

## PRODUCTION OF FERTILIZER BY APPLYING GOOD AGRUCULTURE PRACTICES (GAP) IN TIRTA ARUM FARMER GROUP

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### Abstract

The purpose of this program is to increase the knowledge and skills of farmer group members in making compost and liquid organic fertilizer, as well as increasing knowledge related to the application of GAP to increase production in developing and supporting the existing community economy, especially members of the Tirta Arum farmer group. The method applied in the service activity consists of several stages of activities including field surveys, socialization stages, focus group discussions (FGDs) and training, as well as monitoring and evaluation of program success. From this activity, it can be seen that the production capacity of compost and liquid organic fertilizer has increased as a business activity development of the Tirta Arum farmer group. Previously, the production of compost fertilizer reached 1 ton and liquid organic fertilizer 400 liters every month. After the activity, the production of compost reached 2 tons and liquid organic fertilizer 450 liters per month. The application of GAP in making compost and liquid organic fertilizer shows an increase in productivity. Tirta Arum farmer group is able to optimize existing resources to produce compost and liquid organic fertilizer.

**Keywords:** Compost, Liquid Organic Fertilizer, Good Agricultural Practices (GAP)

### INTRODUCTION

Tirta Arum Farmer Group is located in SP4 Mayamuk District, Makbalin Village, Sorong Regency, West Papua Province. This group consists of 20 people who are chaired by Mr. Rusmanto. The commodities cultivated are food crops and horticulture. The group was formed in 1983 and started implementing environmentally friendly agriculture in 2013. The implementation of environmentally friendly agriculture by Tirta Arum Farmer Group by utilizing organic materials and not relying on chemical fertilizers and pesticides. The results of environmentally friendly products are compost and liquid organic fertilizer. The raw material for compost comes from livestock manure, namely cow and goat manure, while the raw material for liquid organic fertilizer (POC) comes from fruit waste (Sulistyaningsih, 2020).

The community conducts agricultural businesses that require compost and liquid organic

fertilizer. People prefer natural inputs over chemical inputs. Environmentally friendly products make the land and plants grow healthy, fertile, and produce healthy food. Good Agricultural Practices or abbreviated as GAP is a standard in cultivating crops, be it food crops, horticulture or plantation crops, if they want their agricultural products to be accepted in the era of free trade. Practices have the potential to increase production capacity and quality for horticultural commodities (Irfansyah et al., 2021). Good Agriculture Practise (GAP) is a guide on how to do cultivation that is good, right, and environmentally friendly and safe for consumption. To reduce the increased use of chemical pesticides, Good Agricultural Practices (GAP) can be used to increase competitiveness, productivity, added value, and independence. According to Dewi, et. al (2022) one example of poor implementation of GAP is the use of pesticides that are not in accordance with the dosage.

The Tirta Arum farmer group produces 1 ton of compost and 400 liters of liquid organic fertilizer every month. Buyers of these environmentally friendly products come from Sorong Regency, outside Sorong Regency and even from outside West Papua province. This is a challenge in meeting the huge demand after the Covid-19 pandemic. During the pandemic, many people conduct agricultural businesses that require compost and liquid organic fertilizer. Problems began to arise as many consumers bought these environmentally friendly products. Farmer group members, especially farmer group leaders who sell environmentally friendly products, are unable to meet consumer demand due to limited raw materials. Product availability is not always available and cannot meet the many consumer demands. This is a factor that hampers the production process and results in the income earned tending to stagnate. The application of production management and institutional management of the production unit is an obstacle because the production management function has not been maximized. The purpose of this activity is to increase the knowledge and skills of farmer group members in making compost and liquid organic fertilizer, as well as increasing knowledge related to the application of GAP to increase production in developing and supporting the existing community economy, especially members of the Tirta Arum farmer group.

## **IMPLEMENTATION METHOD**

The method applied in service activities consists of several stages of activities including field surveys, socialization stages, focus group discussions (FGDs) and training, as well as monitoring and evaluation of program success. Field survey (initial observation) in Mayamuk District, Sorong Regency, aims to observe the situation and condition of the farmer group as the target object/implementation of activities. The approach was carried out through observation of the environmental conditions of the village and dialog with the farming community in Makbalim Village. This activity involved members of the Tirta Arum farmer group.

The implementation phase of the focus group discussion (FGD) with all members of the Tirta Arum Farmer Group to find out more about the various obstacles and solutions that can be done in the production process of compost and liquid organic fertilizer. In addition, this activity will discuss the optimization of environmentally friendly agricultural products through Good Agricultural Practices (GAP).

Community service training is an activity to provide knowledge and skills to target partners, especially in the context of helping the community through community service programs. This activity involves students and target partners. The main objective of this training is to equip participants with knowledge and practical skills that can be used in optimizing green entrepreneurship of environmentally friendly products. This stage is the technology transfer stage, where the community is given a demonstration of how to process waste in the application of GAP. In this process, the Tirta Arum farmer group was given the opportunity to practice making compost and liquid organic fertilizer. During the period of making compost and liquid organic fertilizer from the processing process, the implementation team will periodically monitor the partner location once a week.

## RESULTS AND DISCUSSION

### Field Survey

Community service activities began with a survey of the Tirta Arum farmer group represented by Mr. Rusmanto as the head of the farmer group (Figure 1) in Mayamuk District. Waste generated from livestock and fruits has been used as compost and liquid organic fertilizer but still not optimal. So the implementation team visited the Tirta Arum farmer group as a first step in socializing activities, namely training in making compost and liquid organic fertilizer by applying good agruculture practices (GAP).



