

Empowering The Limo Urban Village Community in Depok City Through Plastic Waste Recycle Training as an Entrepreneurial Alternative

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Abstract

The service program for community groups in the Limo area, Limo Subdistrict, Depok City, focused on training plastic waste recycling management in environmental care communities that were not yet productive or had no regular income. The problems faced include a waste segregation system that had not been maximized, less than optimal plastic waste management, lack of plastic waste processing technology, and low creation of recycled plastic waste-based products. The purpose of this program was to provide training in making products based on recycled plastic waste as an effort to reduce plastic waste and as an alternative to entrepreneurship. The program implementation was carried out through Focus Group Discussions with partners, knowledge sharing, training on plastic waste processing technology, and the practice of making recycled products. The technology introduced includes a plastic shredder and a simple printing press. The results of the program showed active participation of participants, increased knowledge of plastic waste processing with an achievement rate of 90%, and recycled product manufacturing skills reaching 80%, indicating the success of the program in increasing community awareness, skills, and entrepreneurship in plastic waste management.

Keywords: *businessman, plastic waste, product, training*

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Introduction

The District of Limo is a plain area with an elevation of 70-100 meters above sea level. The area of the district is 413 Km², which is utilized for various purposes. The most common land use in the district is for housing, which is about 395.5 Km² or 95.76% of the total land area, making Limo a residential area. The district consists of 4 subdistricts, namely Meruyung Subdistrict, Grogol Subdistrict, Krukut Subdistrict, and Limo Subdistrict. The population of Limo is 87,240 people, with 44,228 men and 43,012 women. The average population density in Limo is 69 people/Km² (Badan Pusat Statistik Kota Depok, 2019). The population of 87,240 people and the large number of housing estates in the District of Limo have a significant impact on environmental cleanliness, causing various kinds of pollution, including air, soil, and water pollution. Figure 1 shows the location of plastic waste recycling training activities in the Limo area, Depok City.



Fig. 1. Map of the district of Limo

Waste is material that is useless, unwanted, and must be discarded. It generally comes from human activities. As the population increases, so does the amount of waste produced that is disposed of in landfills (Santibañez-Aguilar et al., 2013). The amount of waste produced in the City of Depok reaches 1,250 tons per day, of which about 60 % is organic waste and the rest is non-organic waste, including plastic waste (Kementerian Lingkungan Hidup dan Kehutanan, 2021). This means that each person in Depok City contributes to the disposal of 0.5 to 0.7 kg of waste per day (Maesarini et al., 2020). Plastic waste is one type of waste that can be reused, but because it is not easily decomposed in nature, it causes environmental pollution, plastic

waste polluting Indonesian waters is the second largest in the world (Jambeck et al., 2015). The composition of waste is dominated by organic waste, which reaches 60% of the total waste, and plastic waste occupies second place with another 14% (Purwaningrum, 2016).

Community empowerment is a participatory process that gives trust and opportunity to the community to identify the main challenges of development and propose activities designed to overcome community problems (Totok & Poerwoko, 2015). Community empowerment is a process of trying to strengthen independence, which is a series of activities to strengthen the lower class in society (Alfitri, 2011). With strong community independence, an entrepreneurial spirit will be formed where the community has creative and innovative abilities that are used as a basis, means, and resources in creating business opportunities to achieve success (Mohamad et al., 2012). The entrepreneurial spirit is developed through a creative and innovative process that is able to create something new and different (Saada, 2016).

Enhancing community empowerment and entrepreneurship to address plastic waste can be an effective and sustainable strategy. The first step is to involve the community in the process of identifying problems and potential solutions related to plastic waste in their environment, as well as providing training and education to increase knowledge about the impact of plastic waste and how to manage it. Furthermore, the establishment of community-based social enterprises can be done through business incubators and support in the form of start-up capital and mentoring. This will encourage the community to create creative and innovative products from plastic waste, such as bags, accessories, household furniture, or building materials.

