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Implementation of Tilapia Biofloc Technology in the Bulian Sari Group as an Effort to Reduce Lake Pollution in Pancasari Village, Buleleng, Bali

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A B S T R A C T

Cultivating tilapia in round ponds with the biofloc system which has the advantage that tarpaulin ponds are easy to make, and the pond temperature is more stable than cement ponds. The methods that will be carried out in the implementation of this training are interviews, face-to-face, counseling and direct practice. The advantage of tarpaulin pools is that they are efficient in using water because we only need to fill in water at the beginning and the addition of water is also adjusted according to conditions. The application of Biofloc technology in Pancasari Village can increase tilapia production. The biofloc system can also increase the Survival Rate (SR) of fish and reduce the Feed Conversion Ratio (FCR).

INTRODUCTION

Fish farming includes growth and reproduction. Fish cultivation aims to obtain more or higher and better results than if the fish were left to grow naturally (Ambia et al., 2015). Tilapia aquaculture generally uses high costs, because the cost component in cultivation is the highest due to the feed component. Feed is an important component in fish farming activities (Babo et al., 2013). Feed is a source of material and energy to support the survival and growth of fish, but on the other hand, feed is the largest component (50-70%) of production costs (Yanuar, 2017). The PKM implementation team applied Biofloc technology to overcome the use of high-priced artificial feed. The PKM implementation team applied Biofloc technology as a solution. The biofloc system is to grow microorganisms, especially heterotrophic bacteria, in water to absorb pollutant components, ammonia, in pool water (Kurniawan et al., 2017). In line with that, in his journal said that the Biofloc cultivation system is a fish cultivation technology to improve water quality by utilizing heterotrophic bacteria to convert organic and inorganic N originating from feces and fish food waste into biomass (floc) which can become natural food for fish (Ma'ruf, 2016). In a different journal (Sukardi et al., 2018) also said that Biofloc technology is an alternative solution to the problem of intensive cultivation waste, this technology is the most profitable because apart from being able to reduce inorganic nitrogen waste from leftover feed and manure, this technology can also provide additional protein feed for animals. cultivation to increase growth and feed efficiency. The use of Biofloc technology has been widely studied and applied to the cultivation of shrimp, freshwater fish, catfish and tilapia, which show growth and survival results as well as value.

Feed conversion ratio compared to commonly used rearing. Tilapia is one of the leading fishery commodities with high market demand. Therefore, the productivity of tilapia cultivation for consumption must be driven intensively considering the nature of tilapia fish which can live at high densities (Fitrani et al., 2015; Marisda, 2019). The application of circular pond and biofloc technology can solve problems by increasing fish stocking density, reducing the need for commercial feed, increasing fish uniformity, increasing productivity by reducing mortality, and equalizing fish growth (Ombong & Salindeho, 2016). This activity aims to optimize the unproductive garden land of the Bulian Sari Cultivation group to become productive by installing tarpaulin ponds for cultivating tilapia (Kurniawan & Asriani, 2016). Apart from that, increasing the knowledge and skills of the Bulian Sari Cultivation group community through socialization of activities and assistance with Bioflok technology tilapia cultivation activities.

IMPLEMENTATION AND METHODS

The method implemented in this Community Partnership Program is:

1) Site Survey and Inspection: At this stage, observations are made of the partner location where the cultivation pond will be built, as well as a review of the parameters that support the implementation of cultivation, such as water availability.
2) Socialization and Training At this stage, information is presented on the cultivation of Tilapia using the Biofloc technology. This socialization activity was carried out in Pancasari village on June 26, 2023. This socialization and training is intended to increase the community's knowledge and skills regarding cultivation. The socialization took the form of providing material in the form of PowerPoint, providing material in the form of slides followed by a question and answer session relating to the implementation of the tilapia cultivation process, starting from building ponds, making flocks, the appropriate stages for stocking tilapia seeds, to determining harvest time. tilapia fish for consumption. The process of providing this material was carried out in two meetings. At the first meeting, the general cultivation process was discussed and at the second meeting, it was explained how to make floc or natural food for cultivation accompanied by a demonstration.
3) Pond Installation: Installing a round tarpaulin with a diameter of 2 (two) meters with drainage channels. There are 3 (three) tarpaulin pools made and placed at the location of the Bulian Sari group.
4) Assistance: At this stage, assistance is provided during the Biofloc technology tilapia cultivation process. This activity is intended to facilitate farmer groups in providing feed, seeds and making probiotics

RESULTS AND DISCUSSION

Cultivation of the biofloc system, the use of feed is more efficient, highly productive, water-saving and environmentally friendly. Tilapia fish were chosen for cultivation because this fish has a high tolerance for environmental changes (Rusyadi et al., 2018) and is a fish that eats phytoplankton, zooplankton and detritus (Andriani, 2018). Biofloc itself comes from the word bios, which means "life" and floc "blot". So biofloc is a collection of various organisms (bacteria, fungi, algae, protozoa, worms, etc.), which are combined into a floc (Suryaningrum, 2012). Biofloc can be formed if there are 4 components, namely a carbon source, organic material from food waste and fish waste, decomposing bacteria and oxygen availability. The formation of biofloc occurs through stirring organic material by aeration so that it dissolves in the water column to stimulate the development of aerobic heterotrophic bacteria (in conditions of sufficient oxygen) attaching to organic particles, decomposing organic material (taking C-organic), then absorbing minerals such as ammonia, phosphate and other nutrients. in water. So that the beneficial bacteria will multiply well. These bacteria will form a consortium and floc formation will occur. The result is better water quality and organic matter recycled into edible floc by fish.

