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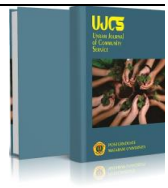

Introduction of Superior Varieties and Seeds Quality in Shallot Cultivation in "*Sumber Hidup*" the Farmer Group Sigerongan Village

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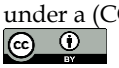

Abstract: Members of the "Sumber Hidup" farmer group mostly carry out farming on narrow fields of land with very low yields. One alternative for developing farming businesses on limited land was the use of superior varieties and quality seeds of shallot. To achieve this goal, activities have been carried out to apply science and technology, both in the training/counseling and plot demonstrations (action research) for farmers. The method used in training was adult education with participatory techniques. The resulting output was an increase in the skills and knowledge of partner farmers. The demonstration plot that has been carried out was action research based on the results of research that has been carried out previously. The demonstration plot that has been done was to compare the planting of superior varieties of shallots with shallot seeds originating from farmers. The results of the activity showed that members of the "Sumber Hidup" farmer group who participated in the extension were very responsive to community service activities. Farmers heard and asked several questions related to planting superior varieties and quality shallot seeds on limited land. Participants were very active in every activity such as selecting seeds, making demonstration plots, planting, hilling, weeding and harvesting activities. The process of technological transformation of the use of superior varieties and quality seeds of shallots on limited land has occurred in the "Sumber Hidup" farmer group. The results of the demonstration plot showed that superior varieties produced 5-7 tons per hectare of shallot.

Keywords: Narrow size land; Participatory; Seed quality; Superior variety

Introduction

Sigerongan Village, Lingsar District has an area of 470 Ha with a population of 6,198 people with a population density of 1,319 people/Km2. Most of the population works in the agricultural sector both as farmers and livestock breeders, especially as sharecroppers and farm laborers. This village has agricultural area consisting of technical (225 Ha), semi-technical (32 Ha), and non-technical (10%) irrigated rice fields (Lingsar District in Figures, 2021).

To increase the development of farming at the farmer level, a Farmer's Group has been formed, with the name " Sumber Hidup". This farmer group mostly carries out farming in technically irrigated rice fields. Land ownership for farming was very low (5-10 acres) per farmer and most of the farmers are sharecroppers and farm laborers with low levels of farmer income. The farming businesses being developed include rice, secondary crops and vegetables.

Vegetable planting in Sigerongan village was still very limited to the types of local vegetables commonly used by local farmers, such as chilies, eggplant, tomatoes and long beans. Planting of onions has never been carried out, in terms of growth conditions for shallots in Sigerongan village it was very suitable with loose soil conditions, sufficient water conditions and the presence of onion pests and diseases was still very lacking.

Initial survey results show that the potential that can be developed for small land farming businesses in Sigerongan village is increased intensification through the introduction of vegetables with economic value and high market demand. One of these vegetables was red

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onions. Consumer demand for shallot commodities continues to increase from time to time (Puspitasari et al., 2019). Consumption of shallots in Indonesia was 2.83 kg per capita per year or 0.23 kg per capita per month so national consumption was estimated to reach 731,100 tons per year (Kiloes, et al., 2022; Direktorat Jenderal Hortikultura, 2016).

One effort to increase shallot production was the use of superior varieties and quality seeds. The use of superior varieties and quality seeds of shallots can guarantee the achievement of maximum production in accordance with their genetic potential (Haryani, et al., 2021). According to Thingalmaniyan et al. (2017), the success of shallot production depends greatly on selecting varieties that adapt to different environmental conditions.

Another technical obstacle that causes low shallot productivity was the use of seeds that do not meet seed certification standards (Departemen Pertanian, 2005; Mariawan, 2015). In general, shallot farmers in producing seeds still use seeds that come from consumed tubers (seed harvest age was equated with consumption), seeds are not selected, and tubers are used continuously (production degradation) (Maemunah and Nurhayari, 2012). Shallot production cannot be separated from the role of seeds. In general, shallot farmers use seeds that come from shallot bulbs. The availability of quality seeds was one of the big problems in achieving increased agricultural production. Seeds have a strategic role in increasing production and adding value to agricultural products. Quality seeds will influence productivity, yield quality and efficiency of agribusiness plant products. The role of seeds as a means of production cannot be replaced by other means, so development efforts are largely determined by the quality of the seeds (Mariawan, 2015).