The plastic to make mineral water bottles is certainly different from the plastic used to make bowls, straws, chairs, and pipes. The type of plastic used as the basic material of a product can be seen in the symbol printed on the plastic. This symbol is in the form of a number (1-6) in a series of arrows that form a triangle, usually printed at the bottom position of the plastic object. Each symbol represents a different type of plastic and forms a grouping for the recycling process, as shown in Figure 2.



Fig. 2. Plastic types and symbols

Understanding these different types of plastics is essential for creating economically valuable products from recycled plastics. Knowledge of the characteristics and uses of each type of plastic will simplify the recycling process and enable the creation of high-quality products that meet market needs. For example, PET or PETE (Polyethylene Terephthalate) marked with the number 1 is usually used for beverage bottles and can be recycled into fibers for making carpets or other textile materials. HDPE (High-Density Polyethylene) with the number 2 is often found in the packaging of household products such as milk bottles and can be converted into hard plastic products such as children's toys or plastic pipes.

By understanding the types of plastics, people can more easily choose the right processing method and produce an optimal end product. In addition, this understanding also helps in the sorting of plastic waste at source, thereby increasing the efficiency of the recycling process. In the end, the resulting recycled products are not only environmentally friendly but also have a high selling value, creating new economic opportunities and supporting the sustainability of the recycling industry (Priliantini et al., 2020).

Based on the results of the observation, it is known that the problems faced by the target partners of the activity were (1) waste sorting had not been maximized even though there are several *bank sampah* (waste bank) in the Limo District area, (2) the community had not been optimal in managing plastic waste, (3) plastic waste processing technology was not yet available, and (4) there was still a lack of creativity in creating products based on recycled plastic waste. The solution offered to overcome this problem is to reduce plastic waste and

create tools that can convert plastic waste into products of economic value. This community service activity was able to provide an understanding to the community about the problem of plastic waste and how to handle it, as well as to create new entrepreneurs from the community groups receiving training in plastic waste recycling.

Methods

The implementation method used in this community partnership program was carried out through several approaches, namely an approach model that emphasizes community involvement in all activities and an approach model through the use of appropriate technology based on science and technology. The first approach involves the community in every stage of the program, from planning, implementation, to evaluation, thus ensuring active participation and community ownership of the program. The second approach utilizes appropriate technology to improve the efficiency and effectiveness of plastic waste management.

Technically, the steps or stages applied in the implementation of this program are shown in Figure 3, which includes:

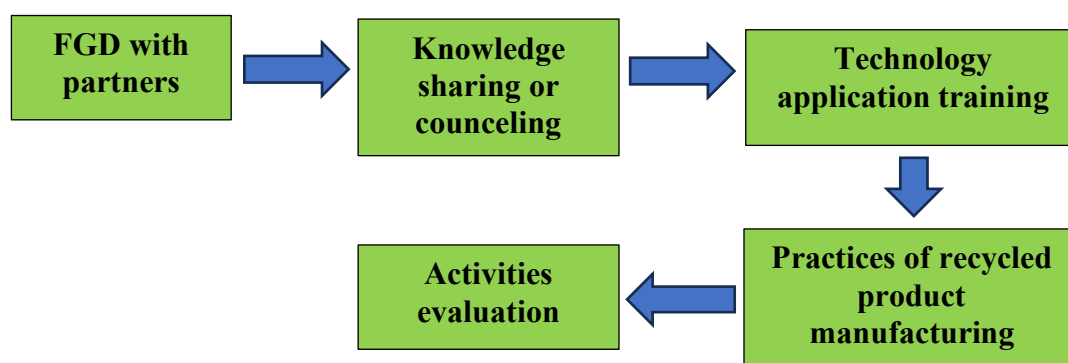


Fig. 3. Stages of implementation of the community partnership program

The implementation method in this community partnership program started with a Focus Group Discussion (FGD) where the community and partners come together to identify the main problems related to plastic waste and gather ideas and suggestions for solutions that can be implemented. After the FGD, a knowledge sharing or counseling session was conducted to provide information on the impact of plastic waste, the importance of recycling, and the potential economic value products from recycled plastic, in order to increase community awareness and knowledge. Next, technology application training was provided to the

