



Cultivation of Tilapia (*Oreochromis niloticus*) Using Floating Net Cage System to Improve Economic Value of Alur Cucur Community, Rantau, Aceh Tamiang

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Abstract: *This village development program aims to develop Tilapia (*Oreochromis niloticus*) cultivation using floating net cage system. The main target was tilapia production to increase income for community. This program was conducted for 6 months with the target of Pokdakan Sepakat Makmur located in the village of Alur Cucur. The main problems faced by the group were the lack of knowledge about tilapia cultivation techniques using floating net cage, aquaculture activities are still conventionally in earthen ponds. In addition, the capital stock is lacking, and financial administration records are still weak. The activities carried out include: training on fish rearing techniques, making floating net cages by partners who were accompanied by program implementers, cultivating tilapia in rivers using floating net cages, and distributing partner products. This community service program resulted in the increasing of tilapia production, community knowledge in using floating net cages system and, and increased income through profit from production and commercialization. At the end of the activity, an evaluation of the implementation and sustainability of the program was carried out after completion of implementation activities.*

Keywords: *Tilapia, floating net cage, pokdakan, rearing techniques*

Introduction

Indonesia is among well-known countries which produce high quality fish and fisheries product in the world. It is estimated that fish resources in Indonesia cover 37% of the world's fish¹. Among the total production, 60% is produced from aquaculture

¹ Agus Putra Abdul Samad et al., "Marine Fisheries and Aquaculture Production of Indonesia:

activity as well as freshwater cultivation such as: tilapia², goldfish, catfish, and others³. Indonesia has a large potential for cultivated fisheries, namely 17.91 million ha which includes: 2.8 million ha (15.8%) of freshwater, 2.96 million ha (16.5%) of brackish water and 12.12 million ha (67.7%) of sea water. However, utilization of the potential area has not been optimal yet. It approximated only 2.7% has been used. Whereas: freshwater cultivation ponds only 316.446 ha. Following this condition, it is predicted that if all the potential area utilized and managed well, fisheries and aquaculture sector will become a driving force for national development⁴.

Aceh Tamiang Regency is one of the regencies in Aceh province which is located on the Aceh-North Sumatra border, whereas this district has many rivers that irrigate various sub-districts in it, one of which is Rantau sub-district. One of the villages in the Rantau sub-district is the village of Alur Cucur⁵. In Alur Cucur Village there is a pokdakan namely Sepakat Makmur that cultivates tilapia. However, the cultivation business is still conventional using an earthen pond. There are six ponds that are used to cultivate tilapia which belong to the group members and all ponds are managed based on regulations issued by the group leader.

Nowadays, the population of Alur Cucur village is around 2.500 people. Most of the people work part time in private plantation. Mostly they receive a low salary which make them live in poverty. Therefore, it is very important for the community to increase their income by running a fish farm system. According to the chairman of the Pokdakan Sepakat Makmur, Suhendri, during the Covid-19 outbreak, the fish farmers wanted to create this tilapia cultivation using floating net cage system in a river around their village, the local community called it *Sungai mati*. By utilizing the river, which cover a very large area (more than 200 Ha), the group members will be able to create an area for tilapia cultivation. Because most of the group members cannot work as usual such as: carpentry, trade and others, because of the pandemic. On the other hand, tilapia fish farming activities that have been carried out so far using earthen ponds only produce a small amount production that cannot fulfil their daily household needs. Therefore they prefer to use floating net cage to increase fish production and to improve the economic life of the family. However, this pokdakan also face various problems including limited knowledge in aquaculture, especially using floating net cages, skilled members, business capital, and product distribution, so that their business is difficult to develop.

Recent Status of GDP Growth," *Journal of Marine Science Research and Oceanography* 4, no. 3 (December 21, 2020): 135-139.

²Kemenko Maritim, *Laporan Kinerja Kementerian* (Jakarta, 2018).

³ Agus Putra AS et al., "Histological Studies on Digestive System Development and Early Feeding Activity of Pangasius Hybrid Larvae," *Journal of Aquaculture and Fish Health* 9, no. 2 (2020): 86-94.

