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Assistance to Farmers in Increasing Rice Production Through Direct Seed Planting System in Langsat Permai Village, Bungaraya District

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ABSTRACT
The increase in agricultural yields of food crops and horticulture in Langsat Permai Village, Bungaraya District was initiated by the construction of canal blocking in the activities of the Partner Village Service Program by DIKTI in the 2017-2019 implementation year which will continue until 2023. However, the harvest index (HI) of rice has not reached 300 due to the transplanting system, so that it takes quite a long time from the transplanting period to finally harvesting and replanting. Therefore, the rice cultivation system with the direct seed planting system can be a solution that can help farmers increase the harvest index (HI) and rice crop production. The activity partners who were the targets of the activity were farmers and members of the Langsat Permai Village youth group. Assistance is carried out by providing knowledge about rice cultivation using the direct seed planting system starting from the understanding of the direct seed planting system, its tool, the advantages and disadvantages of rice cultivation using the direct seed planting system, as well as the stages of the direct seed planting system cultivation from land preparation, seed preparation, planting to fertilization. Based on the results of the mentoring carried out, the knowledge of farmers and youth groups in Langsat Permai Village about rice cultivation using the direct seed planting system has increased compared to before the mentoring activities were carried out.
Keyword: assistance, cultivation rice, the direct seed planting system

ABSTRAK
Peningkatan hasil pertanian tanaman pangan maupun hortikultura di Desa Langsat Permai Kecamatan Bungaraya diinisisasi dengan pembangunan sekat kanal (canal blocking) pada kegiatan Program Pengabdian Desa Mitra (PPDM) DIKTI tahun pelaksanaan 2017-2019 yang masih berlanjut sampai tahun 2023. Namun, indeks panen (IP) padi belum mencapai IP 300 akibat pola sistem budidaya tanaman padi yang dilakukan masih konvensional (sistem tanam pindah/Tapin), sehingga diperlukan waktu yang cukup lama dari masa pindah tanam sampai akhirnya panen dan dilakukan penanaman lagi. Selain itu, biaya upah yang harus dikeluarkan oleh petani cukup besar dan jumlah jumlah tenaga kerja buruh tani untuk pembibitan padi semakin menurun. Oleh karena itu, dilakukan pendampingan petani dalam budidaya padi dengan sistem tanam benih langsung (TABELA) yang diharapkan dapat menjadi solusi permasalahan tersebut. Mitra kegiatan yang menjadi sasaran kegiatan yaitu petani anggota kelompok karang taruna Desa Langsat Permai. Pendampingan dilakukan dengan memberikan pengetahuan mengenai budidaya padi menggunakan sistem Tabela melalui pelatihan dan praktek langsung penggunaan alat Tabela (Atabela), serta pembuatan demplot budidaya padi dengan sistem Tabela. Berdasarkan hasil pendampingan yang dilakukan, terjadi peningkatan kemampuan petani tentang sistem Tabela sebanyak 60% dari sebelum pendampingan, terjadi peningkatan keterampilan petani dalam menggunakan Atabela dan terjadi peningkatan produksi tanaman padi sebanyak 8 kg pada sistem Tabela dibandingkan dengan sistem konvensional.
Keyword: budidaya padi, pendampingan, tanam benih langsung

1. Introduction

Langsat Permai Village is a village that has become a Riau University fostered village because from 2016 until now several community service activities have been carried out, especially in the field of agricultural development. In 2017-2019, dedication activities through Partner Village Service Program DIKTI have been carried out, namely the construction of canal blocking as an effort to manage water management in agricultural land so as to maintain the availability of water to support agricultural activities. The canal blocking has been equipped with a sluice gate that is directed to the rice fields. Through canal blocking, during drought conditions, water is always available for rice and other crops so that they are still able to irrigate rice fields and other crop cultivation businesses. As a result of the canal blocking, it is known that there was an increase in rice productivity from the initial range of 4-5 tonnes. ha-1 increasing to 6-7 tonnes. ha-1[1]. In 2020, farmer assistance has been carried out with the Low External Input Sustainable Agriculture (LEISA) system where the results of the demonstration plot obtained that a 25% reduction in the dose of inorganic fertilizer can provide the same results in the production of rice, chilli and corn crops as the dose of fertilizer cultivated by local farmers [2].

