

Fabricating Tools and Training on Making Fertilizer from Household Organic Waste for PKK Women RT 15 RW 11, Banjararum Village, Singosari District, Malang Regency

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ABSTRACT

Household waste has the potential to generate economic value. One of the benefits is that organic waste can be managed and turned into organic fertilizer. The women of PKK RT 15/ RW 11, Banjararum Village, Singosari District, Malang Regency have problems that organic waste has not been managed and have toga plants that require compost for treatment. This community service activity aims to provide organic waste chopper and to train skills in making organic fertilizers by empowering PKK women. The stages carried out in service activities were surveys, coordination, toolmaking, training, and evaluation. The service implementation results showed that the organic waste chopper worked correctly and produced a small size of waste. The training on making organic fertilizer with a mixture of local micro-organisms (MOL) was done successfully, and PKK women participated enthusiastically. With this service activity, residents of RT 15 and PKK women can manage organic waste well and produce organic fertilizer for the needs of toga plants and can be sold to other residents.

Keywords: Chopper, Organic waste, Organic fertilizers, PKK women

INTRODUCTION

Household waste is a challenge that must always be sought for good management solutions in the future. Transportation, collection, and disposal systems are still using in urban and residential areas. All types of waste are mixed together and then disposed of at the Final Processing Site (TPA). Even though the various types of waste still have economic value, especially organic waste (Asdiantri et al., 2016). One form of processing organic waste is to turn it into compost or organic fertilizer (Indriyanti et al., 2015). Therefore, equipment or machines are needed to chop up waste such as dry leaves and twigs into small pieces and then use them as organic fertilizer (Hendaryanto, 2018). Hence with the enumeration machine, it can relieve and assist in the management of organic waste on a household scale.

In the neighbourhood of RT 15/ RW 11, Banjararum Village, Singosari District, Malang Regency, waste from plant leaves and trees around the toga and plants around the RT area has always been a separate problem where there is still no adequate disposal site. The mobile waste officers managed by the RW management still have not accepted or refused to transport the types of plant waste on the grounds that the storage bins are limited if there is additional plant waste. In addition, the human resources that serves the collection of family waste has not been fulfilled. The impact that occurs is the accumulation of plant waste so that one time in the rainy season it becomes a health problem (because there are lots of mosquitoes). In addition, currently the appeal for food barn security efforts during the pandemic motivates residents to create mini-scale gardens around their homes.

The women of PKK RT 15/ RW 11 have also been managing public facilities for reforestation and toga plants for a long time. Care and fertilization are needed so that the reforestation land and the toga are healthy and not dead or damaged. For care and fertilization, PKK women still often buy fertilizer at the flower market in Malang City or to clean and care for the toga gardens, they often order it from other people. Therefore, to carry out maintenance and fertilizing if there are plants that will die or be damaged requires a rather expensive cost. Then to add cash, the

toga is usually obtained from the sale of crops grown in the garden with the buyer being a resident of RT 15 of the housing.

With the conditions as described above, in order to reduce the amount of plant waste, reduce maintenance costs, and fulfil fertilizers from organic waste, an effort is planned to empower PKK women by processing plant waste into organic fertilizer. That is by helping to make a plant waste chopper and also being given skills training in the field of making organic fertilizers and land care for PKK women RT.15/RW 11 Banjararum Village, Singosari District, Malang Regency.

METHOD

The service method used by the community service team (PPM) of Politeknik Negeri Malang was an individual approach to the PKK RT administrators and PKK mothers. This includes approaches in the form of coaching, especially how to operate the machines provided to destroy organic waste as well as assistance in the form of training in the manufacture of organic fertilizers (Emzain et al., 2020). The following are five methods of implementation stages from start to finish that was carried out in this PPM activity as shown in Figure 1 (Witono et al., 2021).

1. Survey

This stage begins with finding a location for service, after that studying the intended area, especially with regard to determining the feasibility of the activity in the hope that the activity can achieve the target.

2. Coordination with RT/RW

The second stage is to coordinate with the RT and RW devices at the destination regarding their willingness to become a place of service and identify waste management problems in the RT environment.

3. Manufacturing of organic waste shredder

Activities at this stage are the manufacture of organic waste chopping equipment according to the required specifications including the purchase of materials and components, assembly of tools, and painting/finishing.

4. Handover and training on the use of tools and manufacture of fertilizers

The next stage is the handing over of the tools directly by the PPM Politeknik Negeri Malang team to representatives of the local RT management as well as training on the use of tools and the manufacture of organic fertilizer.

5. Evaluation and report

The evaluation is carried out to review the shortcomings of the implementation of this service activity and suggestions for the future for plans for similar service activities and the preparation of activity reports.

