

Empowerment of Fish Cultivation Supporting Integrated Agriculture in Youth Group, Langsat Permai Village, Bungaraya District, Siak Regency

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Abstract. The construction of canal blocking on canals around community agricultural land in Langsat Permai Village through science and technology activities for Mitra Village in 2017-2019 has provided an increase in agricultural yields for both food crops and horticulture. Furthermore, the construction of canal blocking also has an impact on the use of canals for fish farming. Therefore, the purpose of this service activity is to provide assistance in the cultivation of catfish cages and the manufacture of fish feed based on agricultural raw materials and agricultural waste in karang taruna. The success of catfish growth is strongly influenced by the type and amount of feed given. The more feed that is given, the faster the fish will grow but the higher the production costs. Therefore, alternative feeds are needed to reduce the use of fish pellets by making feed made from agricultural raw materials and agricultural waste. Farmer is carried out both in fish cultivation and in the manufacture of fish feed by agricultural raw materials and agricultural waste. Based on the results, all members of karang taruna have understood about catfish farming activities in cages and making fish feed based on agricultural raw materials and agricultural waste. This shows that integrated agriculture has been formed in Langsat Permai Village.

Keyword: Fish cages, fish feed, agricultural waste, integrated agriculture

Abstrak. Pembangunan canal blocking pada kanal di sekitar lahan pertanian masyarakat di Desa Langsat Permai melalui kegiatan Iptek bagi Desa Mitra tahun 2017-2019 telah memberikan peningkatan hasil pertanian baik tanaman pangan maupun hortikultura. Selain itu, hal ini juga berdampak pada pemanfaatan kanal untuk usaha budidaya ikan. Oleh sebab itu, tujuan dari kegiatan pengabdian ini yaitu untuk melakukan pendampingan usaha budidaya keramba ikan lele dan pembuatan pakan ikan berbasis bahan baku pertanian dan limbah pertanian pada kelompok karang taruna. Berhasilnya pertumbuhan ikan lele sangat dipengaruhi oleh jenis dan jumlah pakan. Semakin banyak pakan yang diberikan maka semakin cepat ikan berkembang namun semakin tinggi biaya produksi. Oleh karena itu, diperlukan pakan alternatif untuk mengurangi penggunaan pelet ikan dengan membuat pakan berbahan baku pertanian dan limbah pertanian. Berdasarkan hal tersebut dilakukan pendampingan petani baik dalam usaha budidaya ikan maupun dalam pembuatan pakan ikan dengan memanfaatkan bahan baku pertanian dan limbah pertanian. Berdasarkan hasil pengabdian yang telah dilakukan diketahui bahwa semua anggota karang taruna yang menjadi mitra pengabdian telah memahami tentang kegiatan budidaya ikan lele di dalam keramba dan pembuatan pakan ikan berbasis bahan baku pertanian dan limbah pertanian. Hal ini menunjukkan telah terbentuknya pertanian terpadu di Desa Langsat Permai.

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1. Introduction

Langsat Permai Village is a village that has become one of the fostered villages in the University of Riau. This is because several service activities have been carried out, especially in the field of agriculture and animal husbandry development from 2016 to 2021. Langsat Permai Village has a total area of 750.45 ha/m² in which 102 Ha/m² has been used as rainfed rice fields, 492.65 ha/m² as community plantation land, and 24.66 ha/m² for the construction of public facilities [1].

In 2017-2019, water management efforts have been carried out on the agricultural land, including by making canal blocking and then the water can be used for irrigating rice fields [2]. The canal blocking has been equipped with sluice gates directed to rice fields. Through the construction of canal blocking, water is always available for rice and other crops that are cultivated during drought conditions. This right causes the productivity of plants in Langsat Permai Village to increase where in 2018, there was an increase in rice productivity (from 4.5 tons/ha in 2016 to 7-8 tons/ha in 2018) as well as chili (from 8 tons/ha in 2016 to 14-15 tons/ha in 2018) [3].

In addition to canal blocking, compost houses were also built by Science and Technology Activity team for Mitra Village in 2017-2019 to process organic fertilizers and the provision of several cows every year as well as the construction of the cowshed. In the third year, the construction of fish cages was carried out with the aim of utilizing canal water flow which was much more accommodated in some canals as a result of canal blocking construction. This fish cage business was developed by the youth group chaired by Mr. Suyadi. The types of fish cultivated by the partners consist of tilapia and catfish.

