



Empowerment of the Kusumadewi Women's Farmer Group in Processing Household Organic Waste into Liquid Organic Fertilizer

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ABSTRACT

The Kusumadewi Women's Farmer's Group is experiencing the problem of high production costs to increase the growth and yield of its cultivated plants due to the high cost of chemical fertilizers. This causes the profit obtained to be incompatible with the production costs of group cultivation. The group also complained that they did not understand how to process their household organic waste, causing environmental pollution. Therefore, it is necessary to provide an alternative for processing household organic waste into organic fertilizer that is cheap, easy to make, and at the same time can overcome household organic waste that can pollute the environment. Organic fertilizers have the benefit of increasing the nutrient content needed by plants, increasing plant productivity, and stimulating root, stem, and leaf growth. Organic fertilizers have benefits, loosening and fertilizing the soil. The Kusumadewi Women Farmers Group will be given counseling about the benefits of household organic waste and organic fertilizer, how to process organic waste into organic fertilizer, and how to apply it to cultivated plants. Based on the results of the activity, 70% of partners understand and can independently process organic waste as organic fertilizer, partners can reduce production costs by 25%, partners can reduce organic waste that causes environmental pollution by 80%, partners can increase crop production by 25% so that increase group profits.

1. INTRODUCTION

1.1. Research Background

The Kesumadewi Women's Farmer's Group consisting of 26 people, is located in Asahduren Village, Pekutatan District, Jembrana. Geographically, the area of Asahduren Village, Abian Pekutatan District, Jembrana Regency with a population of 3,521 people [1] and an area of about 6.13 km². Administratively, Taman village consists of 1 Traditional Village and 4 official banjars [2]. The distance from Warmadewa University to the location of the Kesumadewi Women's Farmer Group is 71.6 km.

The Kesumadewi Women's Farmer Group developed henna and gumitir flower plants for ceremonial purposes, as well as developing potted vegetables (Figure 1). The Kesumadewi Women's Farmer Group activity aims to develop and empower the potential of the home yard garden so that it can help the economical income of family. The production costs, especially the fertilizers issued by the Women Farmers Group for the cultivation of flower plants, are felt to be quite high, for that the university wants to help the women farmer groups use organic

waste that has not been utilized into something that has value as organic fertilizer.



Figure 1. Plants developed by Kesumadewi Women's Farmer Group

Organic waste is waste generated from biological materials that can be degraded by microbes. Organic waste is divided into wet organic waste, for example, vegetables, and fruit peels, and dry organic waste, for example, dry leaves [3].

Organic waste cannot be directly used or utilized by plants because the ratio of C/N in the raw materials is relatively high or not the same as the C/N of the soil. The principle of composting is to reduce the C/N ratio of organic matter so that it is equal to the soil (<20) and can be absorbed by plants [4].

The benefits of organic waste can be used as eco-enzymes, organic liquid fertilizer, compost, and biochar. Organic fertilizers are fertilizers that come from all types of organic materials from plants and animals that can be used and converted into available nutrients for plants [5]. Eco-enzymes from organic waste can increase the fresh weight of shallot bulbs per clump by 39.77% [6]. The use of pineapple peel eco-enzyme fertilizer has a good effect on chili growth which is characterized by height, stem diameter, larger leaf width, and greener color than plants without eco-enzyme fertilizer [7]. The increase in the nutrient content of liquid organic fertilizer is increased through the addition of a variety of mixed organic matter [8]. Eco-enzyme solution when mixed with water can be used to water plants and will give better fruit, flower, or harvest yields [9]. Organic fertilizers contain several virtues such as high nutrient levels, hygroscopicity, or the ability to absorb and release and are easily soluble in water so that they are easily absorbed by plants [10].

