



Intensification of catfish cultivation at Pokdakan Baraya in Kotabatu Village, Bogor Regency

Uswatun Hasanah^{1*}, Linda Jati Kusumawardani², Yulian Syahputri³, Ade Heri Mulyati⁴, Diana Widiastuti⁵, Siti Warnasih⁶

^{1,2,3,4,5,6}Indonesia Chemistry Study Program, Pakuan University, Indonesia

*Corresponding author email: uswatun.hasanah@unpak.ac.id

Abstract

Kotabatu village is one of the villages located in Bogor district. Kotabatu Village has several Fish Cultivator Groups (Pokdakan), one of which is Pokdakan Baraya which cultivates catfish. The problem faced by Pokdakan Baraya partners in Kotabatu Village, based on a focus group discussion conducted by the Pakuan University Implementation Team, is the low income obtained when compared to production costs and the risks that fish farmers must face. Based on the problems in the Baraya pokdakan, the proposing team offers the application of fish cultivation technology using the Biofloc system. Service methods include surveys to identify the location and conditions of the target community and holding focus group discussions (FGD). The next stage is outreach by the Pakuan University service team using sharing methods, case studies, and training and simulation of the biofloc system technology package. A regular monitoring and evaluation process is carried out to assess the success of the Pakuan University Community Service program on the performance of the Baraya Pokdakan team in the field. This monitoring and evaluation activity consists of counseling, building fish ponds, seed distribution, nursery, and catfish rearing using an intensive biofloc system; after implementing cultivation with an intensive procedure, pond productivity increased by 1.8%. Pokdakan members' knowledge about fish cultivation technology is also growing and harvest time is also 15 days faster compared to before using the biofloc system.

Keywords: Baraya pokdakan, catfish cultivation, biofloc pond, Kotabatu village.

1. Introduction

The 2022 Minister of Maritime Affairs and Fisheries Regulation states that Pokdakan is an organized group of fish cultivators, having administrators and rules within the group organization that directly carry out fish cultivation businesses. Kotabatu village is one of the villages located in the Bogor district, which has several Fish Cultivator Groups (Pokdakan), one of which is Pokdakan Baraya, which cultivates catfish. Before obtaining certified superior seeds from the Fisheries Service, they initially obtained the fish seeds owned by the Baraya Fish Cultivation Group by purchasing them from other fish cultivation groups. So, the assistance of superior sources then increases their cultivation efforts (Shamsuddin, 2022).

The Baraya Fish Cultivation Group needed help providing feed at the fish cultivation enlargement stage. The price of the feed used in pellets continues to increase. Currently, the cost of fish feed can reach IDR 220,000 / 20 kg. The increase in the price of pelleted feed as the main feed ingredient reduces the profits of fish farmers. This is because almost 50% of the costs of developing fisheries businesses are spent on feeding itself (Hasan et al., 2012). Apart from that, the presence of fish food in sufficient quantities and of good quality will significantly determine the quality and production of farmed fish. The fish feed needed is good quality feed, including \pm 29-30% protein (Dewantoro, 2018). So alternative solutions are urgently needed regarding providing feed in sufficient quantity and quality. Apart from that, the presence of fish food in adequate amounts and of good quality will significantly determine the quality and production of farmed fish. The fish feed needed is good quality feed, including \pm 29-30% protein (Dewantoro, 2018). So alternative solutions are urgently needed regarding providing feed in sufficient quantity and quality.

Based on the problems in Pokdakan Baraya, it is necessary to implement alternative, more efficient fish cultivation methods, one of which is applying intensive catfish cultivation technology with biofloc. This system has been proven to increase fish production and feed efficiency. That way, production costs are reduced, and the time required is relatively shorter when compared to conventional cultivation. Innovative, modern, and productive rearing of catfish is

through the biofloc system because it can reduce production costs (Rukman, 2023; Sudaryati et al., 2017). According to Yu et al. (2023), the biofloc system can be carried out without water changes, and the ecological control is in the form of conditioned biofloc bacteria, does not depend on sunlight, uses organic materials, and has complete and vital aeration. The specialty of the biofloc pond system is that the cultivation time is relatively short, relatively low capital, environmentally friendly, and saves water and feed use (Das et al., 2018).