RESULTS

The survey activity was carried out in January 2021 and determined the location of the place of service in RT 15/ RW 11 Banjararum Village, Singosari District, Malang Regency. This location has the potential to develop skills in terms of maintaining reforestation land and Toga plants and making fertilizer from household organic waste. In addition, this location has obstacles in processing organic waste and managing the budget for purchasing fertilizers in maintaining reforestation land. Coordination was carried out by representatives of the PPM Politeknik Negeri Malang team with the head of RT 15 and the head of PKK women RT 15 discussing problems and solutions for processing organic waste in the RT environment and ready to be service partners. The main target was the group of women who manage Toga (Family medicinal plants) of approximately 35 women who are divided into 2 groups of Dasawisma.

The next activity was the manufacture of a garbage chopper according to the required specifications, namely on a small household scale with a capacity of 20 kg of raw materials/hour (Nugraha et al., 2019). The dimensions of the organic waste chopper are 78 x 33 x 90 cm and the motor rotation is 2800 rpm with a power of 1 HP (Selan et al., 2021). Transmission from the motor to the shaft uses a V-belt and pulley and because it can reduce noise, minimal maintenance, and easy and inexpensive to manufacture (Mahmudi, 2021). Consists of five

blades that are 17.5 cm apart in a zigzag position and a sharp angle of 30 degrees (Ricky & Daco, 2021). The processing time for this organic waste chopper is approximately 1 month from purchasing tools and components to assembly and finishing. The 3D Modelling design with unravelled isometric projections and side and front views can be seen in Figure 2. Types of machine components can be seen in Table 1.

The handover of organic waste counting equipment and training on its use was carried out on May 29, 2021. The handover of the equipment was directly handed over by the PPM team of Lecturers of the Department of Mechanical Engineering at the Politeknik Negeri Malang to the local RT apparatus, in this case the Chairman of RT 15 himself accompanied by representatives of the residents. After handing over the organic waste chopper, the team from PPM Mechanical Engineering Department provided brief guidance regarding equipment setting and operation techniques, which can be seen in Figure 3. In addition, several solutions in case of machine disturbances were presented to representatives of RT 15 residents.

After the technical guidance on setting the machine for crushing organic waste or dry leaves to be processed into organic fertilizer or compost, then the activity was proceeded with the testing stage (running) of the tool directly in front of the RT 15 Monitoring Post. In this activity, the participants were explained how to operate the machine, including safety measures in machine operation. Figure 4 shows the test results of the organic waste chopper, where in this case the object used was leaf waste which is a supporting source of waste that has not been used optimally so far. From the results of the destruction of dry leaf waste into smaller sizes, it can help speed up the process of making organic fertilizer.

Figure 5 shows PKK RT 15 women actively participated in this service activity. The results of collecting leaf waste which have been a problem in disposal and ended with the burning process, but with this chopper, leaf or organic waste can be utilized. From the results of the technical guidance on the operation of the machine, the PKK women were able to produce several sacks of chopped leaves that were smaller in size which would then be carried out in the process of making compost/organic fertilizer.

DISCUSSION

To make fertilizer, the first step is that the enumerated waste is accommodated in a large bucket or container. Then it is mixed or watered with MOL (local micro-organisms) which are made by themselves from sugar solution water. One bottle of mineral water with a size of approximately 500 ml is poured into a large bucket of chopped organic waste or dry leaves (Yurleni, 2017). The function of MOL is as a composer to help produce decomposing bacteria so that the fertilizer formation process is faster (Fatma & Yasril, 2021). For the mixing conditions, it is not very soft or muddy, just moist conditions are enough, then wait for about one week then stir and cover and leave for 1 week so that the total production is 2 weeks. After 2 weeks, it should check again if the fertilizer changes colour to dark brown and the texture changes to powder and does not smell, then the fertilizer is ready to be packaged or used (Subandriyo et al., 2012). Figure 6 shows the process of administering and mixing MOL liquid in shredded waste and storing fertilizer in packaging bags.

CONCLUSIONS And RECOMMENDATIONS

Community service activities for making tools and training to make fertilizer from household organic waste for PKK women RT 15 RW 11, Banjararum Village, Singosari District, Malang Regency was done successfully. From the results of this community service activity, it can be concluded that the organic waste crusher machine can be used by the community to process organic waste or garbage in the neighbourhood of PKK residents RT 15/ RW 11 Banjararum Village, Singosari District, Malang Regency. The results of the enumeration of organic waste can be further processed into organic fertilizer which can be used by the community or residents of RT 15/RW 11 themselves and some can be traded to local residents for the purpose of cultivating food security plants in particular. This community service activity received a very good appreciation and response from PKK residents RT 15/ RW 11, especially the Chairperson

of PKK and the Toga team, and it is hoped that in the future similar activities will continue to be held to support activities in RT 15/ RW 11.