On this community service program has been done by utilizing narrow land farming through the process of transferring technology by introducing superior varieties and quality shallot seeds. It was hoped that the introduction of superior varieties and quality seeds of shallots will make farming activities on limited land more efficient and profitable for partner farmers. Planting superior varieties of shallots will be more productive than planting other vegetables. Therefore, This Community Service Program aims to increase the knowledge and skills of farmer partners of the Sigerongan village " Sumber Hidup " farmer group to utilize limited land by planting shallots through the use of superior varieties and superior seeds. It was hoped that farmers' mental attitudes will change after participating in this service activity.

Method

The implementation method applied in this activity was directed at help partner farmer groups "Sumber Hidup" in Sigerongan Village by increasing the productivity of narrow land farming by planting shallots. This implementation method was also carried out with achievement indicators:

1. There has been an increase in the productivity of shallots and peanuts in small areas of land.
2. There has been an increase in partner farmers' understanding of applying shallot cultivation technology with superior varieties and quality seeds on limited land.
3. Coordination was carried out to increase the capacity of farmer groups with PPL, Village Heads and members of other farmer groups.

To successfully implement this extension activity, there were several stages of activities that will be carried out, namely:

1. Preparation. This preparation stage was carried out to prepare proposals and follow-up plans for implementing activities. Preparatory stages include:

a. Needs analysis

Information gathering was done by observing, interviewing, and following activities carried out by farmers. Data collection includes were the main problems faced, the condition of farming communities both in terms of economics, education their views on new innovations and so on.

b. Analysis of the creation of productive activities

Data collection were carried out simultaneously with activity stage a), covering agricultural product resource issues (potential, production, etc.) in connection with the creation of productive business activities and the selection of agricultural product technology packages to be developed.

c. Program outreach

This activity was an approach that provides outreach to the community about the benefits of continuing the program and its impact on community income levels.

d. Determination of participants

The selected participants were those who have enthusiasm as motivators, mobilizers, facilitators and reformers related to the objectives of the activity. The participants to be selected consist of the head of the Farmer Group, members of the farmer group, field agricultural instructor (PPL), Youth Leader, Farmer Woman Leader, and Local Entrepreneur.

2. Implementation of Activities. The problem solving that had carried out in this program was to increase the productivity of narrow areas of land through the application of shallot cultivation technology. To increase shallot productivity, it was necessary to apply the science and technology possessed by the Team in the form of training activities and plot demonstrations (action research). The stages of activities carried out include:

a. Training

The method used in training was the adult education method (POD) with participatory techniques. Technical training participants include heads and members of farmer groups, PPL, youth leaders, women farmer leaders, local entrepreneurs and active farmer group members. Training activities include material explanations (with LCD and visual aids), discussions and questions and answers. The training activity was carried out for 1 (one) day, with the following training materials: economic prospects for shallots, cultivation of shallots, superior varieties and quality seeds for shallots, harvesting and post-harvest shallots.

b. Plot demonstration (demonstration plot)

The demonstration plot that has been carried out was in the form of action research (action study). Planting was carried out on farmer's land. This activity was carried out to compare the cultivation of superior varieties of shallots and native shallot seeds. The superior red onion seeds come from the collection of Research Group, University of Mataram for Genetic Resources Management, Legume and Horticulture Crops. Farmers were participatively involved together in planning, implementing and evaluating harvest results.

After the training was carried out, it was continued with an explanation of the Demonstration Plot. Demonstration plot arrangements follow the Completely Randomized Block Design (CRBD) with treatment of several superior varieties of shallots.

The next explanation included land preparation, experiment area ploting, planting, plant maintenance, and harvesting. Soil plowing has been carried out once and experiment plot was made with size 150 x 80 cm.

