no supply of raw materials for waste, biogas cannot function effectively. According to the Head of Kertawangi Village, this program was able to run thanks to the agreement of 300 families who were willing to sort out organic and inorganic waste.

Organic waste becomes the raw material for renewable energy for gas, the rest becomes compost. And plastic or inorganic waste is temporarily destroyed by burning it. Although burning is not the only effective strategy in destroying inorganic or plastic waste because the impact is also quite large, it can pollute the environment and cause unpleasant odors, dust, toxic gases from burning waste, and even smoke from burning plastic waste. which are carcinogenic causing cancer, changes in the color and smell of river water, as well as the spread of microorganisms that can contaminate water sources.

Therefore, the Kertawangi Village government held a program of planting thousands of trees in the rainy season, for 2021 it has now been carried out in January 2021. Planting trees in the rainy season is in accordance with natural conditions, so trees can grow and be watered by rain water. Not stopping there, the Head of Kertawangi Village emphasized to the community to continue to plant trees because they can become fields of goodness in this world and in the hereafter. The hope of the existence of the Less Waste Village program can motivate other regions regarding the importance of a waste-friendly environment, and with this program the community will continue to process waste by sorting waste before it is disposed of at the TPS, and waste will stop at the RW, and will even try to stop at the RW. The RT is even in the household, meaning that the family is able to sort and process the waste.

As for the results of environmental and community observations in Village/hamlet 3 which includes RW 09 which is divided into RT 01, RT 02, RT 03, RT 04 that there is still plastic waste scattered on the roadside, ditches, and there are still many residents who destroy plastic waste by how to burn. There are still people who do not know about Kertawangi Village which has been named the Less

Waste Village or "Kampung Kurang Sampah" and there are still many who do not know about the waste less program. Not only that, the community also does not have other alternatives for processing plastic waste.

Therefore, the community service team from KKN 105 UIN Sunan Kalijaga Group 54 brought an alternative in processing by recycling plastic waste, namely the ecobrick making program. Ecobrick is a method of processing waste by means of plastic bottles filled densely with inorganic waste, namely plastic. Ecobricks can be used as a solution to overcome plastic waste into new products that have useful values and selling points by empowering individuals to be responsible for their waste from the source (Leria, Febrianto, Astari, Fitriasari, & Syarifuddin, 2020).

B. Ecobrick Program Procedure

In this procedure, that is by using a participatory method where the researcher goes directly to the field and follows the activities under study when involving community participation. According to Uphoff, Cohen, and Goldsmith (1979: 51) divide participation into several stages, namely:

- 1) The planning stage, this stage is marked by the involvement of the community who plans the development program to be implemented, and prepares a work plan. Where at this stage the community service team discussed the ecobricks making program by discussing with the RW and Hamlet heads regarding waste management, alternatives and making ecobricks. The community service team also collaborated with the RW 09 youth group in planning this program, not only that the community service team discussed with the PKK women in Kertawangi Village regarding the ecobrick program that will try to be implemented in Hamlet 3 RW 09. The results of this planning, that this ecobrick program will held through demonstrations in the form of distributing pamphlets and outreach to the public. To attract the public to try, this program will be used as a competition event for the August 17, 2021 competition which is collected on August 22, 2021. Demonstrations and counseling are carried out during the socialization of preparations for the 17 August celebration with Karangtaruna RW 09 by visiting people's homes one by one or by door. doorstep. Not only in the activities of the 17 August celebration, the community service team also planned demonstrations and counseling for parents who took their children tutoring at the service team's place, and also participated in demonstrations and counseling to tutoring participants and included this activity in cheerful class activities in the field program. education, for demonstration, namely by providing waste sorting pamphlets and ecobrick production pamphlets, and by directing examples as well as practices in making ecobricks by looking at examples that have been made by the service team first.
- 2) Implementation Phase, is the most important stage in the program, the core of the success of a program is implementation. The real form of participation at this stage can be classified into three, namely participation in the form of

contribution of ideas, form of material contribution, and form of involvement as a member. In this case, the implementation of making ecobricks has been carried out when the class activities are cheerful and after the tutoring activities are finished. The service team also continues to make ecobrick when in spare time or when there are no activities. The tutoring participants looked very enthusiastic when making this ecobrick, the garbage that was successfully inserted was approximately 4 large sacks to fill a 600 ml bottle with a weight of more than 200 g and a dense density so that the ecobrick felt very hard and had no more space in it. The implementation of the ecobricks competition was collected on August 22, 2021 in the front yard of the RW 09 Posyandu. There were several people who managed to collect ecobricks, with a total of 20 ecobricks. From the collected ecobricks, modules will be made and become items that can be used and useful.