1.2. Research Objective

This action research program aims to increase the understanding of women farmer groups regarding the benefits of organic waste in the form of fruit peels, vegetable residues, leaves, stale rice, rice washing water into organic fertilizer, training in processing organic waste into organic fertilizer, and assisting the application of organic fertilizer to cultivated plants. The methods used include counseling, direct practice and mentoring that emphasizes active group participation

2. MATERIALS AND METHODS

2.1. Implementation Method

The method of implementing community service activities for Utilizing Organic Waste into Eco Enzymes are as follow:

1. Interview and discussion methods to find out the problems experienced by partners.
2. Face-to-face methods and provide direct counseling, so that partners gain knowledge about the benefits of organic fertilizer from organic waste and how to process organic waste into organic fertilizer.
3. Direct practice, which is guided by instructors who are competent in their fields, so that partners can directly apply the given method.

2.2. Activity Plans and Procedures

The Community service Activity Plans and Procedures to be implemented are:

1. Approaching the group, selecting a place as well as selecting participants, hereinafter referred to as training participants.
2. Interviews and Questions and Answers regarding the problems faced by partners, as well as planning activities that show the steps for solving the problems faced.
3. Participants are given materials that have been prepared by the team in the form of modules on how to make some organic fertilizers and their application to plants.
4. Participants in the direct practice of making liquid organic fertilizer according to the products.

2.2.1. The production of Organic fertilizer from vegetable waste liquid, betel leaf rice washing water, coconut water

- Sorting vegetable waste
- Mix the sugar/molasses with EM 4 plus 1 liter of used water washing rice, and let stand 20 minutes to stimulate the work of microorganisms.
- Enter the remaining rice washing water and coconut water into the jerry can.
- Cut the vegetable waste according to the dose then pounded, also cut the betel leaves according to the dose, the more types of vegetable waste the more nutrient content
- Enter the waste of vegetables and betel leaves that have been pounded into the washbasin then mix the waste of fruit peels with rice washing water which already contains sugar and EM 4 until well mixed
- Put vegetable waste and betel leaves into a jerry can which already contains rice washing water and coconut water
- Close the jerry can. Make a hole the size of a hose, so that no air gets in between the hose and the hole is covered with Plasticine. The hose is connected to a bottle that already contains water so that air from outside does not enter because this liquid organic fertilizer fermentation is aerobic
- Put the jerry can in a place that is not exposed to direct sunlight
- The fermentation process lasts 10-14 days. Liquid organic fertilizer is considered successful if it smells like tape
- Filtering with a filter cloth Stage 10.
- Packaged in plastic bottles labeled with partners and Warmadewa University.
- If it will be used as a fertilizer, 1 liter of liquid organic fertilizer is diluted by adding 5 liters of water, for 1 liter of POC fertilizer added 1.5 liters of water. Give once a week, in the rainy season every 3 days by spraying on the leaves and stems of plants.

2.2.2. The production of Liquid organic fertilizer from fruit peel, rice washing water, coconut water

- Sorting fruit peel waste
- Mix the sugar/molasses with EM 4 plus 1 liter of rice washing water, and let stand 20 minutes to stimulate the work of microorganisms.
- Enter the remaining rice washing water and coconut water into the jerry can
- Cut the fruit peel waste (at least 4) according to the dose then pounded, the more types of fruit skin the more nutrient content
- Enter the fruit peel waste that has been pounded into the sink then mix the fruit peel waste with rice washing water which already contains sugar and EM 4 until well mixed
- Put the fruit peel waste into a jerry can which already contains rice washing water and coconut water
- Close the jerry can. Make a hole the size of a hose, so that there is no air in between the hose and the hole is covered with plasticine. The hose is connected to a bottle that already contains water so that air from outside does not enter because this liquid organic fertilizer fermentation is aerobic.

- Put the jerry can in a place that is not exposed to direct sunlight
- The fermentation process lasts 10-14 days. Liquid organic fertilizer is considered successful if it smells like tape
- Filtering with a filter cloth
- Packaged in plastic bottles labeled with partners and Warmadewa University. If it will be used as a fertilizer, 1 liter of organic liquid fertilizer is diluted by adding 5 liters of water, for 1 liter of liquid organic fertilizer added 1.5 liters of water. Give once a week, in the rainy season every 3 days by spraying on the leaves and stems of plants.

