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TPS, Eco Brick, and Hydroponics as Efforts to Reduce and Manage Waste in RW. 01, Simpang Tuan Village

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ABSTRACT

Simpang Tuan Village, Mendahara Ulu District, East Tanjung Jabung Regency, Jambi Province faces many obstacles in terms of cleanliness quality. The Real Work Lecture Program (KUKERTA) of the State Islamic University of Sulthan Thaha Saifuddin Jambi provides opportunities for students to preserve in community development and service. This study aims to reduce and manage waste in Simpang Tuan Village, Mendahara Ulu District, East Tanjung Jabung Regency, especially in RW. 01 Pematang Lalau Village, as part of the KUKERTA work program of Post 73 Group II, State Islamic University of Sulthan Thaha Saifuddin Jambi. The method used in this study is a qualitative method through observation, interviews with the community, and through secondary data such as journals and scientific articles. The results of the study stated that the form of waste management in the village still faces many challenges, especially related to inadequate infrastructure such as the lack of final waste disposal sites and low public awareness of the importance of protecting the environment. KUKERTA students play a role in waste reduction and management in this village as part of their work program by holding socialization about waste awareness, construction of landfills, ecobricks, and hydroponics. In addition, the waste reduction and management program helps achieve the Sustainable Development Goals (SDGs) in this village. The results of this work program show that the community has started to dispose of waste in landfills and has creativity in processing waste into useful items. In conclusion, efforts to improve waste reduction and processing can continue to be carried out to obtain better environmental health for the community in RW. 01 Pematang Lalau Village.

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Introduction

Every individual has a basic right to a clean and healthy environment. However, until now, the most common disease found in society is the problem of waste that can hinder the achievement of environmental welfare. Waste is the result of human activities in everyday life, both in organic and non-organic forms. Along with the development of technology and population distribution, increasing human activities are the greatest efforts to increase the types and amounts of waste

produced. Good and effective waste management is an important aspect in creating a healthy environment.[1]

To prevent the impact caused by waste management in the community environment can be done. Waste that is not managed properly and correctly, if not managed properly will have an impact on environmental damage and cause problems for the community. The smallest unit in the waste management system is one of the villages. Waste management strategies at the village level must be adjusted to the social, geographical, economic, and cultural conditions of the local community.

Simpang Tuan Village is one of the areas experiencing problems in waste management. The increasing population, changes in consumption patterns, and lack of awareness of the importance of good waste management are some of the factors that affect the environmental quality in Simpang Tuan Village. Environmental conditions where garbage is still found along the road and bushes, even at some points, garbage is piled up. Therefore, good and proper waste management can be socialized to help increase public awareness of the importance of a healthy environment.

The KUKERTA activity of the State Islamic University of Sulthan Thaha Saifuddin Jambi is a form of learning and community empowerment. This KUKERTA activity aims for students to be able to play an active role in helping the community to uncover problems and be able to solve problems found in the community. The problem of waste found in the community of Simpang Tuan Village is the main focus of the KUKERTA work program of UIN SUTHA Jambi post 73 gel. II which is adjusted to the achievement of the Sustainable Development Goals (SDGs) of the village point 15, in the aspect of caring for the land environment to create a prosperous, clean, and healthy environment. Therefore, through this KUKERTA program we hope to provide real contributions in efforts to create a clean, healthy, and sustainable environment in Simpang Tuan Village. Hopefully this article can be a guide for related parties in developing better waste management policies and programs in the future.

Result and Discussion

A. Waste Management in Simpang Tuan Subdistrict

One of the factors that attracts attention to the community environment in Simpang Tuan Village, Mendahara Ulu District, East Tanjung Jabung Regency, Jambi Province is the spread of plastic waste on the side of the highway. Usually, people do not think about the impact of waste that has been thrown away without any final processing. The results of any waste can be thrown anywhere without considering the impact.[2]

Seeing that not all waste management cannot be implemented properly because there is no land available for the waste management process, this does not lead to the 3R model. There is still a lack of well-coordinated waste collection points. People here still throw garbage on the side of the road, especially on roads that still have bushes, or throw it in their respective areas and houses and then bury or burn it. Then the sub-district area is right on the side of the main road that is usually passed by large trucks, it is possible that there will be a lot of littering on the side of the road.

This is a form of minimal knowledge about the impact of improper waste management and indiscriminate waste disposal without considering the impact in the end. The presence of KUKERTA UIN SUTHA Jambi post 73 students places attention on this waste problem which is a form of group work program as a form of community service.