- 3) The stage of enjoying the results, this can be used as an indicator of the success of community participation at the planning and implementation stages of the program. As for the results of making ecobricks from the planning and implementation stages, these ecobricks were successfully made into a module into a bench/chair. Not only that, the collected ecobricks have managed to process and recycle plastic waste. So that it can minimize the accumulation of plastic waste and reduce burning in destroying plastic waste. The module that has been made into a bench/chair from ecobricks will be stored in Poskamling RW 09 and as the work of residents of RW 09. The existence of this ecobrick shows that there are other alternatives in processing plastic waste other than burning it. And this module was completed on August 27, 2021. Not only that, residents who managed to collect ecobrick got a reward and the winner of this ecobrick competition got an additional reward. It is hoped that the successful construction of this ecobrick bench module will be able to attract public interest in processing plastic waste, so that it becomes an alternative in plastic waste management and becomes sustainable.
- 4) This evaluation stage is considered important because community participation at this stage is considered as feedback that can provide input for improving program implementation. The evaluation of the holding of this ecobrick making program is that the community has not all participated in making this ecobrick, so there are still many people who are not aware of the importance of sorting waste and recycling plastic waste. From the existence of ecobricking activities, there is a need for support in the form of follow-up from the government in overseeing this ecobricking program. Because after the collection of ecobricks in the celebration competition on August 17th, people who have made and collected ecobricks are likely to stop and not continue their waste management and ecobricking activities. So that in following up the "Kampung Less Waste"

program, it is necessary to involve all elements, both the community and the government, who support each other in creating a Less Waste Village.

From the demonstration and counseling activities of the ecobrick program which were carried out door-to-door or house-to-house, it was quite effective, the community became interested in making and collecting ecobricks. or directions. This is in line with the research of Astuti and Surasmi (2016), the demonstration method optimizes memory absorption in storing information through the use of visual aids. This research is supported by Ichsan & Surandini (2018) the demonstration method improves motor skills in recycling plastic waste because the demonstration method can improve creative thinking skills and problem solving skills (Oktaverina, Anwar, & Ifroh, 2020).

From the ecobrick program that has been implemented, it can be said that this program tends to be successful in minimizing and processing plastic waste for some time. Ecobrick is an effective program in recycling waste, this is stated by (Primaturrisma & Dhokhikah) the results of the study show that with this Ecobrick can reduce waste accumulation, this activity is very positive because it can produce works from ecobricks in the form of benches, chairs, tables and so on. This is similarly expressed by (Leria, Febrianto, Astari, Fitriasari, & Syarifuddin, 2020) that with training and assistance in making ecobricks, the community can process plastic waste that has not been processed into a product with value and high selling value. Not only that, this ecobrick needs ongoing assistance so that people continue to work in sorting plastic waste, because if there is no sustainable assistance, the community is worried that they will stop processing plastic waste and there will be waste accumulation and waste destruction through burning. This is supported by research conducted by (Primaturrisma & Dhokhikah) that community participation in waste management must include collaboration between the government and the community, the private sector and NGOs must be carried out.

There are four strategies to achieve the goal of community participation in household waste reduction, namely to identify household waste reduction through training for community and environmental cadres, to increase information through mass media and campaigns on household waste related to handling and reduction, to increase the number of environmental cadres. from the community and local leaders and to increase the number of waste banks and their functions. When there is no continuation and assistance in the management of plastic waste, especially in the manufacture of ecobricks, the community will return to the paradigm that the place where waste ends is in the TPA. The hope is that with this ecobrick program, it can be another alternative in the management of plastic waste, so that the destruction of plastic waste can not only be burned but can be processed, recycled into objects that have value and are useful. So that the less waste village program will continue to be implemented with a more environmentally friendly concept.

4. CONCLUSION

Community service activities through recycling plastic waste or called ecobricks which were carried out in RW 09 or Dusun 3 Kertawangi Village can be declared successful. Based on the stages of preparation, implementation, enjoying the results and evaluation of making ecobricks, they have been carried out according to the procedure. The participants from the tutoring participants were very enthusiastic, but the residents of RW 09 have not fully participated and are still considered a minority, even though they are only a minority but the residents are very enthusiastic and the residents understand and are trained on how to make ecobricks. The hope of making ecobrick is that it can be one of the ways to manage waste to reduce plastic pollution in the surrounding environment, and this ecobrick is an alternative to processing plastic waste so that it does not always have to be burned in the destruction of plastic waste. Not only that, this ecobrick is an effort from the plastic waste management strategy as a sustainable of the Kertawangi “Kampung Kurang Sampah” program, so that it will continue to be controlled.

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