⁴ KKP Kementerian Kelautan dan Perikanan, *Laporan Tahunan* (Jakarta, 2018).

⁵ BPS Aceh Tamiang, *Aceh Tamiang Regency in Figures 2018* (Statistic of Aceh Tamiang Regency, 2018).



Figure 1. Survey and discussion with the community (A), and location for floating net cage aquaculture (B)

Seeing those problems, lecturers from Universitas Samudra are willing to help this Pokdakan through the village development program Universitas Samudra to educate the group members and community about how to culture fish using floating net cages. Thus, it is hoped that this activity will be able to increase fish production with high economic value and meet the needs of fish consumption continuously. moreover, it may improve the economy of the community especially the group member of Pokdakan Sepakat Makmur.

Method

The implementation of these assisted village development activities involves various parties including: local governments, communities, field extension workers, village officials, lecturers, and students. Methods and stages in the application starting with identifying the needs of partners through partner networking, program socialization, implementation, and monitoring and evaluation.

To support the realization of the methods, the following procedure shows an overview of working relationships with partners: 1) Survey: Before beginning this activity, the team was firstly conducting a field survey to find the suitable location and meet with potential partners or community to capture problems; 2) Socialization: Socialization regarding this program was carried out by the team to provide information about the aims and objectives of implementing community service for the fostered village development program, explaining to the community about the importance of utilizing idle area to be processed into productive land, explaining various activities that can be carried out from non-permanent land use, proposing business opportunities, transferring technology on how to cultivate tilapia with a floating net cage system, and how to market it online and offline; 3) Training: The team and lecturers of Universitas Samudra were then provided training on tilapia cultivation in floating net cages, starting with the water area preparation, floating net cage installation techniques, techniques for selecting fish seeds, and seeding fish seeds. Followed by training about maintenance of fish during captivity and how to harvest and

distribute the fish in the market.

The roadmap of this Community Program activities were carried out as shown in the diagram below (Figure 2):

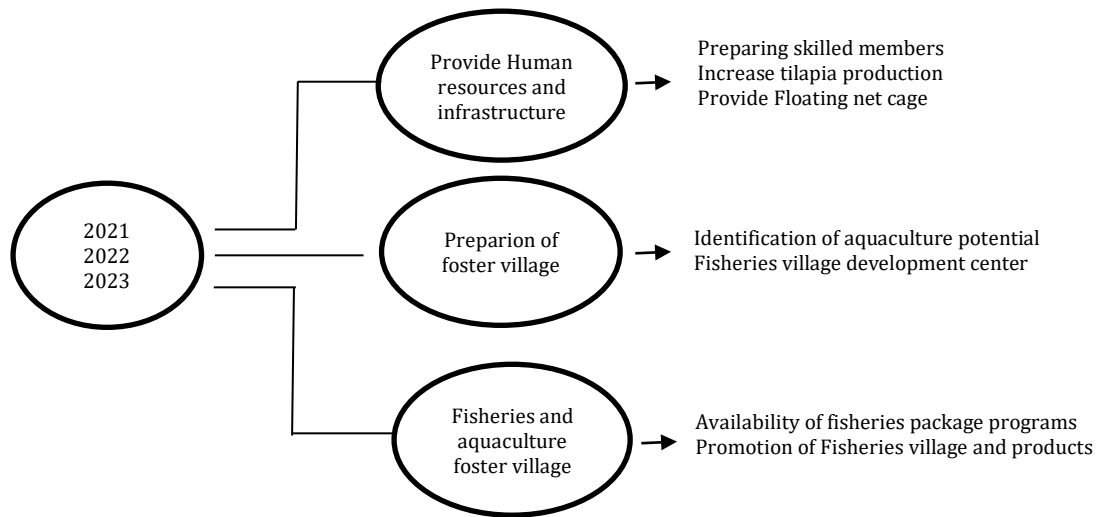


Figure 2. Roadmap of community service program

Results

Field survey

In the early stages, the community service implementation team of the Universitas Samudra program conducted a site survey. The site inspection was carried out by the team, accompanied by Datuk Penghulu, Alur Cucur village and the group leader. The location of this village is about 30 KM from Samudra University. After seeing the location that will be used as the object of the activity, the team concluded that this location is indeed suitable for carrying out this activity, because this village has a very long and wide river flow which is located almost entirely behind people's houses.



