

Catfish spawning training and silkworm cultivation in Pelita Jaya Village Indonesia

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Received 2020-09-16; accepted 2021-04-21; published 2021-04-28

ABSTRACT

The catfish culture development program organized by the National Peatland Restoration Agency in 2017 in the Village of Pelita Jaya has a positive impact on the economy. However, there are several obstacles related to the problem of providing catfish juveniles and formulated feed. The Community Partnership Program (PKM) activity aims to increase the income of the "Senang Bersama" Fish Farmers Group through training in catfish spawning techniques and silkworm cultivation. The activity was held in the Village of Pelita Jaya, Kabupaten Kubu Raya from May to September 2019. The methods used were lectures, demonstrations, training which included hormonal-induced catfish spawning techniques using ovaprim and sludge worm cultivation training. Monitoring and evaluation of activities are carried out starting from the first training until the activity ends. Activity evaluation was carried out using a retrospective (before-after) method using a questionnaire. The results of the training showed that the activity received a good response from PKM partners with the active participation of the partners and increasing the knowledge and skills of partners in the application of catfish spawning techniques and silkworm cultivation. The PKM partners could practice catfish spawning techniques and silkworm cultivation as well and apply them to fulfill the needs of group members in terms of catfish juveniles and feed. The impact of the activity as a whole is to develop the independence of the "Senang Bersama" Fish Farmers Group in providing juveniles and natural feed for catfish.



KEYWORDS

Hormonal induction

Ovaprim

Juveniles feed



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1. Introduction

Pelita Jaya Village is one of the villages that administratively belongs to the Kubu area, Kubu Raya. This village is one of the areas with large peatlands in Kubu Raya. Therefore, Pelita Jaya Village became one of the villages that became the focus of the Peat Affected Community Economic Revitalization Program held by the National Peat Restoration Agency (BRG) in 2017. In the program, Pelita Jaya Village became the focus of fostering the improvement of community income through fisheries in the form of catfish cultivation development. Some farmers from two regions, namely Tanjung Sari and Suka Raja, founded a Fish Farming Group named "Senang Bersama". This group obtained the development of catfish farming skills which include maintenance and enlargement techniques of catfish as well as business management. The results of the economic analysis of the catfish cultivation business "Senang Bersama" in Pelita Jaya Village showed the need for catfish cultivation investment capital in Pelita Jaya Village is very high, related to large transport for procurement of goods. Nevertheless, based on business financial analysis, marketing analysis, and social analysis, *dumbo* catfish breeding is still possible to be done in Pelita Jaya Village. *Dumbo* catfish cultivation business is feasible from the financial aspect and this can be seen from the R/C ratio of 1.46 >1 and the value of BEP shorter than the economic life (5 years) with a BEP period of 1.38 years [1]. The prospect of improving the fish farming business of the "Senang Bersama"

Group is quite high, considering that there have not been many fish farming efforts conducted by the community in Pelita Jaya Village and its surroundings. However, there are still problems faced by the "Senang Bersama" fish farming group, namely the high cost of production or maintenance of fish due to the high cost of transportation for the provision of seeds and artificial feed. During this time, fish seeds and artificial feed were obtained from Rasau Jaya Subdistrict, which can be reached by speed boat for 1 hour, for Rp 600,000.00. The high cost of transportation causes the cost of fish seeds and artificial feed to be higher, such as catfish seeds with sizes 4-6 in Rasau Jaya sold for Rp. 450.00/tail, while in Pelita Jaya Village the selling price is Rp.550.00/tail.