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[1] Ariyadi, Mira Saskia Ningrum, et al . *Real Work Lecture Analysis of Waste Management in the Karang Rejo Village Community, Gunung Maligas District* . Journal of Community Development, Vol. 4, No. 4, 2023, p. 7998

[2]Hendri Fauza, Andini, et al. *Analysis of Waste Management by KKN Students Group 74 Uinsu in the Bagan Kuala Village Community, Tanjung Beingin District, Serdang Bedagai Regency* . Scientific Journal of Wahana Pendidikan, Vol. 10, No. 6, 2024. P. 421

Through socialization about cleanliness and the impact of waste to the younger generation in this area. With the realization of cooperation between KUKERTA students and the surrounding community, by building a waste disposal site that coincides with RW. 01, RT. 01 Kelurahan Simpang Tuan, utilization of waste with hydroponics, ecobricks, and also placement of waste disposal posters as a form of effort to care for a clean and healthy environment.

With all that, the form of community service by KUKERTA UIN SUTHA Jambi students can be beneficial for good waste management in Simpang Tuan Village and can be an inspirational form in the eyes of the community.

B. Waste Reduction Efforts Through Community Creativity

1. Garbage dump

Waste processing in an area aims to provide services to residents for the waste they produce, which indirectly helps maintain public health and create a clean, good and healthy environment.[3]

In Simpang Tuan Village, KUKERTA UIN SUTHA Jambi students at post 73, the focus of their work program is waste management. Waste sources are generally closely related to land use and the division of areas for various uses. Basically, waste sources can be classified into several categories, namely: settlements, public places and trade places, government-owned public service facilities, light and heavy industry, and agriculture.

One of the waste reduction efforts carried out by KUKERTA UIN SUTHA Jambi students is to build a waste disposal site. Assisted by mutual cooperation with the community, the TPS was established permanently, located in RW. 01, RT. 01, Simpang Tuan Village.

In addition to being a manifestation of the KUKERTA group's work program, TPS is expected to be a means of disposing of waste from the community to minimize the spread of litter and the accumulation of waste that is not further managed.

Figure 1. *TPS creation*

2. Eco bricks

Plastic waste is the most widely discarded waste by humans because many people use plastic for their daily needs, be it individuals, shops, or large companies. The disposal of plastic waste into the air and soil is also increasingly widespread, this is increasingly triggering environmental

[3] Djatmoko Winahyu, et al. *Waste Management Strategy at Bantargebang Final Disposal Site, Bekasi.* Journal of Regional Development Management, Vol. 5, No. 2, 2013. Pg. 4

damage because plastic waste is made of inorganic materials.[4]

One way to handle plastic waste is through the ecobrick method or utilization of waste using plastic bottles. Ecobrick comes from the words eco and brick which means environmentally friendly bricks which are an alternative to conventional bricks in building buildings. Therefore, ecobrick is a plastic bottle filled with non-biological waste, namely plastic.

Ecobrick is a creative effort to manage plastic waste into useful objects, reducing pollution and toxins caused by plastic waste. Ecobrick is a creative effort in handling plastic waste. Its function is not to clamp plastic waste, but to extend the life of the plastic and process it into something useful, which can be used for the benefit of humans in general. However, the purpose of ecobrick itself is to reduce plastic waste and recycle it with plastic bottles to be made into something useful.

Ecobrick is a collaboration-based technology that provides a no-cost solid waste solution for individuals, households, schools and communities. Ecobrick is an alternative way to utilize these wastes other than sending them to landfill. With ecobrick, plastic waste will be stored safely in bottles, so it does not need to be burned, piled up and buried. Ecobrick technology allows us to not make plastic as one of the industrial recycling systems, thereby eliminating the biosphere and saving energy.

From the observations that we have made together with all student members of the 73 KUKERTA UIN SUTHA Jambi post, in Simpang Tuan sub-district, which is located on the edge of the main road and is often passed by large trucks, so it does not demand the possibility of large amounts of plastic waste and plastic bottles. Lack of awareness and responsibility for environmental cleanliness, so that there is no public knowledge in utilizing plastic waste, some people do not know about sorting, processing and recycling waste, and the unavailability of landfills so that waste piles up and is not useful which results in environmental pollution and becomes a problem in waste management in this area. Therefore, there needs to be an appeal so that the public is able to understand the importance of the availability of ecobricks in the form of chairs and tables that support environmental cleanliness and health, and this activity is also a form of community service program by KUKERTA students this year.