The Warmadewa University Community Service Program is a forum for researchers at Warmadewa University to apply research results in the form of science and technology to solve existing problems in the community, problems that develop in the Pancasari Village community, Buleleng Regency, where most of the people are freshwater fish cultivators. with the floating net bag system in Buyan Lake, Pancasari Village, but currently, there is a ban from the BKSDA for fish farming in the lake because it is feared that cultivating with floating net bags in Buyan Lake will increase pollution in the lake. The PKM implementation team applied Biofloc technology to overcome problems in the Bulian group related to the ban on fish farming in Lake Buyan. The biofloc system is growing microorganisms, especially heterotrophic bacteria in the water to absorb pollutant components such as ammonia in pond water. Biofloc cultivation system is a fish farming technology to improve water quality by utilizing heterotrophic bacteria to convert organic and inorganic N from feces and fish feed residue into biomass (floc) which can be a natural fish food. Biofloc technology is an alternative solution to the problem of intensive aquaculture waste. This technology is the most profitable because besides being able to reduce inorganic nitrogen waste from leftover feed and manure, this technology can also provide additional protein feed for cultivated animals so that it can increase growth and feed efficiency. The use of Biofloc technology has been extensively studied and applied to tilapia aquaculture which shows better growth and survival results as well as feed conversion ratio values compared to commonly used maintenance. Tilapia is one of the leading fishery commodities with high market demand. Therefore, the productivity of consuming tilapia aquaculture must be intensively driven by considering the characteristics of tilapia which can live at high densities. The application of circular pond technology and biofloc can solve problems by increasing fish stocking density, reducing the need for commercial feed, increasing fish uniformity, and increasing productivity by reducing mortality and even distribution of fish growth.

The steps that must be prepared for Tilapia Cultivation with the biofloc system are as follows:

1) The round central drain pool with a diameter of 3 and a depth of 2 m is cleaned by brushing it until it is clean and filling it with water.
2) Aeration installations were installed in 2 round pools with 9 aeration stones for each pool. The position of the aeration stone is adjusted so that oxygen can be evenly distributed throughout the pool water column. The oxygen flow was set at a speed of 10 L/minute.
3) The ingredients for making biofloc media are 1 kg/m3 of coarse salt, 50 grams/m3 of dolomite lime, 100 ml/m3 of molasses, probiotics with a composition of bacteria Bacillus sp. 10 ml/m3 (using a combination of multi cells and bio flocculant). Each of these ingredients is sequentially dissolved in water and put into the pool.
4) Leave the pool for 7-10 days or until the pool walls feel slippery when touched.
5) Water quality is measured and maintained at a minimum dissolved oxygen content of 3 mg/L and pH 6-8 and watercolor is observed.

6) Tilapia fish seeds were put into the pond in the afternoon (15 July 2020) with a planned density of 120 fish/m3, but due to limited seeds, they were tried with a density of 90 fish/m3.
7) Fish are fed after 2x24 hours at a dose of 3% of the fish's body weight.
8) To treat water during rearing is as follows: Molasses and probiotics are added if the oxygen level is close to 3mg/L. Dolomite is added if there is a change in the pH of the water to become acidic (pH 5), Try to make the biofloc media water brownish. Volume The flock is maintained at 50 ml/L and if the flock becomes too dense, feeding is stopped.
9) Water is added when evaporation occurs.

Figure 1. Installation of aeration

Figure 2: Spreading Tilapia fish seeds in ponds

Figure 3. Visit of PKM partners from CBSUA Philippines

The benefit and advantage of the biofloc system for tilapia cultivation is that biofloc which is formed from a collection of organic materials can stabilize the pH of the tilapia biofloc pond water and reduce ammonia levels in the water. This is beneficial because the high ammonia content will poison the tilapia. If the ammonia has poisoned the tilapia, the chances of the fish surviving will be low. The biofloc system can also increase the Survival Rate (SR) of fish and reduce the Feed Conversion Ratio (FCR). Because biofloc can convert fish waste into fish food. The biofloc technique is said to be a very cost-saving technique because the stocking density of tilapia using the biofloc system reaches 120 fish/m^3 or 10x that of the regular technique. This system can save expenses for pond land and water. Tilapia fish cultivated using the biofloc technique only need 2-4 months to harvest because they grow faster, and there is no need to change the water in the biofloc fish pond too often because the fish waste will be eaten by good bacteria which will later be recycled into feed and is very environmentally friendly.

CONCLUSIONS AND RECOMMENDATIONS

Community service program regarding the application of tilapia biofloc technology in the Bulian Sari group as an effort to reduce the burden of lake pollution in Pancasari Village, Buleleng Regency. Achievement indicators have been successfully achieved, namely:

1) Counseling runs smoothly which is marked by the interaction of the team and partners where there is an exchange of information and discussion of problems faced by partners
2) The practice of installing ponds, making cultivation media for the biofloc system, and stocking tilapia with Bulian Sari fish cultivator group partners went smoothly
3) Monitoring and evaluation activities were successfully carried out as shown by partners who used the results of the activities after the activities had been running for 3 months.

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