Based on the above problems, there are several solutions offered in this PKM activity, namely training techniques of spawning artificial fish with hormonal induction, and maintenance of silkworms as natural fish feed. Catfish spawning technique that will be introduced is a modification of artificial spawning techniques using *ovaprim* [2], [3], taking into account the maturity level of gonads IV according to the criteria of the maturity level of the gonads [1]. The principle is done by doing artificial fertilization followed by artificial fertilization. The use of *ovaprim* to induce spawning of various species of fish has been widely done, among others in cork fish [4], and catfish [2], [3], [5]. Meanwhile, silkworms are one of the very important natural feeds in the cultivation of fisheries, especially for maintenance in the larval and seed phases. Silkworms are very favored by some species of fish larvae and non-fish. Generally, freshwater fish larvae are ornamental fish or fish consumption such as catfish are very fond of silkworms [6]. The administration of silkworms is proven to affect the rate of survival and growth of catfish larvae [7]. Silkworms are easy to digest and have nutrients with a high content of coarse proteins. The use of growing media in the form of quail droppings can even provide protein content that reaches 66.26% and fatty acids 12.79%, with the main profile of proteins in the form of lysine [8]. Some research shows that silkworms can live on the media by using various wastes such as tofu pulp [6], and chicken manure [9]. This PKM activity aims to produce quality catfish seeds, both with artificial spawning technology and produce silkworms that can replace some of the artificial feed needed during the maintenance of catfish, to create group independence in terms of providing catfish seeds and natural feed.

2. Method

PKM activities are carried out through several stages of activities, namely the licensing and socialization stage, training, mentoring, as well as monitoring and evaluation stages. Fish spawning training was conducted for two days in May 2019, while silkworm cultivation training was conducted for one day in June 2019. Mentoring is carried out intensively with assistance from BRG, starting after both stages of training until the end of the activity, namely September 2019. Monitoring and evaluation were conducted from July to September 2019. The target of this activity is all members of the "Senang Bersama" Fish Farming Group of 10 people. This training activity also involves BRG facilitators involved as a companion to the activities. Furthermore, the implementation of PKM activity is carried out by several methods, namely:

- Lectures or counseling; The method of lectures or counseling is done at the beginning of the training.
- Demonstration; In this PKM activity, the demonstration method is done by showing clearly how or stages of spawning catfish with hormonal induction and how to cultivate silkworms. The goal is to give participants confidence that the way of spawning catfish and the cultivation of silkworms is easy.
- Training; Direct training or practice is conducted in two stages. Stage I is the direct practice of spawning catfish with hormonal induction, while Stage II is a direct practice of silkworm cultivation. The practice of spawning catfish uses several supporting tools such as fish spawning ponds, which consist of a male and female mother breeding pond each one pond, a spawning pond, and a larval maintenance pond. In the process of spawning with hormonal induction, hormone injection is carried out with the help of a *syringe*. Meanwhile, for silkworm cultivation

training, maintenance is carried out on tubs arranged on arak with water circulation flowing vertically using a pump. An overview of how to spawn catfish with hormonal induction and how to cultivate silkworms is described in the following description:

- Spawning catfish with hormonal induction

The practice of spawning catfish with hormonal induction begins with the process of hormone injection. The parent is weighed in advance to determine the dose of the hormone to be administered. The use of the hormone *ovaprim* has been widely done to help spawn catfish and show good results [2], [3]. Hormone injection is performed intramuscularly in the back and is done once at a dose of 0.4 ml/kg [3]. The mother fish is put back in the container and left until the time of egg retrieval by *stripping*. While sperm retrieval in catfish is done by dissecting the mature male mother gonads, vertically just behind the gill cap, the belly of the fish is cut from the pectoral fin to the anus, and the sperm bag is taken using tweezers. The cleaned sperm is put into a clean bowl. Furthermore, the sperm bag is crushed and added 500 ml of sodium chloride (NaCl) to dilute the sperm. Stripping is done by preparing clean and dry containers, chicken feathers, clothes, and tissues. The female mother catfish is wrapped in a cloth, but the abdomen and genital holes are left unclosed. The abdomen is sorted towards the urogenital hole and the outgoing eggs are accommodated in the container. Furthermore, the sperm solution is mixed into the egg and stirred using chicken feathers until well mixed, approximately for a minute, to produce good fertilization [2].

- Silkworm cultivation

In addition to spawning training, it is also introduced to the maintenance of silkworms with modification of maintenance methods according to Ngatung [10]. Maintenance of silkworms is done using mud with a thickness of 10 cm, manure (chicken manure) as much as 3 kg, and EM4 as much as 100 ml per tub. Training on the use of silkworms as natural fish feed is conducted by the *at satiation* method with feeding frequency as much as 3 times a day, namely at 08.00 WIB, 12.00 WIB, and 16.00 WIB. The given feed is mashed or chopped first using a cutter so that the larvae are easy to eat.