community on how to use appropriate technology, in the form of simple tools or machines, to process plastic waste, with the aim of providing practical skills. After the training, the community practiced making recycled products from plastic waste to ensure they were able to apply the skills they had been taught. The last stage was activity evaluation, where the program was evaluated to assess its effectiveness, implementation success, and impact on the community, as well as involving feedback from the community for future program improvements.

The program incorporates community involvement at every stage. This includes holding the FGDs to allow community members to voice their opinions and needs, providing counseling to increase their understanding, delivering training to impart practical skills, and offering hands-on practice to ensure they can apply what they have learned. Additionally, the evaluation of activities involves the community to ensure that the program aligns with their needs and expectations. By utilizing these two approaches, the program not only enhances the community's technical capabilities in managing plastic waste, but also fosters the emergence of new recycling-based entrepreneurs, thus contributing to the improvement of the community's economic well-being and environmental sustainability.

Results and Discussions

The community partnership program began with FGD activities conducted with partners, Limo Village officials, and environmentally concerned communities in Limo District. In the first phase of the program, preparation and coordination were carried out with the Head of Limo Village to identify the problems faced by the community in managing plastic waste. The second stage includes knowledge sharing with the material presented relating to the processing of recycled plastic waste to solve the waste problem completely while supporting the climate village program in the fostered partner area. In addition, knowledge material was also presented about the challenges of plastic waste and the process of making it into products. Knowledge sharing activities carried out by waste bank administrators and members as well as environmental care communities in the Limo Village area are shown in Figure 4.

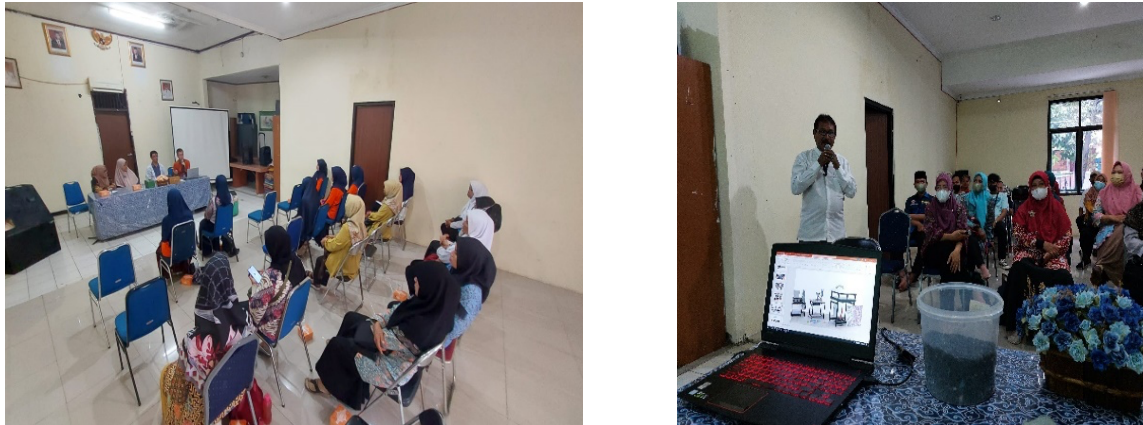


Fig. 4. Activity of knowledge sharing about plastic waste recycling processing.

The next stage of the activity was to carry out training on the application of technology and manufacture of plastic waste shredding products through the utilization of plastic waste with PET and HDPE characteristics for the environmentally concerned community of Limo Village, Limo District, Depok City. The training and practical sessions began with the waste sorting process followed by shredding plastic waste into small plastic pieces using a plastic shredder. Once the plastic pieces were ready, the next step was to use them to make recycled plastic products such as tissue holders, the activity can be seen in the Figure 5 and Figure 6. The aim of this activity was to increase public awareness of the plastic waste management process and encourage the use of recycled products.