Despite the development of agriculture, fisheries, and livestock businesses in Langsat Permai Village, the assistance of farmers from youth groups is still needed, especially in rice cultivation. This is due to the increasing price of production costs that farmers will incur in conducting rice cultivation. One of the costs that will be incurred by farmers in the early planting period is the cost of wages for conventional rice planting of IDR 1,400,000/ha and wages for pulling rice seeds which is IDR 600,000/ha. So, if the total becomes approximately Rp 2,000,000/Ha. Based on this, it will certainly be a fixed expense in addition to the cost of purchasing fertilizer later. This is also related to the decline in youth interest in crop cultivation given the high production costs that must be incurred, including youth groups (Primary data from interviews).

An effort to reduce wages at the beginning of planting is to develop a direct seed planting system. In Bungaraya sub-district, rice cultivation with the direct seed planting system is still very limited at around 17 ha compared to neighbouring sub-district farmers, namely Sabak Auh sub-district, which has reached 100% of farmers developing rice cultivation with the direct seed planting system. Whereas the wage costs incurred with the direct seed planting system are only around Rp 500,000/Ha which of course will save production costs that will be incurred by local farmers. Based on the results of the interview, it was also informed that the low level of farmers in conducting the direct seed planting system was due to the absence of tools used to spread rice seeds when planting the direct seed planting system so that so far farmers have only spread the seeds unevenly and ultimately caused the height of the rice to grow unevenly. Therefore, it is necessary to assist farmers in developing the direct seed planting system which can later have an impact on increasing the harvest index (IP) which is initially still IP 200 to IP 300. Research results report [3] rice yields variety Inpari 43 with the direct seed transplanting system has plant height, total number of tillers, number of tillers, faster harvest age of 98 days and higher productivity than the direct seed planting system farmer's pattern. In addition to increasing rice IP, the direct seed planting system also has the advantage of more rice tillers [4] and reducing stress on rice plants that will be cultivated due to transplanting from previous seedlings.

However, increasing the IP of rice with the direct seed planting system must of course be prepared with the right land to help the direct seed planting system to be optimally carried out. This is in accordance with the opinion of [5] which states that one of the weaknesses of rice cultivation with the direct seed planting system is that it requires more perfect tillage in addition to good weed management. Efforts can be made by assisting soil management by applying cellulolytic bacteria from the research to help improve the decomposition process of organic matter in the soil left over from previous rice cultivation. This bacterial consortium consists of six cellulolytic bacterial isolates (consortium) consisting of two bacterial isolates from rice straw (Bacillus cereus JP6 and B. cereus JP7), two bacterial isolates from oil palm empty fruit bunches (Proteus mirabilis TKKS3 and P. mirabilis TKKS7), and two isolates from acacia litter (Providencia vermicola SA1 and P. vemicola SA6) [6]. The application of these bacteria is expected to help optimise the direct seed planting system for rice cultivation in Langsat Permai Village. Direct application of the six bacteria has been carried out in rice research where if the bacteria are given into the soil directly with the incorporation method (stirred together in the soil) it is better in increasing the growth of rice plants compared to being spread on the soil surface [7]. The use of these bacteria has also been applied as biofertilizers in rice plants [8], [2]. Based on this, a community assistance service has been carried out which is expected to improve farmers' skills in cultivating rice with the direct seed planting system as well as developing this system cultivation system so as to increase rice productivity and harvest index (IP) in Langsat Permai Village.

2. Methods

The method used is a plot demonstration. The method of implementing coaching activities in Langsat Permai Village, Bunga Raya Sub-district Riau Provience, was carried out with pre-implementation, implementation, and evaluation stages. At the pre-implementation stage, the service team tested the respondents' knowledge using a questionnaire and continued to make a rice cultivation demonstration plot. The materials taught to the farmers were:

a. *Direct seed planting system*. The materials taught to farmers are: types of planting systems, understanding and advantages of direct seed planting systems.
b. *Making direct seed planting tools*. The framework of the direct seed planting tool consists of wheels and seed collection tools.
c. *Practice of seed planting tools using research demonstration plots.* The research demonstration plot is a rice field that has been treated with solid compost and is ready for planting.

