

Empowerment of Sederhana Farmer Groups Through the Use of Organic Pelet Fertilizer on Chili Plants on Coastal Land

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Abstract. The problem is that coastal land has different characteristics from rice fields, so the organic fertilizer used must be appropriate. Alternative solutions offered to overcome this problem include counseling and FGD on organic fertilizer in the form of pellets and how to make it. Another solution is training and demonstrations on the introduction of pellet printing machine technology, as well as its application to chili plantson sandy land and analysis of farming. The output target of this program is increasing partners' knowledge and skills as a result of outreach, training and demonstrations. The method or activity plan proposed to achieve thistarget is Focus Group Discussion carried out by gathering strategic target audiences, namely simple farmer groups to take part in counseling, lectures and discussions. Demonstrations on making organic pellet fertilizer and its application on chili plants through demonstration plot. Analysis of coastal land chili farming using organic pellet fertilizer. There are 18% of farmers whose change in knowledge is in the high category, 55% of farmers are in the medium category, and 27% are in the low category. The demonstration plot results showed that by using organic pellet fertilizer around 12% of chili plants died. Meanwhile, chili plants planted conventionally without using organic pellet fertilizer resulted in the number of chili plants dying as much as 30%. Key words: sand land, chili, organic fertilizer.

1 Introduction

Community empowerment is an effort to provide empowerment or strengthening to the community [1]. Community empowerment can also be defined as a person's ability to work together with the community to realize community empowerment and aim to find new alternatives to improve community welfare [2]. There are 3 main goals in community empowerment, namely developing community capabilities, changing community behavior, and organizing community self-organization. Of course, there are many community abilities that can be developed, such as the ability to do business, the ability to search for information, the ability to manage activities, abilities in agriculture and many more according to the needs

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or problems faced by the community [3].

Chili is a horticultural commodity that has high economic value [4]. There are many types of chilies, but in Indonesia only certain types of chilies are used, such as large chilies, namely red chilies, green chilies, curly red chilies and paprika, as well as small types of chilies, namely cayenne pepper [5]. One of the regions in Indonesia that produces red chilies is the Special Region of Yogyakarta. There are four red chili producing districts in DIY, namely Kulonprogo, Sleman, Bantul and Gunungkidul districts. During the 2018-2020 period, Bantul Regency ranked third for red chili production in DIY. Bantul Regency is able to produce chilies with an average of 27,513 quintals each year with a contribution of 7.65%. Almost all farmers in Bantul Regency cultivate chilies on coastal sand land, as in Figure 1.



Fig. 1. Chili cultivation on coastal sand

Waste from beach culinary stalls in Depok, Bantul Regency has been processed into organic fertilizer, both solid and liquid, and is named MB-45 Depok. MB-45 Depok organic fertilizer has also been tested for nutrient content at the UMY Faculty of Agriculture Soil Laboratory with very good nutrient content results, as shown in Table 1.

Table 1. Laboratory Test Results

Nutrient	Solid Organic Fertilizer	Liquid Organic Fertilizer
Kadar Carbon (%)	21.35	5.35
Bahan organik (%)	36.58	9.72
Nitrogen total (%)	12.74	5.22
C/N ratio	1.67	1.02
Phospor total (ppm)	568.93	23.11
Kalium total (ppm)	1482.16	1981.21

The characteristics of coastal sand land include having low water retention capacity, so it requires watering twice a day. This causes a lot of labor costs. Chemically, the ability of beach sand to bind nutrients or fertilizer is low so it is easily lost, plus it is watered twice a day. This

condition causes the need for more nutrients or fertilizer, causing production costs in chili cultivation to increase. Several studies have partially proven the potential of the South Coastal Sand Land in Yogyakarta along with several alternative treatments that can be applied to support the success of plant cultivation on the land [6] [7][8][9] However, in its application, farmers have become accustomed to adding manure and clay soil in amounts and frequencies according to their empirical experience, and they realize that soil improvement does not occur immediately but requires several years to achieve soil conditions that are adequate enough to achieve optimal production.

Farmers who are members of the Simple Farmers Group in Kretek District, Bantul, cultivate chilies on sandy land. Considering the characteristics of sandy land as written above, fertilizer is needed that is easily absorbed by plants and does not quickly disappear on the land. Therefore, organic fertilizer will be used, in this case organic fertilizer in the form of pellets from beach culinary stall waste. Pellets have the same advantages as POG (Organic Fertilizer Granules), namely: ease of application, packaging and transportation. Another advantage is that the manufacturing process is shorter and easier. The important advantages of POP (Organic Pellet Fertilizer) are in terms of technique and production costs [10]. This is supported by research by [11] that the use of 500 kg/h chicken manure pellet NPK fertilizer is more effective in increasing the growth and yield of soybean plants on regosol soil.

2 Methodology

The stages of the method used include:

2.1 Time, location and targets

This activity will be carried out in March-April 2024. The location and target were determined deliberately in a simple farmer group in Bantul Regency with the consideration of actively planting chilies on coastal land. The targets for this activity consisted of 11 farmers.

2.2 Focus Group Discussion (FGD)

This activity was carried out by gathering strategic target partners, namely the Simple Farmers Group, to take part in counseling, lectures and discussions about organic fertilizer in the form of pellets that is appropriate for cultivating chilies on sandy land. The complete extension material can be seen in Table 2.