Figure 3. Survey of suitable location for floating net cage aquaculture system

Socialization activity

The community service team and the chief of village (Datuk Penghulu) invited Pokdakan Sepakat Makmur members and villagers to attend the socialization about tilapia cultivation program using floating net cage system. The aim of this activity was to inform the community that in Alur Cucur village will carried out an activity namely: Tilapia culture using floating net cage, which utilize the river around their house. This insight was needed so that all pokdakan members and villager aware that this program might be useful and may be able to open business opportunities by cultivating tilapia in the idle area; whereas the community service team will provide floating net cage and tilapia seeds to Pokdakan Sepakat Makmur.

From this activity can be seen that all villagers and pokdakan members were very interested and enthusiastic in heard and received this program. Moreover, the chief of the village also would like to thank to community service team of Universitas Samudra for this program. He also added that other lecturers may bring the same program to this village in order to improve the ability or skill of the villagers, especially about fish aquaculture, to open new business opportunities and to increase economic value of the village.



Figure 4. Socialization with Pokdakan members and villagers of Alur Cucur village

Training of Tilapia culture

The socialization and training of tilapia cultivation system which was initiated by community service team from Universitas Samudra was participated by the community in Alur Cucur village including the members of the Pokdakan Sepakat Makmur, villagers, village officers such as the village chief and his assistants, as well as team from Universitas Samudra and collegers.

Some preliminary information about the program were delivered clearly by the team to all audiences. The team also explained about the cultivation system using floating net cage, how to make a good infrastructure and maintainance. More over, in order to stimulate the villagers, especially the pokdakan members, the university team also share some experiences about tilapia distribution and marketing system.

Furthermore, from discussion session, it revealed that generally most of villagers and pokdakan Sepakat Makmur members still have limited knowledge or skilled in aquaculture system especially using floating net cages. Therefore it is very necessary for the team to give training to all participants about how to cultivate tilapia using the floating net cage techniques.



Figure 5. Floating net cages use for cultivating tilapia fish

During this training activity, the community service team also provide all required materials to prepare some floating net cages which may be use to culture tilapia and being a new business opportunity in improving the community's economy. The results indicated that all Pokdakan members have started to think that tilapia cultivation using floating net cages is easier or more effective than using earthen pond, then it may be increasing their fish production not only for their own consumption but also become a business.

The implementation of this activity training started from making floating net cages, selecting tilapia seeds, providing food and care and harvesting methods. The materials needed are 20 pieces of 200 litre drums, 4 x 4 angle iron, ropes, boards, 2 x2 blocks and 200 meters of net. The process of making cages is carried out together with group members and the service team. Group members were very enthusiastic about participating in this activity, step by step the group members took it seriously until the cages were formed.

After the process of making the cages was completed, the University of Samudra service team handed over the floating net cages and their supporting equipment to the Pokdakan Sepakat Makmur whom represented by the chief of the village. With this floating net cage, the business group will be able to carry out a sustainable tilapia cultivation business which may lead to become an independent village, especially in fulfilling the needs of tilapia in the fish market of Aceh Tamiang and surrounding areas.

Discussion

This present community service program was aimed to create an independence village by providing and giving knowledge in cultivating tilapia in floating net cage in order to increase the economic income to villager especially to Pokdakan Sepakat Makmur members. This program also following the government order since the enactment of Law No. 6 of 2014 concerning villages and law No. 20 of 2003 states that in order to achieve an independence village, it is needed to develop human resources, create intelligent, tough, quality and skills in society. Independence can be achieved if the community is also empowered through an active role in several economic activity and the final process of empowerment is empowering citizens so that they can improve their standard of living and optimize its resources⁶. In the concept of economic independence, economic actors are encouraged as the dominant entity and become the subject of development so that economic development is able to be oriented towards prosperity community⁷.