In the implementation activities, the service implementation team conducted coaching and mentoring on various aspects including

a. Coaching target partner farmers (youth groups) about the importance of good and environmentally friendly tillage to prepare land for rice cultivation with the direct seed planting system and coaching target partner youth to design the right tools to optimise seed planting with this system so that it will produce uniform rice growth;
b. Assistance to target partners of youth groups in rice cultivation activities with the direct seed planting system and tillage before planting this system with the application of research-derived bacteria to help accelerate the process of cultivating rice plants.

Evaluation activities are based on indicators of success to be achieved. The form of evaluation of coaching includes a pre-test conducted before the target group is given material in the form of questions about farmers' knowledge of rice cultivation techniques with the direct seed planting system.

The indicator of the success of coaching is an increase in knowledge and motivation of the target partner youth in conducting rice cultivation with the direct seed planting system. This can be seen in the post test conducted at the end of the coaching. After the training, it was continued with the construction of a demonstration plot of rice plants with the direct seed planting system.

3. Results and Discussion

The direct seed planting system coaching was carried out through training for the entire youth group of Langsat Permai Village. This activity was attended by the Secretary of Langsat Permai Village, the service team as resource persons and farmers in Langsat Permai village (Figure 1). The training was conducted in the form of a presentation on rice cultivation using the direct seed planting system, starting from the definition of the direct seed planting system, the tool of the direct seed planting system, the advantages and disadvantages of rice cultivation using the direct seed planting system, and the stages of the direct seed planting system cultivation starting from land preparation, seed preparation, planting to fertilisation. This training activity is also carried out to determine the ability of farmers to practice rice cultivation with the direct seed planting system and then after the service is expected to increase the knowledge and skills of farmers as target partners in rice cultivation using the direct seed planting system and how to use the it’s tool. In addition, the training also aims to improve competencies that help farmers become more independent in making decisions related to their agricultural businesses. Farmers will have more in-depth knowledge about land management and marketing strategies so that farmers are able to make smart decisions and innovate to increase the productivity of rice fields [9]. The results of the pre-test and post-test questionnaires during the direct seed planting system socialisation can be seen in Table 1.

Table 1. Pre-test and post-test devotion questionnaire results.

No	Question	Pre-Test		Post-Test	
		Respondents	Percentage	Respondents	Persentage
1	Do you know what the direct seed planting system is? If yes, please explain briefly	10/25	40%	25/25	100%
2	Do you know the benefits of the direct seed planting system in rice cultivation?	7/25	28%	25/25	100%
3	Do you know how to use tools in the direct seed planting system cultivation? If you know, please explain	3/25	12%	25/25	100%

Table 1 shown that some farmers in the village Langsat Permai has known about rice cultivation with the direct seed planting system (as much as 40%). This is because in the neighbouring village of Langsat Permai Village, Sabak Auh Village, Bungaraya Sub-district, many farmers have applied rice cultivation with the direct seed planting system. However, there are no farmers in Langsat Permai Village who apply the direct seed planting system to their rice cultivation. The low number of farmers who apply the direct seed planting system in Langsat Permai Village is due to farmers not knowing the benefits of rice cultivation with the direct seed planting system. Pre-test question 2 showed that only 28% of farmers knew about the benefits of this system. Furthermore, farmers in Langsat Permai Village consider that cultivation with the direct seed planting system is more complicated than the transplanting system. This is due to farmers' ignorance of the tools of the direct seed planting system, which has not been widely found in Langsat Permai Village. It can be seen that in the third questionnaire question, only 3 farmers (12%) knew about the direct seed planting tool.

Figure 1. Community empowerment training on direct seed planting system.

Based on the results of the training conducted, farmers generally know about the direct seed planting system, but there are still many who do not want to apply this system because the community still persists in using the old system of rice cultivation using the transplanting system. This is due to the shortcomings of the direct seed planting system, namely that rice cultivated with the direct seed planting system is vulnerable to pests and weeds and is only suitable for cultivation in the dry season. Whereas if done with the direct seed planting system, many other benefits can be felt including cost and labour efficiency. [10] stated that the comparison of the use of time and the use of labour in rice farming in the direct seed planting system is more efficient than the transplanting system, where the amount of labour use in the direct seed planting system is 38.59 Ha.