3. Results and Discussion

3.1. Licensing and Socialization

The Community Partnership Program begins with orientation and socialization activities. Licensing and socialization were conducted in early May 2019. The permit was carried out by reporting the activity plan to the Head of Pelita Jaya Village and continued with the socialization of activities carried out by the implementing team (chairman and executive members) to village officials, community leaders, and members of the "Senang Bersama" Fish Farming Group. This socialization activity is carried out to convey PKM activities to be carried out, targets, and targets of activities, as well as coordination of the implementation time of activities. The result of this socialization activity is PKM partners, namely "Senang Bersama" Cultivation Group, fully committed to actively participating in this PKM activity.

3.2. Training

The training activity consists of two stages. In Stage I, the material given is about spawning catfish with the help of hormonal induction, while in Stage II, the material given is about the cultivation of silkworms. Each training is preceded by a lecture activity, followed by demonstrations, hands-on practice, and evaluation of activities. In Stage I, the training is conducted by lectures or counseling on various methods of seeding catfish and about the advantages of doing artificial spawning. Participants seemed enthusiastic, as evidenced by some questions from the participants. These questions include how to distinguish between male and female fish that are ready for spawning, the right time to move the mother catfish after spawning, the dose of hormones given to induce spawning, and the type of feed that can be

given to hatched eggs. After counseling, the activity is continued by demonstrating how to inject hormones that will be used to help the spawning process.

After the demonstration, the next process is the direct practice by participants or members of the cultivation group. The practice is preceded by simulating exercises taking and injecting the hormone *ovaprim* with the help of water and bottles of mineral water. Each participant is allowed to practice injecting. The practice of spawning catfish is carried out using the help of the hormone *ovaprim*. The results of the evaluation of Stage I training can be seen that this training activity received a positive response from PKM partners, which can be seen from the questions that arise during the training, as well as the activeness of participants during the practice (Figure 1). All questions have been discussed together, including the preparation of the tubs of the mother fish, which should be filtered, the dose of *ovaprim* used, as well as when to transfer the mother catfish after spawning. Based on observations, this catfish spawning training activity provides great benefits and has the potential to be developed in the area with various considerations:

- Catfish spawning technique with hormonal induction is a simple and easy technique to do. This can be seen from the trainees who can well practice catfish spawning techniques in this artificial way.
- Artificial catfish hatchery activities have never been commercialized in Pelita Jaya Village. Whereas in addition to meeting the needs of seeds for members of the Fish Farming Group "Senang Bersama", there are also some catfish farmers in Pelita Jaya Village and its surroundings who require catfish seeds continuously.



Fig. 1. Catfish spawning training with the help of *ovaprim* hormone induction

In this training, the success rate of the hatchery was only 60 percent. This is thought to have something to do with the readiness of the parent pond, wherein preparation is not filtered, thus allowing the presence of bacteria in the pond to affect the hatchery of the eggs. Stage II was silkworm cultivation training, which was held at the home of Mr. Suhadi as the Chairman of the "Senang Bersama" Group, which was attended by members of the "Senang Bersama" group and a BRG facilitator. This activity also begins with a lecture on the principles of silkworm cultivation and the benefits of silkworms. In the talk, residents were introduced to some alternative natural feed to substitute artificial feed, including silkworms that can be given at the time of enlargement of larvae. In this PKM activity, it was introduced the maintenance of silkworms with modification of maintenance methods [10]. Maintenance of silkworms introduced, for each maintenance tub used mud with a thickness of 10 cm, manure as much as 3 kg, and EM4 as much as 100 ml. The training starts from the assembly training of the silkworm cultivation site and how to maintain it (Figure 2). Some questions arise regarding how to obtain seeds, how long silkworms can be harvested, as well as the characteristics of successful cultivation of silkworms.