**Figure 1. Site Survey**

### Implementation of Socialization and Training

The first stage of activity implementation was focus group discussion (FGD) (Figure 2). FGD activities with all members of the Tirta Arum Farmer Group were carried out to find out more about the various obstacles and solutions that can be done in the production process of compost and liquid organic fertilizer. Participants actively participated in discussing their problems. The results of the FGD from the farmers were the limitation of raw materials (livestock manure) due to the cows' indulgence. Farmers indulge their cattle because there is no land for cages and the cost of making cages. After the FGD activity, the training on fertilizer making was continued.



**Figure 2. Focus Group Discussion Activity**

Community service training is an activity to provide knowledge and skills to target partners. Training is a form of community empowerment that can increase sustainability in the community (Kibukho, K., 2021). The results achieved at this stage of the activity are that the community, especially members of the Tirta Arum farmer group, have knowledge and insights about making compost and liquid organic fertilizer with the application of GAP and increasing production capacity. The process of making this fertilizer involves community members directly so that in the future they can make it independently. Public awareness of the impact of using organic fertilizers on soil fertility and the environment can be increased with intensive socialization and mentoring activities (Rosalina et al., 2022). The training activities for making compost and liquid organic fertilizers with GAP practices can be seen in Figure 3. The service implementation team conveyed to group members related to making compost and liquid fertilizers and the importance of GAP practices.



**Figure 3. Training on the Production of Compost and Liquid Organic Fertilizers**

### Production of Compost and Liquid Organic Fertilizer

Composting is a biological process carried out by microorganisms to convert organic solid waste into a stable product resembling humus. Composting is basically an effort to activate microbial activities in order to accelerate the decomposition process of organic matter. Composting is a biological process that has been used for centuries as an organic waste management solution (Lin, C., et. al., 2022). What is meant by microbes here are bacteria, fungi and other microorganisms.

Tirta Arum Farmer Group uses composting to process livestock manure into fertilizer. One of the innovations used by the Tirta Arum Farmer Group is using MOL (local microorganisms) as a decomposer instead of EM4. MOL is a collection of microorganisms

that can be used as a starter, decomposer, liquid fertilizer, and vegetable pesticide (Sholehah et al., 2024). MOL can replace the role of EM4 in decomposing or fermenting organic matter. Making MOL is based on coconut water which is available around the environment (Figure). The process of making compost fertilizer is described as follows:

#### 1. Making MOL

- a. Add coconut water
- b. Add molasses
- c. Stir all ingredients until evenly mixed
- d. Cover the container with a lid with aeration holes
- e. Fermented for two weeks



**Figure 4. Making MOL**

#### 2. Composting (Figure 5)

- a. Prepare the materials: Cow feces and additional materials (chaff, straw, or dry leaves).
- b. Pile the materials: Combine the cow feces with the additional materials, piling them on top of the soil or compost container.
- c. Manage moisture: Make sure the pile is moist (not too wet or dry).
- d. Turning: Turn the pile every 1-2 weeks to provide oxygen and speed up decomposition.
- e. Maturation: After 2-3 months, the compost will be mature (dark in color and odorless).
- f. Use: The compost is ready to be used as organic fertilizer.



**Figure 5. Compost Fertilizer Production**

Liquid organic fertilizer is a fertilizer derived from organic materials such as crop

residues, animal manure, or compost, which are fermented to produce a nutrient-rich liquid. Liquid organic fertilizer can be used as a substitute or supplement to chemical fertilizers is an intriguing solution for hydroponic planting (Phibunwatthanawong, T., & Riddech, N., 2019). According to (Ramamoorthy, K., 2024) the use of liquid organic fertilizer shows superior results compared to chemical fertilizers. This fertilizer is effective for increasing plant growth and improving soil quality. Steps for making liquid organic fertilizer:

- a. Mix the ingredients: Put the leftover fruits (pineapple was used during the training) and brown sugar into a large container.
- b. Add water: Pour enough water until the ingredients are submerged, with the ratio of water to organic ingredients (Figure 6).
- c. Fermentation: Add the MOL, then cover the container tightly and let the mixture ferment for 1-2 weeks. Make sure to stir every 2-3 days to ensure even fermentation.
- d. Strain the liquid: Once the fermentation process is complete, strain the liquid from the pulp.



**Figure 6. Preparation of Liquid Organic Fertilizer**

#### Program Outcomes

The result of this activity is an understanding of the importance of applying GAP in making compost and liquid organic fertilizer to increase production. From this activity, it can be seen that the production capacity of compost and liquid organic fertilizer has increased as a business activity development of Tirta Arum farmer group. Previously, the production of compost fertilizer reached 1 ton and liquid organic fertilizer 400 liters every month. After the activity, the production of compost fertilizer reached 2 tons and liquid organic fertilizer 450 liters per month.

#### CONCLUSION

The problem of not meeting consumer needs and the availability of fertilizer-making materials can be solved by socialization and training. The application of GAP in making compost and liquid organic fertilizer showed an increase in productivity. The production results produced by the Tirta Arum farmer group are quite promising, reaching 2 tons and 450 liters of liquid organic fertilizer per month. Tirta Arum farmer group is able to optimize existing resources to produce compost and liquid organic fertilizer.

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