Planting shallots was carried out with a spacing 20x15 cm. Plant maintenance was carried out on shallot plants. Every month, weeding was carried out while weeding by turning over the soil so that the soil becomes loose. Shallot crop was fertilized with NPK (15-15-15) at a dose of 300 kg/Ha. Fertilizer was applied to shallots 3 times during planting. Pest control was carried out physically by directly killing pests on the surface of the leaves. Irrigation was done with irrigation water, which was done at the one day after planting, 20 days, 30 days, 40 and 50 days after planting.

Shallots crop were harvested at 65 days after planting. The parameters observed in shallots plant were plant height, number of leaves, number of bulbs, fresh weight of the bulbs, and dry weight of the bulbs.

Results and Discussion

The transformation of agricultural technology results in the form of superior varieties and quality seeds of shallots must be utilized by farming communities. The technological transformation methods developed were training (extension) and plot demonstrations.

Training activities (extension)

The training was carried out to deliver extension material. In order for research results to achieve success in the adoption process, a technology needs to be heard, demonstrated and carried out, so that the implementation of training needs to be continued with practical activities in the plot demonstration. Training was a form of communication media in efforts to develop information in the dissemination of research results (Indraningsih, 2011).

Theoretically, agricultural extension is an effort to change the behavior of farmers so that they have broader knowledge, have a progressive attitude to make changes and be innovative towards new things (information) and are skilled in carrying out various activities that are beneficial for increasing agricultural business productivity, income/profits, and for the welfare of the family and society (Mardikanto, 1996).

This community service activity has been carried out to increase the knowledge and skills of the " Sumber Hidup" partner farmers group in Sigerongan village to utilize limited land by cultivation shallots through the use of superior varieties and superior seeds. In this activity, the communication technique used by the extension team was direct extension, namely face to face communication between the extension agent and farmers. The direct method was used so that farmers hear and respond directly and quickly to the extension material presented. The extension team delivered outreach materials at the experimental demonstration plot. According to Martanegara (1993) the direct method is considered more effective for convincing and strengthening the relationship between extension workers and farmers as well as quick response or feedback from the target. Figure 1 explains the face-to-face lecture activities between instructors and members of the " Sumber Hidup" farmer group.

Figure 1. Farmers were following the explanation about the process of planting and growing superior varieties and quality seeds of shallots

The results of the service activities showed that the extension participants were very responsive to the extension activities. This can be seen from the presence of the participants and the involvement of the participants during the implementation of the counseling. The presence of participants was in line with the target, namely 16 people with the composition of participants consisting of members of the "Sumber Hidup" farmer group, head of Water User Farmer Group, community leaders and women farmers. Participants in this extension were deliberately selected directly from farmer groups, because they were considered effective in directly implementing shallot cultivation. Judging from the involvement of the participants during the extension, it turned out that the participants really listened and were directly involved in the questions and answers.

This lecture activity was carried out to teach about the economic prospects of shallots, cultivation of shallots, superior varieties and quality seeds of shallots, and harvesting and post-harvest shallots. Farmers were more enthusiastic about practicing by looking at the reality in the field from planting to harvesting. Participatory techniques were mainly carried out to hear directly about problems regarding shallot planting and invite farmers to work together to find solutions to increase agricultural yields.

The use of superior varieties and quality seeds of shallots can guarantee the achievement of maximum production in accordance with its genetic potential (Haryani, et al., 2021). According to Thingalmaniyan et al. (2017), that the success of shallot production was very successfulrelies on selecting varieties that are able to adapt to different environmental conditions. Apart from the issue of superior varieties, use of seeds that do not meet seed certification standards (Department of Agriculture, 2005; Mariawan, 2015) is a problem in itself for farmers. In general, shallot farmers in producing seeds still use seeds that come from consumed bulbs (seed harvest age was equated with consumption bulbs), seeds were not selected, and bulbs were used continuously (production degradation) (Maemunah and Nurhayari, 2012).The availability of quality seeds was one of the big problems in achieving increased agricultural production. Quality seeds will influence productivity, yield quality and efficiency of agribusiness plant products. The role of seeds as a means of production cannot be replaced by other means, so development efforts are largely determined by the quality of the seeds (Mariawan, 2015). Criteria quality shallot seeds are healthy, pithy bulbs, no fungus growing, bulbs are not rotten, not porous or hollow. Discard seeds that have these signs and preferably use seeds that show these symptoms. Shallot seeds must be stored first before they are ready to plant. Storage time ranges from 60 to 90 days after harvest. This was because shallot seeds need to enter a period of dormancy.

