

Community Empowerment Through Probiotic Production and Fish Feed Production Based on Local Materials in Gapoktan Mekar Mulyo, Sukun District, Malang City

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ABSTRACT

Increasing the local materials' utilization through community participation in freshwater fish farming is one of the keys to realizing family-based food independence. It can be done by utilizing narrow land, utilizing local raw materials that can be used as ingredients for handmade fish feed, preventing pests and diseases, and improving the aquatic environment's quality. Those steps need to get the attention of various parties through an appropriate technology approach. One of the areas for developing freshwater fish farming in Malang is the Sukun sub-district. The fish farmer group association called "Gapoktan" in the sukun sub-district that carries out fisheries activities is the "Mekar mulyo" Gapoktan. Gapoktan Mekar Mulyo was formed in 2014 with the chairman, Mr. Rahmad, located in Gadang village, Sukun sub-district. There are four groups: one mina weling fish cultivator group, two farmer groups, namely blossom sari, advanced farmers, and one mulyo farmer group. The number of group members is 55 people. Internal community service activities for Gapoktan "Mekar Mulyo" fish farmers in Gadang village, Sukun District, Malang City aim to increase knowledge and skills on the application of acceptable fish farming methods (CBIB), to improve partners' skills in producing fish feed based on indigenous raw materials, and to increase the skills and knowledge of partners in environmental management based on herbal plants. The methods used in the fisheries team's internal community service program where training and mentoring on acceptable fish farming methods (CBIB), independent fish feed production, and probiotic propagation based on local raw materials. The internal community service activities results are as follows: partners can implement an intensive cultivation system in freshwater fish cultivation activities based on acceptable fish farming practices (CBIB). The program partners have succeeded in producing independent fish feed in fermentation, increasing probiotics manufactured from local raw materials, and partners can implement sustainable water quality monitoring. This evaluation is in line with the increase in fish production data during the activity.

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1. Introduction

Increasing local materials potential through active community participation in freshwater fish farming is one of the keys to realizing family-based food independence. This increase can be done by utilizing narrow land, utilizing local raw materials that can be used as raw material for independent fish feed, preventing pests and diseases, and improving the quality of the aquatic environment. This step needs to get the attention of various parties through an appropriate technology approach.

One of the areas for developing freshwater fish farming in Malang is the Sukun sub-district. Gapoktan Mekar Mulyo was formed in 2014 by Mr. Rahmad, located in the Gadang, Sukun sub-district, Malang City. The business activities carried out include aquaculture activities, agricultural activities, and livestock activities by four different communities. They are mina weling fish cultivator group, two farmer groups, namely blossom sari, advanced farmers, and one mulyo farmer group containing 55 people in each group.

Fish farming activities are still carried out using land or traditional ponds and tarpaulin ponds. The water comes from drilled wells and irrigation channels. The average pool ownership of group members is four plots with a pool area of 3 x 4 x 1 m and 4 x 6 x 1 m. Freshwater fish commodities are currently being developed, including eel, catfish, tilapia, and carp. The average level of education of group members is a senior high school or equal.

Since 2016, there have been obstacles faced in fish farming activities, which decline fish cultivation production, especially eel and catfish farming, due to the inaccurate process of fish farming management. It leads to an impact on pests and fish diseases. The other obstacles are the increasing price of factory-made feed, which has reached IDR 12 500/kg, increasing production costs and decreasing water quality due to high waste disposal into irrigation channels.

These partners' condition is necessary to obtain solutions through appropriate technological innovations that can change the mindset and insight of fish cultivators, from the traditional application of fish farming systems to the intensive application of fish farming systems with attention to environmentally friendly aspects. This community service program can be beneficial in a sustainable manner to increase fish production and increase fish cultivators' income, especially in Gapoktan Mekar Mulyo.

Internal community service activities aim to increase knowledge and skills on applying suitable fish farming methods (CBIB), improve partners' skills in producing independent fish feed based on local raw materials, and increase the skills and knowledge of environmental management partners herbal plants.