The last stage of the implementation of this community partnership program was to evaluate the entire series of activities that have been running. The results of the evaluation of this activity were that the training participants play an active role in participating in each activity, an increase in knowledge about plastic waste processing with an achievement level of 90%, and skills in using plastic waste shredder machines and making plastic waste recycling products with an achievement of 80%.



Fig. 5. Training in the application of plastic waste shredding technology

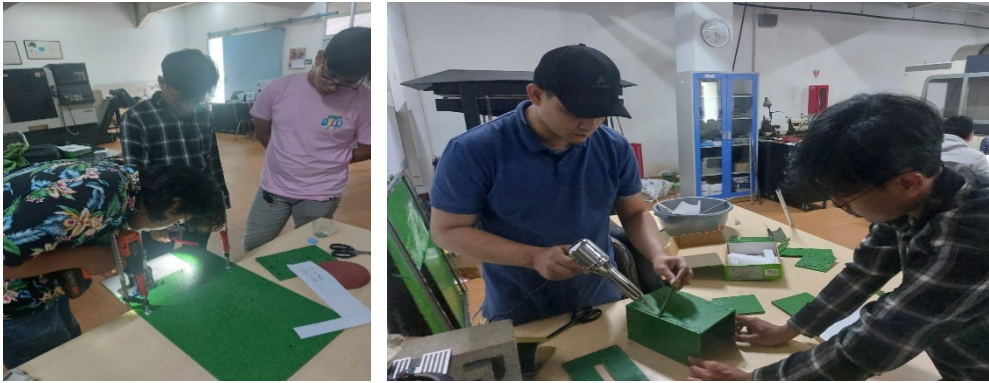


Fig. 6. Training on making tissue holders from recycled plastic waste sheet boards



Fig. 7. Group photo of participants and community partnership program implementation team

The program succeeded in significantly increasing participants' awareness and skills. Participants' behavioral changes were evident from the increased active participation in plastic waste sorting and processing activities in their neighborhoods. In addition, there was an increased awareness of the importance of recycling and the economic potential of recycled products, which was reflected in their enthusiasm in using plastic shredders and making recycled products. The participants' technical skills in operating the shredder and creating products from plastic waste also showed considerable improvement, it can be seen in the Figure 7.

During the program implementation, several challenges were faced, including the community's initial lack of understanding of the importance of waste segregation and technical constraints in the use of the shredder. These challenges were overcome through intensive counseling and additional training sessions to ensure all participants understood the processes and techniques

taught. The active involvement of waste bank administrators and the environmental community also helped overcome initial resistance from some participants.

Based on the evaluation results, several modifications can be implemented for future iterations of the program. First, extending the duration of the training and providing more practice sessions to ensure participants are fully proficient in using the technologies taught. Second, improve technical support and ongoing monitoring after the training to ensure consistent application of the skills learned. Third, develop partnerships with more institutions and organizations to expand the reach of the program and increase available resources. Finally, adding a marketing and distribution component of recycled products to help participants sell their products and create a sustainable source of income.

Conclusion

The Community Partnership Program in Limo Village has had a positive impact in addressing the problem of plastic waste and managing waste from the source. Training in plastic waste recycling has become an alternative strategy for community entrepreneurship, creating value-added products that improve the economy. The long-term sustainability of the program lies in the active involvement of the community and the continued support of government and non-government organizations. Future initiatives that could be considered include expanding the reach of the program, developing marketing of recycled products, establishing cooperation with the private sector, and integrating environmental awareness into local education. Thus, the program not only provides a short-term solution to the plastic waste problem, but also contributes to sustainable economic and environmental development.

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