The steps for making ecobricks begin with collecting plastic drink bottle waste, washing them all clean, then drying them. The size of the bottle is adjusted to the needs and the concept being designed. It is recommended to use a bottle measuring between 300 and 600 ml so that the manufacturing process does not take too long. The bigger the bottle, the longer the manufacturing time and the more plastic is needed to fill it. After that, collect various types of plastic packaging, such as instant noodle packaging, instant drinks, plastic wrap, plastic bags and so on. Plastic that must be ensured is free from all types of food (left in it), dry and not mixed with other materials (clips, threads, paper, etc.).[5]

The second step is to cut clean and dry plastic, then insert the plastic pieces into the bottle. This stage can stimulate the ability of eye and hand coordination to perform fine motor movements such as cutting, squeezing, squeezing and pinching by inserting objects into the mouth of the bottle. The bottle filler must not be mixed with paper, glass, metal, sharp objects and materials other than plastic. The plastic material that is put into the plastic bottle must be compacted until it is very dense and fills the entire space in the plastic bottle. The method of compaction is to use a tool made of bamboo or wood (such as bamboo or wooden sticks).

[4] Ririn Widiyasari, Zulfitra, Salsabila Fakhirah. *Utilization of Plastic Waste with the Ecobrick Method as an Effort to Reduce Plastic Waste.* National Seminar on Community Service LPPM UMJ, Muhammadiyah University of Jakarta, 2021. Pp. 2-4

[5] Rahmi Alendra Yusiyaka, Ana Dwi Yanti. *Ecobrick Smart and Practical Solution for Plastic Waste Management.* Learning Community: Journal of Non-School Education, Vol. 5, No. 2, 2021. Pp. 5-6

Figure 2. *Ecobrick Materials and Compaction Process*

In the process of making tables and chairs with ecobricks, you can use bottles of the same size, or even the same type and brand, so that it is easier to arrange. To make a table, bottles that have been filled and solid are put together in a round or square shape. This requires 6-10 bottles, then making it comfortable when used or sat on, requires a seat cushion. The seat cushion is made of flannel and dacron or synthetic cotton that is sewn in such a way that it is then put together on the ecobrick using a glue gun. To make a table, the ecobrick is formed into a square which requires 9 bottles for the table legs. Plywood here is used as a tablecloth wrapped in flannel.

Figure 3. *Making Ecobrick Tables and Chairs*

The target of placement of the results of the ecobrick table and chair by students of KUKERTA post 73, Simpang Tuan Village, UIN SUTHA Jambi is SDN 208/X Simpang Tuan, especially in the library room. With that, the results of the ecobrick table and chair we made with such creativity by adding flower accents made from the remaining flannel fabric. With the aim of attracting students' interest in art.

Figure 4. *Handover of Ecobrick Tables and Chairs To SDN 208/X Simpang Tuan*

3. Hydroponics

The accumulation of plastic waste is a problem that is often found in society because of the nature of plastic waste that is difficult to decompose. Although it can be managed again, plastic waste has its own challenges. Open burning, which is one of the waste management methods that is often found in society, can produce dangerous air pollution and risk causing cancer. Plastic waste also has the potential to pollute various environmental components such as air and soil. One of the most common types of waste is plastic bottle waste.[6]

Plastic bottles are one of the commonly used plastic products and also contribute to the increase in plastic waste. The large amount of plastic bottle waste is not properly processed by the community. In fact, if utilized properly, plastic bottle waste will have a new function that can also increase economic value. On the other hand, conventional agricultural methods that also rely on soil to grow crops also experience various obstacles, such as limited land, poor soil quality, and excessive air use. In this context, the use of bottle waste as a hydroponic planting medium can be an innovative and sustainable solution. The use of used bottle waste as a hydroponic planting medium has the potential to increase urban agriculture and agriculture in areas with limited land. This provides opportunities for the community to engage in sustainable agricultural activities and contribute to local food security. Utilizing used bottle waste can also help maintain environmental cleanliness and reduce negative impacts on the ecosystem.[7]

Currently, a technique for growing plants that can be done outside the soil has emerged, namely hydroponics. Hydroponics is a method of cultivating plants without using soil, but by providing nutrient solutions directly to the roots of the plant. Cultivation with this hydroponic method does not require a large area of land so that its application can also utilize narrow land. In addition to providing solutions to the problems of limited space and soil quality, hydroponics can also increase the efficiency of water and nutrient use and accelerate plant growth. The use of used bottle waste as a hydroponic planting medium is an interesting innovation in overcoming

[6] Wahyu Halya Aprilia Putri, et al. *Utilization of Used Plastic Bottles as Containers in Hydroponic Systems for Vegetable Cultivation.* Benefits: Indonesian Community Service Journal, Vol. 1, No. 3, 2024. Page 2

[7] Wensislaus Arman Ndau, et al. *Utilization of Used Bottle Waste as Hydroponic Planting Media.* JMM: Jurnal Masyarakat Mandiri, Vol, 7, No. 5, 2023. Pg, 5132

two problems at once, namely the increase in plastic waste and the need for efficient farming methods. Hydroponic techniques using used bottles are very effective and efficient in reducing plastic waste and maximizing the waste production process consisting of reduction, reuse and recycling. Used bottles that are usually considered waste can be turned into useful containers for growing plants using hydroponic techniques. Hydroponic plants grow healthily, strongly and cleanly and are rarely attacked by pests.