Fig. 2. Silkworm cultivation training

3.3. Mentoring, Monitoring, and Evaluation

The mentoring activity was conducted intensively after the provision of two training materials, namely catfish spawning and silkworm cultivation, with the help of facilitators from BRG. This mentoring activity aims to increase the motivation of partners to develop their business commercially, as well as to help improve the skills of partners in the development of catfish seeds and silkworms. Monitoring is carried out from the first training activity, namely when spawning catfish until the evaluation of PKM activities ends. Monitoring and evaluation activities were conducted with two visits, namely in mid-July and September 2019 (Figure 3). Evaluation of activities is done by retrospective method (before-after), which is a method that is done by comparing the aspects that are needed, then compared to the conditions before the activity. To get information, evaluation is done using questionnaires, before and after activities.



Fig. 3. Visits and discussions during monitoring and evaluation

From the results of monitoring, after training and mentoring, it can be known that members of the aquaculture group "Senang Bersama" only conduct catfish hatchery activities for their purposes and have not been commercialized. As a result of the evaluation, all the knowledge of group members about the benefits and ways of spawning catfish with hormonal induction has improved, and skills related to the spawning process of catfish with induction have also improved. However, the success rate of fish hatchery still ranges from 60-70%, and only some members do catfish spawning themselves. This is due to several things, namely:

- The success rate of hatching is still small, which is influenced by several factors, such as the maturity level of the gonads of the parent and the environmental factors of the spawning pond. According to Laila [11], artificial spawning with hormonal assistance can produce the highest hatching percentage, which reaches 90%.

- The parent price is relatively expensive, so catfish hatchery activities still depend on the mother catfish from PKM activities. Until PKM activities end, as many as 40% of members have provided inductees independently.
- Catfish cultivation is still a side job, while if the eggs are ripe and not immediately cultivated, the eggs will be resorbed.

Seeding catfish independently can not only lower maintenance production costs related to the availability of seeds but also has the potential to be developed as a commercial business in Pelita Jaya Village. In the efforts of catfish hatchery carried out by artificial spawning, attention is needed on several things, namely seeding preparation, parent maintenance, spawning, egg hatching, and larvae care. Harvesting fish seeds can be done at the age of 2-3 months, and at a size of 5 cm can already be traded. In general, catfish seeds that enter the market demand have a size of 5-7 cm [12]. Meanwhile, the results of evaluation and monitoring for training II, namely about the cultivation of silkworms, showed that PKM partners continue to cultivate silkworms. Nevertheless, within 2 months of maintenance of silkworms, the results obtained are still few. The growth of silkworms is still not optimal. This is thought to be due to the poorly maintained cleanliness of the maintenance container, seen from the edge of the maintenance container which is heavily overgrown with green moss. The harvest of silkworms, in addition to being used for brood, is also used for the feed of catfish larvae. Feeding silkworms for the enlargement of catfish larvae is done by method at satiation, with the frequency of feeding as much as 3 times a day, namely at 08.00 WIB, 12.00 WIB, and 16.00 WIB. The results of the analysis of silkworm cultivation efforts showed that with a fairly low production cost of Rp 46,500 can produce 1200 gr of silkworms with maintenance for 56 days [13]. Thus, the use of silkworms as feed can lower the cost of production or maintenance of catfish. At present, the availability of silkworms in West Kalimantan and surrounding areas still does not meet market demand. Silkworm products are generally obtained from Java. Therefore, the development of silkworm cultivation in Pelita Jaya Village has great potential to be developed. Increasing knowledge and skills of members of the Fish Farming Group "Happy Together" in terms of catfish hatchery and silkworm cultivation has an impact on the formation of group independence in terms of the provision of fish seeds and natural feed. With this independence, it is expected to reduce the cost of catfish maintenance production and increase the group's income.

4. Conclusion

This PKM activity received a good response from PKM partners, as evidenced by the active involvement of partners and the improvement of knowledge and skills related to catfish spawning techniques and silkworm cultivation. PKM partners have been able to practice catfish spawning techniques and silkworm cultivation well and develop them to meet the needs of members of the Fish Farming Group "Senang Bersama" so that the group's independence is formed in terms of providing fish seeds and natural feed. The suggestion of this PKM activity is the need for more intensive assistance from the local Fisheries Service to develop catfish hatchery activities and silkworm cultivation as a commercial business.

Acknowledgment

Researchers thanked the Directorate of Research and Community Service-DIKTI who has provided financial support to this service, through the grant of the Community Partnership Program.

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