Plot Demonstration

The knowledge and technology produced by researchers needs to be transferred to farmers. Farmers' access to information on technological innovation is relatively limited, so it is necessary to socialize and provide understanding to the farmers. Understanding a technological innovation certainly goes through a mental process stage from the individual farmer to making the decision to adopt it (Mardikanto, 1993).

Adoption of seed production technology can not only be done through lectures or discussions, but needs to be done through direct practice. Plot demonstrations are a form of outreach media carried out through direct practice in the field by comparing farmers' methods and the application of technology for using superior varieties/lines and quality shallot seeds.

The demonstration plot that has been carried out was testing several superior varieties and quality seeds of shallots. Demonstration plots are an extension method in the field to show/demonstrate in real terms the methods and/or results of applying agricultural technology that has been proven to be profitable for farmers. It was hoped that the adoption of this technology will result in changes in behavior in the form

of farmers' knowledge, attitudes and skills after receiving the "innovation" conveyed by the instructors to their targets. Acceptance here means not just "knowing" but actually being able to carry it out or apply it correctly and living it up.

In this activity, after carrying out the theoretical explanation, it was continued with an explanation of the Demonstration Plot. The next explanation includes land preparation, plot creation, planting, plant maintenance, and harvesting (Figure 2).

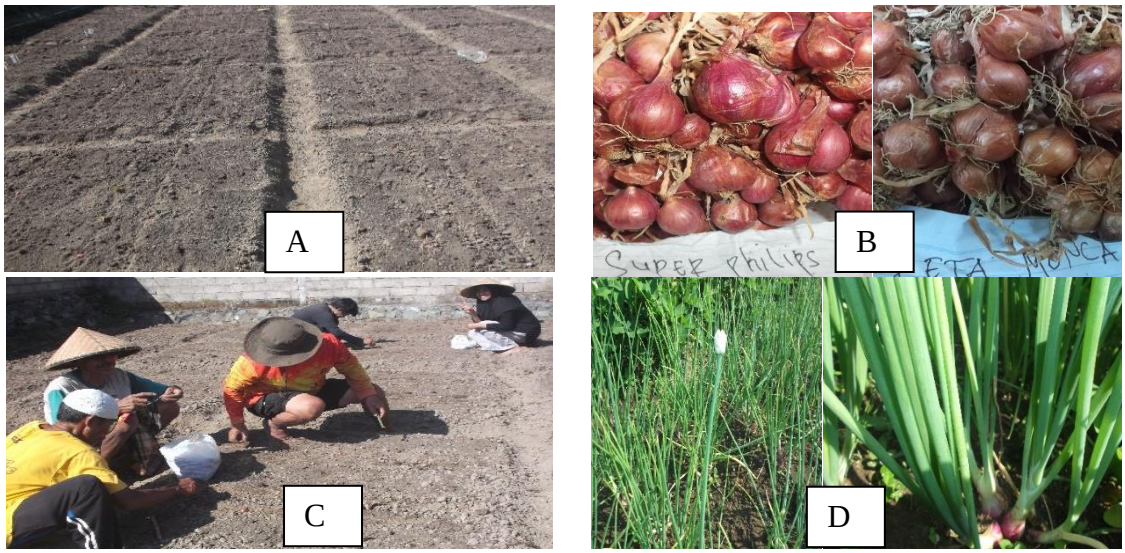

Figure 2. Demonstration activities of (A) making experimental plots and planting, (B) shallot seeds/seedlings, (C) planting shallot seeds (D) growth of shallots aged 50 days