Through the UMM internal community service program, it is expected that community partners of Gapoktan fish cultivators "Mekar Mulyo" be able to apply good fish farming methods (CBIB). Moreover, they produce independent fish feed based on local raw materials and manage the aquatic environment using probiotic propagation and aquatic plant biofilters. Besides, the Gapoktan "Mekar Mulyo" can also provide seeds and fish consumption in the Sukun sub-district, Malang City.

2. Methods

The method used in the internal community service program with farmer partners Gapoktan "Mekar Mulyo" was to apply Training and mentoring on right fish farming methods (CBIB), independent fish feed production, and probiotic propagation based on local raw materials. The stages of implementation are as follows:

1. Identify partners related to current fish farming techniques



2. Conducting theoretical and practical Training on program partners by applying technology, piloting good fish farming methods (CBIB), independent fish feed production, and propagating probiotics based on local raw materials.
3. Assisting to fish cultivator communities on good fish farming practices (CBIB), independent fish feed production, and probiotic propagation based on local raw materials.
4. Evaluating the success of the program both physically and the response of program partners and local communities.

3. Results and Discussion

The Internal Community Service Program (PPMI) was held for eight months at the "Mekar Mulyo" Farmers Group Association (Gapoktan), Gadang Village, Sukun District, Malang City. The activities that have been carried out in the implementation are as follows:

A. Training and Assistance for the Application of Good Fish Cultivation Methods at Mekar Mulyo Gapoktan

The training material focuses on improving fish culture management through the application of good fish farming methods. According to the Directorate of Aquaculture (2017), there are three principles of good cultivation, including biological safety, such as preventing disease in the cultivation system and spreading from one place to another. Moreover, the second principle of food safety and the three principles of environmental protection.

Training and mentoring activities for good fish farming methods are implemented with program partners by strengthening knowledge and skills related to fish farming facilities and infrastructure, feeding methods, managing water quality, and preventing fish diseases. Program partners also directly obtain technology transfer in the form of a pilot tarpaulin pool easy to use. Figure 1 below is presented the form of Training and assistance for good fish farming methods.



Fig. 1. Activities for Implementing Good Fish Cultivation Methods

Through assistance activities, partners could obtain several freshwater fish cultivation stages for catfish, tilapia, and gouramy, such as the construction of tarpaulin



ponds, installing water inlet channels, water drains, installing water pump machines. Moreover, the tarpaulin pond's advantages are also easy to use, measuring and analyzing water quality, monitoring growth, fish survival, and more affordable cost.

This activity's results can be proven by the percentage of fish survival rate of 78% higher than the previous exercise with 55%. The cultivation production time can be reached for three months, and water use from the cultivation media is more efficient.

B. Training and Assistance for Independent Fish Feed Making based on Local Potential

The purpose of implementing Training and mentoring activities for the manufacture of independent fish feed at Gapoktan "Mekar Mulyo" was to solve the high demand for feed, and the price of commercially made feed reaches IDR 10 700 to IDR 12,500 per kg. These conditions impact the increase in production costs for the provision of feed during freshwater aquaculture activities. It requires technology transfer of utilization of feed raw materials available in partner areas.

Training and mentoring activities for making independent fish feed based on local raw materials in the partner areas provided education or Training in identifying feed raw materials and techniques for formulation fish feed. The following is presented in Figure 2. fish feed making training activity.



Fig. 2. Independent Fish Feed Making

Assistance in the process of making fish feed is the result of a team study with partners. Handajani et al. (2014) state that there is a need for assistance to fish farmers on making fish feed independently by utilizing alternative materials and managing good water quality for fish. The preparation of feed formulations is based on the research results on alternative fish feed materials' ingredients. The stages of program mentoring activities are as follows: the team's first steps with program partners by identifying feed raw materials. Based on the identification results, it was known that the raw materials included tofu waste, fish silage, taro tubers, instant noodle waste, *Azola* sp., snails, and earthworms. The second step was weighing additional feed ingredients based on the square method. The third step was mixing the feed raw materials, and the fourth step is adding probiotics to the mixed feed ingredients. In the next step, the feed was formed in a



paste, and the sixth step was storing the fish feed independently. The following shows the process of making additional or alternative fish feed.