The objectives of this service activity are: Increasing the knowledge of fish farmers, especially Pokdakan Baraya, Kotabatu Village, regarding intensive catfish cultivation techniques, increasing profits for fish farmers through efficient production costs and increasing land productivity, increasing the income of families/supported groups, and can be used as a sustainable program involving students.

2. Methodology

The method used to implement this activity is an approach to empowerment and increasing community participation, emphasizing community involvement in all activities carried out. The methods used in this service activity are surveys, namely initial interaction with potential partner communities, to obtain information and data on the obstacles likely partner groups face. Then, this survey activity also becomes a means of socializing the service activities carried out: counseling includes material preparation, preparation of materials, and equipment used during training and mentoring. The outreach process is carried out by prioritizing sharing information with the target community, training and demonstrating, providing technology packages, accompaniment, and monitoring and evaluation. After the outreach process, a training and demonstration process is carried out using interactive methods to make the knowledge transfer process more effective.

3. Results and Discussion

3.1. Location Survey

The implementing team (chairman and members) surveyed the pool construction location at the start of community service activities. The activity is located in Kotabatu village, Ciomas sub-district, Bogor district (see Figure 1). Surveys are carried out to determine the position and size of the pool, energy requirements, costs for building the pool, and pool equipment requirements. The pool size is 2m x 4m with a depth of 1.5 m in two (4) units. The pool is lined with HDPE plastic at the embankment and bottom.

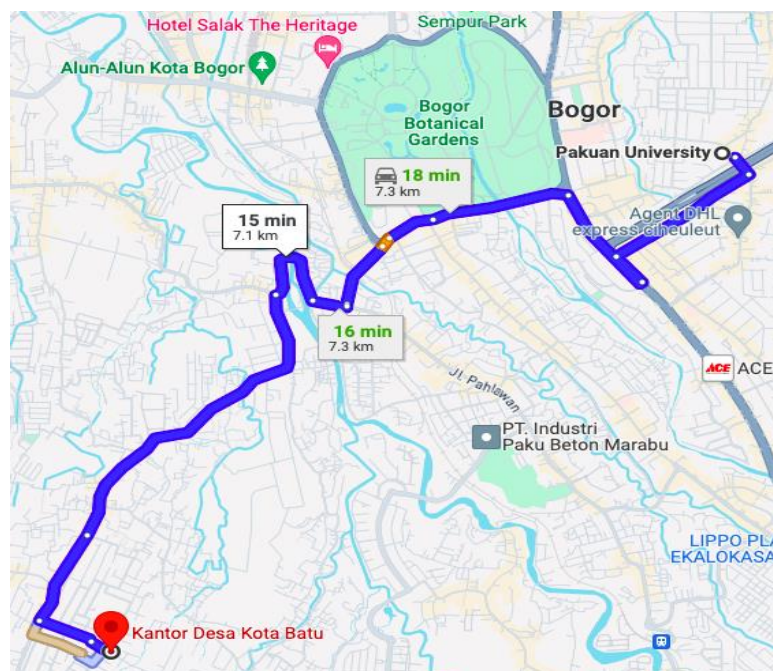


Figure 1: Kotabatu Village

3.2. Pool Construction

The pond was constructed by mapping the pilot pond's location (see Figures 2, 3, and 4) for eight days, involving six workers from the Baraya fish cultivator group. The size of one pool unit is 2m x 4m x 1.5m, which requires 12 m² (3m x 4m) of HDPE plastic.



Figure 2: Mapping the location of fish ponds



Figure 3: Making a fish pond



Figure 4: Fish pond design



Figure 5: Biofloc formation process

3.3 Nursery and rearing of catfish

Before the catfish are stocked into the pond, biofloc is first grown in the catfish-rearing pond as a natural food to accelerate the growth of the catfish. Biofloc development was carried out by spreading 5 kg of leftover feed and 5 kg of molasses into each pond and aerating it for ten days. Within ten days, biofloc will form so that the fish are ready to be stocked (see Figure 5). Before stocked in the rearing pond, catfish seeds are raised from 3-5 cm to 5-7 cm for 15 days. In this nursery phase, the density of catfish seeds is 1,500 per pond. This nursery aims to get uniform catfish sizes so that cannibalism is reduced. Through this nursery, it is hoped that the fish survival rate will increase. After being in the nursery for 15 days, catfish fry are raised in the rearing ponds that have been prepared. Commercial feed is given every day with a protein content of 30%. This enlargement phase is carried out for 40 - 60 days when harvesting is planned.