In this demonstration plot activity, the team conducted an experiment by testing the yield of several shallot varieties, namely Super Philip, Keta Monca, Bima Brebes, Nganjuk, and Bali Karet.The experimental land was processed once until smooth and plotted. Experimental plots were made with measurements 80 x 150 cm. The planting medium was fertilized with 3.5 tons of compost per hectare or 1.5 kg plot. Before planting, shallot seeds were cut into 1/3 parts. Cutting the seed tubers was done one day before planting. Planting was done with a spacing of 20 x 20 cm. The shallot plant bulbs were inserted into the hole previously made with a tugal. The planting hole was made as deep as the tuber. Each planting hole was sprinkled with Furadan 3G. The tubers were inserted into the soil like turning a screw.

Watering was done according to the age of the plant: 1-10 days old, 2 x/day (morning and evening); 11-35 days old, 1x/day (morning); 36-50 days old, 1 x/day (morning or evening). Fertilization was carried out by applying NPK compound fertilizer (15-15-15) at a dose of 300 kg per hectare. Fertilizer was applied 3 times, namely basic fertilizer before planting, additional fertilizer at 10-15 days, and 30-35 days. Fertilizer was applied by spreading it and stirring it evenly as deep as the treated layer. Weeding was carried out every week by pulling out weeds that have been mapped in the experiment. The demonstration plot did not carry out pest and disease control, because no pests and diseases were found and the use of pesticides was avoided. Harvesting of shallots was carried out 65 days after planting (DAP) or the shallot plants show signs of 60% soft stem necks, fallen plants, and yellowing leaves.

During harvesting, several parameters were also observed such as the number of tubers, fresh weight of the tubers, and economic dry weight of the tubers. The results of demonstration plot tests for several shallot varieties could be seen in Table 1.

Table 1. Demonstration plot results for yield of several shallot varieties (plot area 1.5 x 0.8 m^2)

Variety	Number of bulbs per hill	Fresh bulb weight (g) per plot	Dry bulb weight (g) per plot	Dry bulb weight (tons) per hectare
Bima Brebes	5.9b	460.0b	434.6b	3.6b
Bali Rubber	3.6a	979.1d	884.1d	7.4d
Super Philip	7.4b	747.0c	664.5c	5.5c
Keta Monca	8.2b	803.9d	682.6c	5.7c
Nganjuk	11.1c	896.5d	838.7c	7.0d
Seeds from farmers	5.7b	360.7a	320.4a	2.7a

Note: Numbers followed by the same letter in the same column are not significantly different in the Duncan 5% test

In Table 2 it could be seen that the use of seeds from farmers produces a small number of tubers per hill, the weight of the harvested tubers was also lighter, namely an average of 320.4 g per plot or 2.7 tons per hectare. The Bali Karet variety has the heaviest tuber dry weight, namely 7.4 tonnes per hectare. The Bali Karet variety genetically has a small number of tubers but has a large tuber size. The yield power of several shallot varieties will be able to produce optimally according to their genetic potential. From the results of this demonstration plot, farmers could see and directly compare the growth and yield of several shallot varieties

Conclusion

Based on the description of the activities described above, it can be concluded that: (1) Members of the " Sumber Hidup" farmer group who participated in the extension were very responsive to community extension activities. Farmers heard and asked several questions related to planting superior varieties and quality shallot seeds on limited land; (2) Participants were very active in every activity such as selecting seeds, making demonstration plots, planting, hilling, weeding and harvesting activities; (3) There was a process of technological transformation in the use of superior varieties and quality seeds of shallots on limited land in the "Sumber Hidup" farmer group, Sigerongan village; (4) The "Sumber Hidup " farmer group took part in a plot demonstration to compare the planting of superior varieties and quality shallot seeds on a small plot of land. The results of the demonstration plot show that superior varieties can produce 5-7 tonnes per hectare of shallots.

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