Fig. 3. Handmade Fish Feed Results based on local raw materials

C. The water quality management training

Assistance activities for water quality management have been carried out with program partners to implement water quality management or management through the aquatic plant approach as bio filtering and recirculation systems. It is essential to manage water quality because good water quality is one of the main factors for freshwater fish farming, especially catfish, tilapia, and carp.

The water quality management system used by partner locations before program implementation relied on water from irrigation canals and boreholes. However, the water quality conditions for aquaculture activities were less than optimal levels. This condition is necessary to get a solution immediately to solve the problem. The program was pointed to introduce a cultivation model of the recirculation system by utilizing water plants as biofilters used in aquaponics and hydroponics systems. The stages in this activity include the following: partners gain knowledge of the construction process and recirculation system in aquaponics.

Furthermore, Partners receive technology transfer related to measuring and monitoring water quality, including temperature using a water thermometer, water pH using a pH pen measuring device. The measurement process is carried out every day. According to Sutarjo (2018), measuring water quality can use a water temperature thermometer, oxymeter to measure the dissolved oxygen content in water, pH, or litmus to measure water pH.

The partners also obtain knowledge about probiotic propagation techniques applied through feed and water from cultivation media, authentic materials around their area, and the research process. The ingredients are used, including molasses, yeast tape, tempeh yeast, fresh cow's milk, turmeric, red ginger, passion fruit, and pineapple. The raw material for probiotic propagation is sourced from maintaining good water quality during fish farming activities.





Fig. 4. Water Quality Management Assistance

D. Evaluation of Activities at Gapoktan "Mekar Mulyo" Village Gadang, Sukun District, Malang City

The evaluation has been carried out by the implementation team of activities and the evaluation team of DPPM UMM. The assessment aims to determine the extent to which the community service program on fish feed making and water quality management at Gapoktan "Mekar Mulyo" has been implemented. Based on the evaluation results, information was obtained that program implementation was carried out following the program activity schedule.

Based on the results of the evaluation of the implementation of the UMM internal community service program, it is known that the following things are known; namely, the partners can implement an intensive cultivation system in freshwater fish farming activities based on the principles of good fish farming practices (CBIB), the program partners have succeeded in producing fish feed independently in the form of fermentation, and has succeeded in increasing the number of probiotics made from local raw materials available in partner areas. Moreover, partners can also implement sustainable water quality monitoring. This evaluation is in line with the increase in fish production data during the activity. Production data for 2016 to 2018 is presented in Figure 5 below.

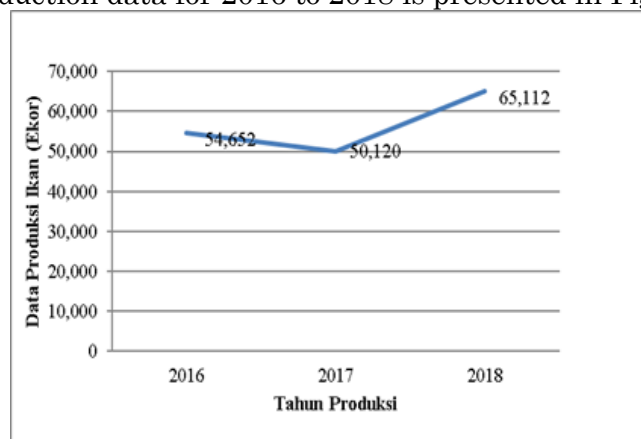


Fig. 5. Production data of "Mekar Mulyo" Gapoktan Village Gadang Village, Sukun District, Malang City



The increase in fish production in Gapoktan "Mekar Mulyo" is inseparable from partner's active participation and openness to technology transfer from the program implementation team to members of farmer group associations. Besides, the pilot pond model helps transfer information to fish farmers and the community in the program location.

4. Conclusion

The conclusion of the implementation of the UMM internal community service program is as follows: Program partners can apply technology transfer related to freshwater fish cultivation management, which refers to good fish farming methods (CBIB), partners can produce fish feed independently in the form of fermented fish feed, and partners can carry out water quality management through the application of probiotics. The activities of independent fish feed production assistance and probiotic propagation have met fish farmers' needs in "Mekar Mulyo" Gapoktan so that freshwater fish farming production runs well.

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