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APPENDIX

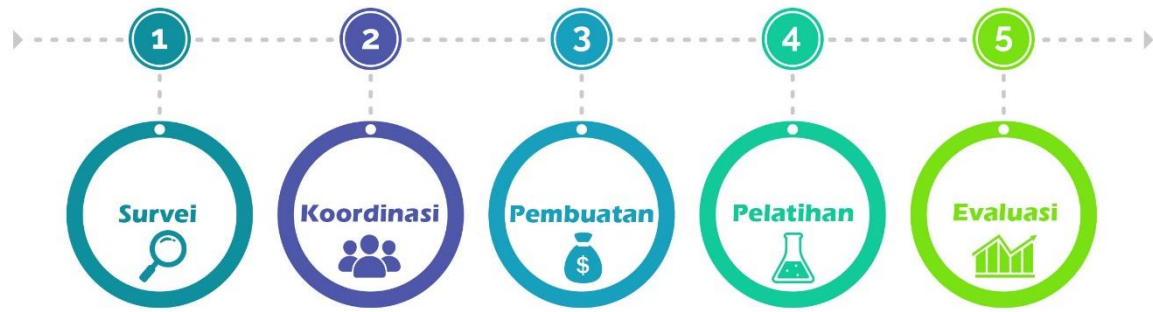


Figure 1. Stages of community service activities

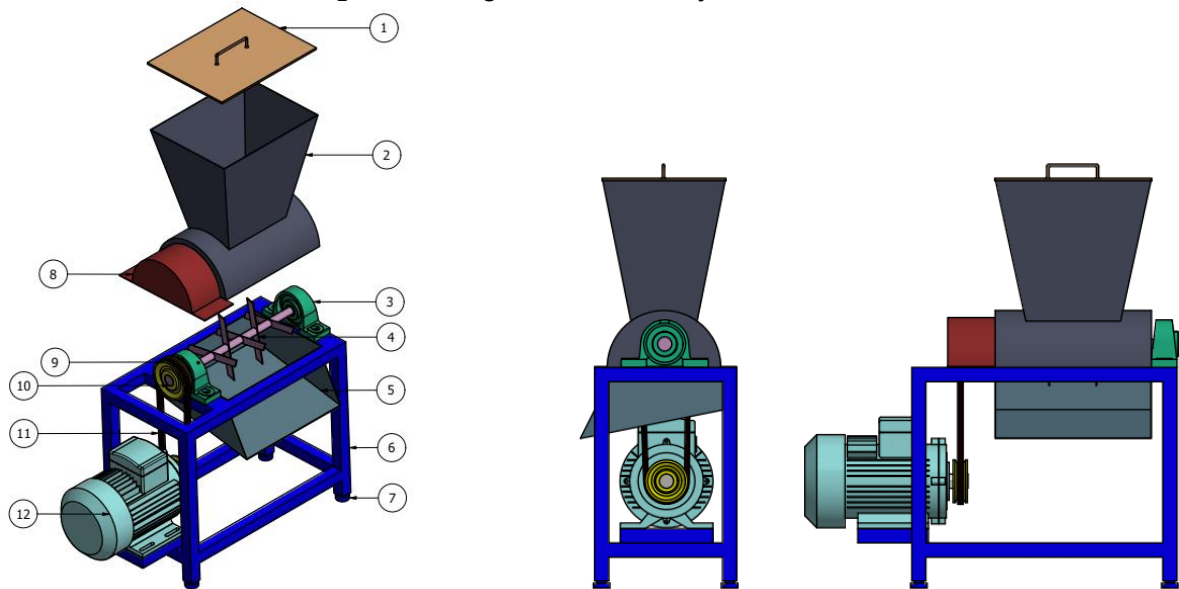


Figure 2. Design of organic waste chopper

Table 1. Components of organic waste chopper

No	Description
1	Inlet funnel cover
2	Inlet funnel
3	Bearing
4	Blades
5	Outlet funnel
6	Frames
7	Footwear frame
8	Pulley cover
9	Pulleys
10	Shaft
11	V Belt
12	Electric motor



Figure 3. Handover and training on the operation of the organic waste chopper



Figure 4. Test results of the organic waste chopper



Figure 5. PKK RT 15 women actively participate in collecting organic waste



Figure 6. Mixing chopped organic waste with MOL liquid and storing fertilizer in packaging bags