The development of this fish cage is still not optimal due to the lack of public knowledge about fish farming. In addition, fish seeds cultivated by the local community still come from outside the village, resulting in fishery activities not being able to continue and develop even though several fish cages have been built by the local community. Fish cultivation in cages in the canal also have some problems, because the quality of the water flowing in the canal, might not meet fish culture standards. This is very necessary considering that some of the water that flows in Bungaraya District is peat water, that might affect the fish breeding. Therefore, it is important to measure water quality before fish cultivating [4]. According to [5], a good pH for fish is 5.0-9.0 while for types of fish that live in swamp waters it has a very low pH of 4. Although some types of fish are less able to grow and thrive in water that has a low pH, there are types of fish that can be developed on peat, namely catfish (*Clarias* sp.) [6]. In addition to observing the pH of the

water, other water quality measurements are also needed such as the levels of BOD and COD in the water [7].

Aquaculture business in Langsat Permai Village can be developed by seeking alternative feed production by utilizing existing agricultural and livestock waste. This will be an effort to feed efficiency so that it can reduce production costs that must be incurred. Some agricultural wastes that have been used as fish feed include rice bran and corn cobs [8] and rice straw [9]. From the results of research [8] showed that the best treatment for fish feed was a ratio of 5 sludge, 35 fish meal, 35 rice bran and 25 corn cob (%) which resulted in feed quality 20% protein, 5% fat, 22% ash, 11% water content and buoyancy for 11 hours. However, the use of rice straw for fish feed still needs further monitoring because the quality content of the fish feed produced still does not meet the quality standards of fish feed [9].

The development of a sustainable fishery business also depends on the development of fish hatcheries and nurseries. This is important because people will not always use fish seeds that come from outside the area. The process of breeding and hatchery does require attention, especially on the feed for these fish seeds. The process of breeding fish in general uses a lot of natural food such as silk worms (*Arthemia sp.*) [10]. Through the manufacture of alternative feeds for both rearing and breeding fish, it will reduce farmers' expenditures in terms of production costs. If this fishery activity is developed continuously by utilizing agricultural and livestock waste, then Langsat Permai Village can later become a sustainable integrated agricultural village. Therefore, a fish cultivation empowerment service will be carried out to support integrated agriculture in Langsat Permai Village, Bungaraya District, Siak Regency. Through this service activity, it is hoped that the youth group can carry out fish cultivation in cages in canals and fish feed management by making fish feed independently by utilizing organic agricultural waste in Langsat Permai Village so that it can increase the income of target partners in addition to developing agricultural and livestock businesses.

2. Method

This service was held in Langsat Permai Village, Bungaraya District, Siak Regency, 156 km from Pekanbaru. This activity was carried out in 2021. Guidance and mentoring activities for fish farming were carried out directly on the fish cage cultivation land in the canals around agricultural cultivation areas owned by local farmers. In addition, training activities for making fish feed based on agricultural waste was carried out in one of the houses of members of the coral group cadets.

The target partners in the service activity consisted of 30 young group from Langsat Permai Village, led by Mr. Suyadi. In fishery activities, 12 members of the youth group was indirectly

participate in fishing activities. Several stages of service activities in Langsat Permai Village, Bunga Raya District were carried out as follows:

- a. Assistance of target partner youth for the construction of fish cages in canals around cultivation areas that increase the number of existing cages;
- b. Development of target partner youth in the Karang Taruna partner group on fish farming techniques in cages starting from measuring water quality, managing canal water for aquaculture, fish feed management, and fish care;
- c. Guidance and mentoring of target partner youth in the manufacture of fish feed for agricultural waste-based enlargement.
- d. Assistance of target partner youth in fish rearing and fish harvesting;

Some descriptions of science and technology implemented in the target were;

1. Increasing the capacity of the community, especially target partner groups in fish cultivation techniques in canals around village agricultural cultivation areas;
2. Improving the ability and skills of farmers in terms of fish cultivation including hatcheries, nurseries, and fish rearing;
3. Increasing the ability and skills of farmers in the manufacture of feed based on agricultural waste independently and sustainably;
4. Increasing community income, especially for the fishery sector from fish cultivation carried out by the community in Langsat Permai Village;
5. Increasing awareness of the importance of maintaining the condition of canal waters in order to continue fish farming in canals;
6. Increasing community interest and motivation in developing the potential of sustainable integrated agriculture in Langsat Permai Village.

All results of the implementation of this guidance are summarized and used as input for related parties to be taken into consideration in the development of fishery businesses in canals in the village. There were some indicators of success used as an evaluation design, including:

1. Coaching, the form of evaluation includes looking at the ability of the target partner group before community service is carried out, this activity is considered successful if there is an increase in the knowledge and motivation of the target partner youth in conducting fish cultivation in cages on the canal;

2. Mentoring, this form of mentoring evaluation is carried out by asking questions about fish hatchery, breeding, fish rearing and fish feed processing based on agricultural and livestock waste. The indicator of success is that the target partner group can understand effective fish farming techniques with optimal fish weight as a result of adding alternative fish feeds based on agricultural waste. Furthermore, the target partner group can develop sustainable cultivation starting from hatcheries, fish nurseries, and fish rearing as well as processing feed based on agricultural and livestock waste independently.