Hydroponics can be an alternative suitable for planting without requiring a large area and more efficient. Hydroponics is identical to a fairly large capital, but in this case it can be done by minimizing the capital used to be suitable for planting by using used bottles as the media. Hydroponics using used boots is considered more effective and efficient if using the hydroponic method. This bottle can be used to plant various plants and vegetables such as kale, lettuce, and mustard greens.[8]

a. Tools and materials
    1. Scissors
    2. Cutting knife
    3. Vegetable seeds
    4. Land
    5. Solder
    6. Air
b. Steps to make
    1. Prepare a used bottle that will be used as a planting medium, then cut it into two parts, then place the cut bottle cap on the bottom of the bottle with the cap facing down.
    2. Make a hole in the bottle cap using a soldering iron, this will open the roots out to reach the nutrients in the air.
    3. Once all the circuits are formed and can function properly, you can pour water into the bottom of the bottle before touching the upside-down bottle cap. Its function is air that has high nutrient elements that have high mineral content that plants need so that plants can photosynthesize.
    4. Prepare the planting medium in an inverted bottle by filling it with plant seeds and using soil as the planting medium.
    5. Change the water regularly to meet the decreasing nutrient requirements.

Bottles are chosen as a hydroponic planting medium because used bottles are considered very easy to find in the surrounding community, so people do not need to look for media with quite expensive prices. The advantages of being suitable for planting with the hydroponic method are:

a. Agricultural areas are cleaner because they do not use any soil at all.
b. The growth rate of plants using the hydroponic method is faster, this is because there is no certainty that the plant's needs will be absorbed optimally considering that the media is in liquid form.
c. Minimize the use of large land areas
d. Plant control is easier to do because it is in the yard or around the house.
e. The risk of plants being attacked by pests and diseases will be smaller
f. Farming with this method is suitable for hot and cold weather conditions.
g. The costs incurred will be cheaper

[8] Mufida Diah Lestari, Herry Nur Faisal. *Assistance Program for Fulfilling Food Needs Through Hydroponics Using Used Bottles in Tulungagung Regency* . JANITA (Tulungagung Community Service Journal), Vol. 1, No. 1, 2021. Pg. 2

h. Can meet the family's vegetable nutritional intake
i. Cultivate the spirit of "loving to eat vegetables" in the family

Figure 5. *Hydroponics*

Utilizing the yard is currently a good medium to foster a sense of farming, because this method is a revolutionary method and provides considerable benefits. After understanding the community's suitable farming pattern with the hydroponic method, it is necessary to evaluate the success and benefits of implementing the method. Currently, the community's desire to respond to family members' preferences for consuming vegetables, especially vegetables, is very low, so inviting the community to suit farming in a fun way will create a positive response to this.

Conclusion

Simpang Tuan Village is one of the areas experiencing problems in waste management. Population growth, changes in consumption patterns, and lack of awareness of the importance of good waste management are some of the factors that affect environmental quality in Simpang Tuan Village. The environmental conditions are still found with a lot of garbage along the road and in the bushes, there are even piles of garbage in several places. Therefore, good and proper waste management can be socialized to help increase public awareness of the importance of a healthy environment.

The KUKERTA activity of the State Islamic University of Sulthan Thaha Saifuddin Jambi is a form of learning and community empowerment. This KUKERTA activity aims for students to be able to play an active role in helping the community to uncover problems and be able to solve problems found in the community. The problem of waste found in the community of Simpang Tuan Village is the main focus of the KUKERTA work program of UIN SUTHA Jambi post 73 gel. II. Through socialization about cleanliness and the impact of waste to the younger generation in this area. With the realization of cooperation between KUKERTA students and the surrounding community, by building a waste disposal site that coincides with RW. 01, RT. 01 Simpang Tuan Village, utilization of waste with hydroponics, ecobricks, and also placement of waste disposal posters as a form of effort to care for a clean and healthy environment.

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