The direct seed planting system labour use was 38.59 HOK/Ha while the transplanting system was 64.05 HOK/Ha. In addition, the calculation of R/C ratio showed that the direct seed planting system was more viable than the transplanting system. The R/C ratio value of the direct seed planting system was 1.99/ha while the transplanting system was 1.04/ha. After the presentation of material on rice cultivation using the direct seed planting system, it was followed by direct practice with the community on the use of the tools of the direct seed planting system. The direct seed planting tool is one of the farming technologies developed to facilitate the process of planting rice with the direct seed planting system. The use of the direct seed planting tool is very helpful in the planting process because it can reduce the labour required. The use of it has the advantages of

time, labour and cost efficiency. However, the use of it has the disadvantage of using quite a lot of seeds. The direct seed planting tool circuit can be seen in Figure 2.

Figure 2. The direct seed planting tool and hands-on practice of using it with farmers of Langsat Permai Village.

The process of making the direct seed planting tool starts from making the frame, installing the tubes and then installing the wheel installation. The framework serves as a link between all parts of the tool such as wheels, seed collection tools and other parts. The framework must be strong and sturdy this refers to the strength of how long the tools we make will last. The seed collection tube is made of a container or basin that has a strong resistance designed to be attached to the direct seed planting tool framework.

The way this tube works is very simple where the seeds are inserted into the tube as much as 3/4 parts so that the seeds easily come out through the tube hole that has been made. The wheel is made from a used bicycle wheel with a diameter of 60 cm but before that the rubber part of the wheel has been separated so that it only uses a bicycle wheel frame. Then a 5-7 cm iron plate is added around the wheel which is designed to run in muddy rice fields.

Operation of the direct seed planting tool starts with filling the seed collection tube. After the seed is inserted, the seed filling hole is closed again tightly so that it does not scatter. The operation of this tool is done by pulling, make sure the hole where the seeds come out is open. Pull the tool straight from the edge of the rice field to the end, do this activity in a repetitive manner. During pulling, do not stop halfway, as the seeds will fall into a heap.

3.1. Demonstration plot preparation

The direct seed planting system demonstration plots include several main activities, namely land preparation, planting with the direct seed planting tool, plant maintenance and harvesting. The establishment of demonstration plots or experimental land in agriculture aims to test and evaluate various factors that affect agricultural yields. In order to reduce the use of inorganic fertilizers, organic fertilizers are an alternative in reducing inorganic fertilizers. One of the organic fertilizers that can be used is compost. The compost used in the demonstration plot is solid which is solid waste from palm oil mills. Solid compost is expected to improve the physical, biological and chemical properties of soil. The use of solid compost on rice plants is good, namely by using the recommended dose of 16 tonnes.ha-1. In addition to the use of solid compost, biofertilizers are also applied. The use of them began to be developed in order to reduce the use of synthetic chemicals. To improve soil fertility and plant growth, biofertilizers can be the right solution. According to [11] biofertilizers containing beneficial microbes have a real effect, namely increasing nutrient uptake in the soil, so that the application of biological fertilizers at the right dose will increase rice yields. Based on the research of [8], the application dose of biofertilizers in good rice plants is 10 ml per plant with three applications. Form of demonstration plot activities Rice cultivation with the direct seed planting system can be seen in Figure 3.

Figure 3. The direct seed planting system demonstration plot.

From the cultivation results, the production of rice with the direct seed planting system reached 30 kg compared to the conventional system of 22 kg. In addition, the number of tillers of rice plants produced more in the direct seed planting system compared to the conventional system. This shows that the direct seed planting system can help in increasing rice production in Langsat Permai Village. There was an increase in farmers' ability to learn about the direct seed planting system by 60% from before the assistance.

4. Conclusions

Based on the results of the mentoring conducted, there is an increase of 60% in the farmers' knowledge about the direct seed planting system, and the total production of rice with the direct seed planting system has increased by 8 kg compared to the conventional system. The cultivation of direct-seeded rice needs to be continued on a larger demonstration plot so that farmers can sustainably adopt the direct-seeded rice system.

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