3.4 Final Harvest

The harvesting process is carried out in two stages, namely by sorting the catfish size >100 grams, and the final harvest is carried out in 4 ponds, producing a total of 251.1 kg of catfish with a selling value of IDR. 8,035,200,- (catfish selling price IDR 32,000/kg). Based on economic analysis, the technological application implemented in this PkM program has succeeded in increasing pond productivity and income of fish farmers who are members of the Pokdakan Baraya group, Kotabatu Village, Ciomas District, Bogor Regency. Pokdakan members' knowledge about fish cultivation technology has also increased, and harvest time has become 15 days faster than before using the biofloc system.

Table 1: Comparison of cultivation pond performance before and after technology application

Parameter	Before	After
Solid stocking	90 heads/m ²	90 heads/m ²
Yields	138.5 Kgs	251.1 kg
Harvest age	60 days	45 days
Sale value	IDR 4,432,000	IDR 8,035,200

4. Conclusion

Community service activities in Kotabatu Village, Ciomas District, and Bogor Regency are going well and smoothly. Fish farmers can receive information and apply fish cultivation technology from Pakuan University's implementation team. This is proven by the success of implementing cultivation technology well until the final harvest. Cultivators' knowledge about cultivation with intensive catfish cultivation technology has increased, and pond production has increased by 1.8%, thereby increasing the income of the Baraya pokdakan.

Acknowledgments

The community service team would like to thank Pokdakan Baraya as a community service partner and LPPM Pakuan University for funding community service activities in 2023.

References

- Das, S.K. and Mandal. Biofloc Technology (BFT): An Effective Tool for Remediation of Environmental Issues and Cost Effective Novel Technology in Aquaculture. *Int J Oceanogr Aquac.*
- Dewantoro, E., Dhahiyat, Y., & Rostika, R. (2018). Growth performance of tinfoil barb (*Barbonymus schwanenfeldii*) fed with different protein levels and energy/protein ratios on diet. *Aquaculture, Aquarium, Conservation & Legislation*, 11(4), 1300-1310.
- Hasan, B.M.A., Guha, B., dan Datta, S. 2012. Optimization of Feeding Efficiency for Cost- Effective Production of *Penaeus monodon* Fabricius in Semi-Intensive Pond Culture System. *Aquaculture research & development*, 3(6): 1-7.
- Peraturan menteri kelautan dan perikanan Nomor 1 tahun 2022 tentang Petunjuk Teknik Penyaluran Bantuan Pemerintah Sarana Budidaya Pada Kelompok Pembudidaya Ikan Tahun 2022.

- Rukman, D. (2023, September). Comparative analysis of profitability of catfish business using conventional and biofloc systems in Maros District. In *IOP Conference Series: Earth and Environmental Science* (Vol. 1230, No. 1, p. 012040). IOP Publishing.
- Shamsuddin, M., Hossain, M. B., Rahman, M., Kawla, M. S., Shufol, M. B. A., Rashid, M. M., ... & Rakib, M. R. J. (2022). Application of Biofloc Technology for the culture of *Heteropneustes fossilis* (Bloch) in Bangladesh: stocking density, floc volume, growth performance, and profitability. *Aquaculture International*, 30(2), 1047-1070.
- Sudaryati, D, Heriningsih, S, Ruserlistyani. Peningkatan Produktivitas Kelompok Tani Ikan Lele Dengan Teknik Bioflok. *Jurnal Pengabdian dan Pemberdayaan Masyarakat*, 1(2) September 2017.
- Yu, Y.-B.; Choi, J.-H.; Lee, J.-H.; Jo, A.-H.; Lee, K.M.; Kim, J.-H. Biofloc Technology in Fish Aquaculture: A Review. *Antioxidants*. 2023, 12, 398. <https://doi.org/10.3390/antiox12020398>.