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Socialization and Operational Training of Garbage Burners as a Solution to Reducing Piled Volume at Tegal Regency Garbage Disposal Sites

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Abstract

In the case of Tegal Regency, the limitation of waste disposal at the TPA is due to the process of revamping it, resulting in several villages making efforts to deal with waste problems independently by managing them under village-owned enterprises through the process of collecting waste from residents' homes, then sorting, processing waste, recycling, and burning when it can no longer be processed. The manual combustion process by burning directly on the trash cannot produce complete combustion because the waste condition is usually wet. The various types result in the garbage being unable to burn evenly and running out, especially during the rainy season. The amount of unburned waste will increase and pile up. Besides that, the garbage disposal location on the side of the road can disturb road users because of the foul smell and, of course, the unhealthy air. The method used in this community service activity is to socialize on the first day about the impact of the waste problem, information about several examples of waste incinerators, waste management and the application of the waste recycling process. The next day was a simulation of burning waste using a waste burner based on used oil and water. The operational strategy of burning is the main activity in community service. The end result of this training is that all waste managers can operate the tools and hope that the existing tools can be donated as examples for manufacturing and application at waste disposal sites.

Keywords: Training, burning, rubbish

1. Introduction

Several villages in the Tegal Regency area have conducted independent household waste management programs managed by the town. The program is managed by BUMDES (Village Owned Business Materials) as a program that facilitates residents in efforts to deal with household waste problems (Agrawal, 2017; Gaevaya et al., 2017). However, on the other hand, the program has created a new trial because the waste taken by the cleaners/garbage is disposed of in landfills in the village. Still, waste management has not been managed, so this has become a new problem, namely waste accumulation.

Even though the existing waste is located in the village environment, the effects of the collection of waste that is not processed have an impact on the surrounding

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environment in the form of a pungent garbage odour and pollution to the soil, water and air (Brancoli et al., 2017; Haupt et al., 2018; Sarigiannis et al., 2021).

Figure 1.1 Example of Garbage Disposal Location in one village

Efforts made by the management have been carried out by burning waste manually and collecting plastic waste and other waste for recycling or selling to collectors. However, the efforts that have been made have not been maximized because the volume of waste continues to increase, resulting in accumulation and can result in environmental pollution (Lee et al., 2017; Mollica & Balestieri, 2020; Setti et al., 2018).

From the above problems, one of the program solutions carried out within the framework of higher education tri dharma activities at Pancasakti University of Tegal is community service in the form of socialization and operational training of waste incinerators based on the results of research or research that has been carried out (de Menna et al., 2018; Keng et al., 2020; Ramos & Rouboa, 2020).

2. Method

The activity method used in this community service is qualitative, prioritizing the quality of the results to be achieved in this activity in the absence of waste that has accumulated for a long time with operational training for waste managers so that it becomes an example in producing and using waste incinerators. The steps taken in this activity include observation, interviews and outreach and training.

As for the implementation of socialization and training, things that need to be prepared include. Preparation of socialization materials. Preparation of tool raw material requirements for tool simulation demonstration. The practice of the need for raw materials and tools. It is necessary to provide materials and tools before the training process begins, namely, materials used: used oil, water, garbage, drum for the container, and burner/burner plate maker. Equipment used: matches, thermometers,

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dimmers, toolset, welding machine. Training on making, maintaining and repairing tools must be done so that cleaning workers can make products/tools independently and maintain and improve them themselves. It is also necessary to make a guidebook so that one day when needed, it can be opened for further study.

The need for training to improve production quality. Training is needed so that cleaners can improve the performance of the equipment. Based on the existing problems, the solutions carried out are divided into two: Physical Programs or Hard Programs and Non-Physical Programs or Soft Programs. The Hard Program is training in the operation of tools such as the waste sorting process, the ignition process, the combustion process and the disposal of combustion ashes. Soft Programs are training programs that are provided in the form of presentation material to cleaning workers in the village, both the officers and BUMDES administrators, which include program socialization, the impact of waste problems, various waste processing processes and the application of waste incinerators.