2.2.3. *The application of liquid organic fertilizer to plants*

liquid organic fertilizer dilution is as much as 10 liters of liquid organic fertilizer diluted to 100 liters (1:10). Furthermore, liquid organic fertilizer is applied to the roots by mixing 1 part of POC with 3 parts of water. Sprinkle on plants with a dose of 250 ml per plant. Watering is done once a week. The application on the leaves is by mixing 1 part of liquid organic fertilizer with 5 parts. Spray on the leaves once a week.

2.3. *Partner Participation*

A total of 16 group members were trained to make liquid organic fertilizer from household waste and apply it directly to the plants being cultivated. Participants were very enthusiastic about participating in the training. Partners have replaced the use of chemical fertilizers with liquid organic fertilizers that have been produced by themselves.

3. RESULTS AND DISCUSSION

3.1. *Implementation*

Community service activities began with counseling in the form of providing material about liquid organic fertilizer from household waste and techniques for applying liquid organic fertilizer to plants.



Figure 2. Giving Materials on liquid organic fertilizer from household waste

The activity was continued with hands-on practice of making liquid organic fertilizer from household waste. Participants make organic fertilizer from vegetable waste liquid, betel leaf rice washing water, coconut water, and liquid organic fertilizer from fruit peels, rice washing water, and coconut water. All materials used in the manufacture of liquid organic fertilizer are materials from household waste and agricultural waste.



Figure 3. Participants practice making liquid organic fertilizer

Liquid organic fertilizer that has been fermented for 10-14 days can be directly applied to flower, fruit, and vegetable plants. Service participants were also trained in the application of organic liquid fertilizer. Liquid organic fertilizer is applied by diluting liquid organic fertilizer in a ratio of 1:10. Furthermore, liquid organic fertilizer can be directly applied by spraying the plants on the leaves and roots according to the dose.



Figure 4. The application of a liquid organic fertilizer to plants by participants

3.2. *Economic Impact*

The community partnership program carried out at the Kusumadewi Women Farmers Group provided benefits to partner groups, in particular, namely partners were able to independently produce liquid organic fertilizer from environmentally friendly household waste to the packaging stage, with such progress spending on the production process of vegetables, fruit, and interest can be minimized, in the future, it is expected to be able to produce more so that it can be marketed to the wider community. Based on the results of the activity, 70% understood and were able to apply liquid organic fertilizer from household waste. Partners can reduce production costs by 25%, partners can reduce organic waste that causes environmental pollution by 80%, and partners can increase crop production by 25% thereby increasing group profits.

3.3. *Obstacles in the Implementation of Service*

The obstacle faced in implementing community services is the low interest of the community to apply the introduced technology, of the 16 group members trained, only 70% have successfully implemented it to the application level, so further efforts are needed for assistance, especially in solving problems encountered in the production process. fertilizers and their application to plants.

3.4. *Strategy for Further Realization*

Our next strategy is to improve the quality of liquid organic fertilizer produced by carrying out various stages including testing and calculating macro and micro nutrients in fertilizers, and organic matter content. Furthermore, liquid organic fertilizer products of good quality can be marketed so it is very important to carry out attractive and economical packaging.

4. CONCLUSION

From this community partnership program, it can be concluded that the Kusumadewi Women Farmer group can produce liquid organic fertilizers of physical quality. Economically, the impact has not yet been seen because the fertilizers have only been used by some group participants, and have not yet reached the production stage on a large scale. 70% of partners understand and can apply liquid organic fertilizer from household waste. Partners can reduce production costs by 25%, partners can reduce organic waste that causes environmental pollution by 80%, and partners can increase crop production by 25% thereby increasing group profits.

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