Table 2. Extension and FGD materials in simple farmer groups

No	Material	Sub-Material
1.	Beach culinary stallwaste	<ul style="list-style-type: none"> ● Types of waste from beachculinary stalls ● Excess organic fertilizer frombeach culinary stall waste
2.	Organic fertilizer in pellet form	<ul style="list-style-type: none"> ● Description of organic fertilizer pelletsfrom waste beach culinary stall ● How to make organic fertilizer pellets

2.3 Transfers of technology

Transfer or transfer of appropriate technology through technology for making organic fertilizer pellets and facilitating pellet printing machines to groups of simple farmers. The goal is for partners to make organic fertilizer in pellet form. This activity also explains in detail the framework of the pellet printing machine, so that other people can adopt this tool in the future. The application of organic pellet fertilizer to sand-based chili plants is carried out through demonstration plots on land owned by farmers who are members of the simple farming group. This activity is carried out periodically to develop and assist strategic target audiences until they succeed in producing and utilizing Appropriate Technology Transfer in producing competitive organic fertilizer pellets and partners can consult about program implementation until they can achieve maximum results.

2.4 Data Analysis

Analysis of changes in knowledge was carried out using the gain normality test [12] with the following formula:

$$N \text{ Gain} = \frac{S_{post} - S_{pre}}{S_{maks} - S_{pre}} \quad (1)$$

Information:

N Gain : Gain Normality
 Test Value S_{post} : Score Pre-Test
 S_{pre} : Score Post-test
 S_{maks} : Score Maksimal

The effectiveness criteria interpreted from the normality gain value according to Meltzer can be seen in Table 3 below.

Table 3. Classification of gain normality values

Gain Normality Test Value	Criteria
$0,70 \leq n \leq 1,00$	High
$0,30 \leq n \leq 0,70$	Medium
$0,00 \leq n \leq 0,30$	Low

3 Results and Discussion

Before counseling, a pre-test is carried out to determine the partner's initial abilities. Extension material related to the benefits and uses of organic fertilizer in pellet form for cultivating chilies on coastal sand land. The resource person for this activity was Ir., Mulyono, M.P from the Agrotechnology study program, Faculty of Agriculture, UMY. The activity was attended by 11 farmers because at that time there was a simultaneous event so not all members of the farmer group participated in the extension activities. Documentation of these activities is:



Fig. 2. Counseling and Pre-test activities

Demonstration and practical activities were carried out on April 15 2024 at the same time as breaking the fast together with partners in the sand area. The activity began with practice on how to make organic fertilizer in pellet form using a pellet machine, followed by planting chilies in sandy land. Planting is carried out on sand land owned by one of the farmers who is a member of a simple farming group by renting the land. The land was made into two beds, one bed for control and the other bed using organic pellet fertilizer. The imperial type of chili is grown. The resource person for this activity was Ir. Mulyono, M.P from the Faculty of Agriculture, UMY. The event closed with breaking the fast together. The following is documentation of these activities:



Fig. 3. Practice of making organic fertilizer pellets and planting chilies in sandy land

This activity was carried out to monitor chili plants planted in sand fields with organic fertilizer pellets and control. Activities were carried out 2 weeks after planting. The results of the first monitoring and evaluation show that there is no significant difference between the two treatments. Monitoring is carried out again after the plants are 5 weeks after planting. The results of the second monitoring showed that there were differences in the growth of chili plants using organic pellet fertilizer and the control. Chili plants with organic pellet fertilizer showed better growth than control chili plants. With a bed measuring 1.5 x 20 meters, the number of chili plants was 102. The results showed that by using organic fertilizer pellets only 12 or 11.76% of the chili plants died, while the control plants (not using organic pellet fertilizer) were 31 or 30.39% of the plants. dead chili. The following is monitoring documentation for chili plants with pellet and control organic fertilizer.

Pre-test activities are carried out before counseling and discussions are held to determine the initial capabilities of partners regarding pelleted organic fertilizer. After counseling and discussion, a post test was carried out to determine whether there was a change in partners' knowledge before and after the counseling was carried out. The normality gain value for this activity can be seen in Table 2. Based on the results of the N gain calculation in Table 2, it can be seen that around 18% of farmers whose changes in knowledge are in the high category, 55% of farmers are in the medium category, and 27% are in the low category.

Table 4. Results of calculating the N Gain score

<i>No. Sampel</i>	<i>Score</i>		<i>Score N Gain</i>	<i>Criteria</i>
	<i>Pre Test</i>	<i>Post Test</i>		
1	9	12	0,3333	Medium
2	10	12	0,2500	Low
3	7	12	0,4545	Medium
4	9	9	0,0000	Low
5	9	10	0,1111	Low
6	7	13	0,5455	Medium
7	8	12	0,4000	Medium
8	6	18	1,0000	High
9	7	18	1,0000	High
10	8	12	0,4000	Medium
11	7	12	0,4545	Medium

In order to support the smooth running of this community service activity, the UMY communityservice team provided material grants to simple farmer groups in the form of:

- a. 1 package of organic fertilizer pellet printing machine
- b. One package of organic fertilizer
- c. Imperial chili seeds
- d. Rent sand land

**Fig. 4.** Monitoring and evaluation of chili planting on coastal land

4 Conclusions

1. This study is able to help overcome the problem of the rapid decomposition process in chili cultivation on coastal sand.
2. There are 18% of farmers whose change in knowledge is in the high category, 55% of farmers are in the medium category, and 27% are in the low category.
3. The demonstration plot results show that by using organic pellet fertilizer around 12% of chili plants die. Meanwhile, chili plants planted conventionally without using organic

fertilizer pellets resulted in the number of chili plants dying as much as 30%.

Acknowledgement

The community service team would like to thank the UMY Community Service Institute for providing financial support through the 2023/2024 International Community Service Applied Research scheme so that this activity can be carried out well.

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