From these two programs, a flow chart of the activities offered to support the realization of the science and technology program can be made as shown in the following figure :

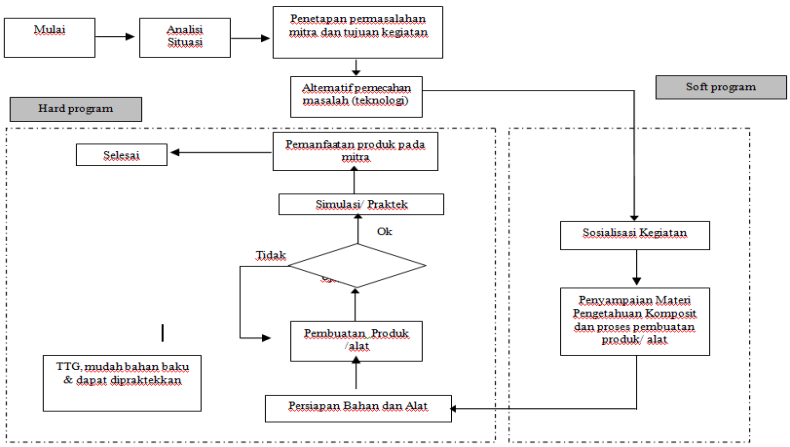

Figure 1.2 Activity Flowchart

During the implementation of these activities, several steps were taken to achieve these objectives, namely: Namely, the initial survey was conducted to find out/ identify problems regarding the waste in the village from the time of garbage collection, disposal and the burning process. Facilitating the development of science and technology, namely in the form of developing waste incineration as a substitute for conventional combustion media using methods that can increase efficiency and

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productivity, can be applied in the form of short training, specialized materials/equipment and maintenance of equipment that can be carried out efficiently, with the following steps: Identify the condition and amount of waste. The product design is done as simply as possible so that residents/partners understand the material more quickly and efficiently first. Activity Stages The stages or steps in implementing the solutions offered to overcome the problems are as follows:

In producing household appliances, knowledge is needed in planning, calculating, and making products/tools. Therefore, the first step in applying this waste incinerator is for the team to create and test it until it is successful, prepare the materials and tools needed, and conduct training for cleaning workers (Hard program). So that in this case, the first task of the PKM team is to identify problems, analyze, design and apply tools. Meanwhile, the partner's mission is to assist in preparing collected and segregated waste and provide necessary information related to materials and other devices.

In addition to production problems, it is also necessary to socialize the cleaning staff's understanding of this activity so that there are no misperceptions about the management or regulation of waste collection so that the quantity in preparation for the manufacture of products can run smoothly so that training in implementation and production management is not hampered soft programs.

In this activity, there are several obstacles encountered, including: In the tools section. The tool shown is an appropriate technology that the community can easily make at a relatively low price and with raw materials that are easy to obtain. However, because this tool is based on research results regarding the quality of materials and operations, the design is still being developed, especially in terms of waste entry, because the holes are too high.

The participants, especially the waste managers, were still lazy in putting garbage into the holes because they were too high, so they needed a tool to raise and wrap the trash so that it was easy to put it in. Besides, there are complaints about waiting for the fire size because it needs hot steam first to push it up.

Place and Time of Activity. The activity location is in the village of Kalsoka Dukuhwaru Tegal Regency. Activity Time is described in the table as follows:

Table 1.1 Schedule of Community Service Activities

No	Activities	Place

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1	Site Survey/Problem Identification (17 January 2022)	TPS Village
2	Preparation of Tools and Materials (2 – 25 February 2022)	Lab. Mechanical Engineering
3	Outreach to waste managers and BUMDES and village officials (30 March 2022)	village meeting hall
4	Trial / Simulation of a garbage burner (31 March 2022)	village meeting hall
5	Tool Delivery Assistance (June 22, 2022)	village meeting hall
6	Activity Report (29 August 2022)	LPPM UPS Tegal

Figure 1.3 Presentation of Material on Waste Management

3. Result and Discussion

The results of community service from the Socialization and Implementation of this garbage incinerator are: Garbage burners can function appropriately by burning the waste in the location by working optimally. Assist village cleaning workers in managing the litter around the landfill site. The existing waste incinerator will be used as a reference in developing the waste incineration process in the village location. Motivating residents, especially waste managers, to recycle waste so that it becomes a valuable product can increase income and generate fields for employment.

Figure 3.1 Discussion on the process of developing a waste incinerator

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Figure 3.2 Garbage Burner Operational Training

Based on the results of the evaluation and the existing constraints, the community service activities for the next stage are developing this type of waste incinerator so that it is easy to put waste into the combustion chamber so that the initial combustion process is faster and the smoke output is cleaner, namely by making a smoke filter. Evaluate the tools that have been applied and whether there are obstacles that need improvement.

4. Conclusion

Mentoring activities need to be carried out continuously so that the waste problem in the village can be resolved. Assistance is carried out by observing the tool and interviewing the instrument user and the general public. Improving the quality of TTG products/tools so that they can continue to be used and developed in other villages.

Acknowledgement

We realize that the implementation of community service activities is not perfect, it still needs improvement and follow-up development in the future, and activities cannot run alone without the involvement of other parties. Therefore, we thank the village head, Bumdes, and waste managers in one of the villages in Tegal Regency and Universitas Pancasakti Tegal.

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