3. Results and Discussion

The existence of water flow in canals around the plant cultivation area in Langsat Permai Village provides the potential for the development of fish cultivation in cages known as floating net cages. Some villagers have used the canal to make fish cages, but because the condition of the canal water dries up in the dry season, local farmers are no longer doing fish farming. After the canal blocking, the community was very enthusiastic about redeveloping fish farming activities in the canals around the agricultural land. However, not all canals can be used for fish farming business, because some of the canal water is peat water and has a low pH that can inhibit the growth of the cultured fish. In addition, it is important to ensure that the canals are not contaminated with pesticides used by local farmers in crop cultivation.

The first thing is the fish farming mentoring activity for partners, namely measuring the quality of the water that will be used for fish farming in the canal. Quality measurement, pH and oxygen levels, is carried out by partners before the cultivation business, because the previous fish farming is not optimal. According to [11], the success of fish farming with a floating net cage system must have sufficient water flow and circulation to get good oxygen. The dissolved oxygen levels in the water in the canal to be built fish cages was 8 ppm. Based on the Quality Standards Government Regulation Number 82 of 2001, oxygen levels above 5 ppm are suitable for developing fish farming. Therefore, the dissolved oxygen level in the canal water is suitable for fish development.

In addition to dissolved oxygen levels, pH is also an important factor in the success of fish farming. Based on the observations that have been made, the pH of the water in the canal was 6. In general, the soil in Langsat Permai Village is peat soil that lowers the pH of the water in the canal. However, [6] stated that catfish has the potential to be cultivated in peatland drainage channels. Therefore, catfish was chosen to be cultivated in the canal compared to other types of fish.

This pH is tolerant enough for the growth and development of catfish. According to [12], the pH range for catfish culture ranges from 6.5 to 8.5. Even though the pH of the water in the canal was 6, catfish are still tolerant enough to thrive in the canal. This is in accordance with the

opinion [6] which states that catfish can still be developed at a pH of 4.8-5.9. The process of measuring water quality can be seen in Figure 1.



Figure 1. The process of measuring water quality by the service team

After measuring water quality, it was found that the low than optimal growth and development of fish in the previous aquaculture business was due to the size of the net used for cages being too small, resulting in a buildup of feed and toxins at the bottom of the cage waters, causing the fish to die. Therefore, the youth group built 4 cages in the canal with a size of 4 x 3 where the number of catfish seeds stocked was 2000 seeds. The process of making cages on the canal and the shape of the cages can be seen in Figure 2.



Figure 2. Making fish cages in canals around agricultural land

According to [13], feed management is very necessary for catfish farming business and fish management [14]. [15] stated that feed is the largest expenditure of fish farming. One of the efforts to reduce the cost of fish feed is by utilizing agricultural waste waste in Langsat Permai Village, such as corn cobs and rice bran, as an ingredient for making fish feed.

The training for making feed was attended by several members of the youth group. Raw materials used in the manufacture of fish feed are rice bran and soybean flour. Soybean flour content is more than 40% and used as the source of protein in fish feed. In addition, cassava leaf flour contains 27.28% protein [16] and also can be used as a source of high enough protein in the fish feed. Rice bran added to feed serves as a source of fiber. The amount of rice bran given to carnivorous fish food should not be more than 15%, while for omnivorous/herbivorous fish it is 35% [17]. The use of rice bran for catfish feed has been carried out by [18], where the best

formulation in increasing the growth of catfish is in the composition of fish meal; corn; bran, namely 60%; 19.75%; 19.75% and 60%; 9.5%; 30%.The training process for assisting the manufacture of fish feed based on agricultural waste can be seen in Figure 3.



Figure 3. Training on making fish feed with several members of the youth group

It can be seen from Figure 3 that assistance in the manufacture of fish feed based on agricultural materials and agricultural waste has been carried out. This activity was also organized by Real Work Lecture students who were carrying out activities in Langsat Permai Village. From the results of the activity, it is known that members of the youth group are quite enthusiastic in making fish feed based on agricultural waste. However, the manufacture of this feed has not been able to be on a large scale, because there is no pellet printing machine owned by local farmers. Therefore, this service activity program has been successful because there has been an increase in partner skills in making feed by utilizing agricultural raw materials as raw materials for making fish feed. The result of this activity is expected to reduce production costs during fish farming.

4. Conclusion

It can be concluded that it is known that all members of the youth organization who are service partners have understood about catfish farming activities in cages and making fish feed based on agricultural raw materials and agricultural waste. This shows that integrated agriculture has been formed in Langsat Permai Village.

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