Moreover, it is mentioned that to create economic independence of a group in a village required three aspects as support, namely: the economic, social and human resource. Economic independence in a village can be achieved if there is cooperation between elements of society with village government by empowering resource capacity⁸. Therefore, due to a good communication with Universitas Samudra, then a team of community service from this university was introduced, presented and accomodated a new tilapia fish cultivation technique using floating net cage to the villagers through a group called Pokdakan Sepakat Makmur. This program is believed to be succeed because most of villagers already has ability to cultivate tilapia previously using earthen ponds. Through this new aquaculture technique, it is hoped to increase the tilapia production.

The Ministry of Marine Affairs and Fisheries has developed three independence factors in order to develop aquaculture in Indonesia, those are: independence of facilities and infrastructure, independence of the cultivator group, and independence of the business. To achieve this goal, synergy between institutions and actors is necessary⁹. Therefore, it is important to each Pokdakan to cooperate with other institution including university because there are many experts who can deliver their

⁶ Mohammad Mulyadi, "Peran Pemerintah Dalam Mengatasi Pengangguran Dan Kemiskinan Dalam Masyarakat," *Kajian* 21, no. 3 (2017): 221-236.

⁷ Calvin Edo Wahyudi, "Mewujudkan Good Governance Dalam Implementasi Program Pemberdayaan Badan Usaha Milik Desa Di Jawa Timur," *Journal of Economics Development Issues* 2, no. 02 (2019): 43-52.

⁸ Ahmad Sururi, Sukendar Sukendar, and Rahmi Mulyasih, "Pemberdayaan Ekonomi Masyarakat Perdesaan Melalui Penguatan Kapasitas Kelompok Usaha Bersama Di Desa Sukabares Kabupaten Serang," *Simposium Nasional Ilmiah & Call for Paper Unindra (Simponi)* (2019).

⁹ Baihaqi Baihaqi et al., "Peningkatan Kemandirian Ekonomi Pokdakan Tanah Berongga Melalui Budidaya Lele Bioflok Autotrof Di Kabupaten Aceh Tamiang," *JMM (Jurnal Masyarakat Mandiri)* 4, no. 6 (2020): 1138-1149.

knowledge to the group members. On the other hand, emphasize the independence of a business groups is determined from an organizational perspective group, cultivating group capital, productive member businesses, group administration, social benefits, knowledge development, skills and attitudes of members, cooperation and mentoring networks institutions that aim to foster self-reliance, form autonomy capabilities and form the knowledge base of society¹⁰.

Aquaculture is one of the most important economic sectors which has potential and important role in national development¹¹. The role can be seen from its function as a provider of raw materials booster for agro-industry, contributor of foreign exchange through exports fisheries, job opportunities and support for environmental sustainability life¹². Thus, this present program is also aimed to increase the fish production by managing idle area (dead end river) to be a productive area using floating net cages.

Data from the Department of Food, Maritime Affairs and Fisheries aceh tamiang district in 2019 stated that the number of Pokdakan for Freshwater/brackish water aquaculture is 54 groups with a total of 919 members spread in Bandar Pusaka sub-district, Kejuruan Muda, Tamiang Hulu, Tenggulun, Rantau, Seruway, Bendahara, Banda Mulia, Karang Baru, Sekerak and Manyak Payed¹³. Among those aquaculture groups, Pokdakan Sepakat Makmur is the only Tilapia cultivator. Seeing this condition, it is very suitable for community service team from Universitas Samudra to support this Pokdakan to improve their ability and skill in increasing their fish production.

Conclusion

Alur Cucur village, Rantau, Aceh Tamiang, is a village which located around wide idle river that has not been utilized by the community. Through this community service program from Universitas Samudra, recently, this big river has been used for tilapia cultivation activities using floating net cages system. This activity succeed to introduce and create a new business opportunity for Pokdakan Sepakat Makmur and villagers to start, develop and increase the tilapia fish production. The present program seemed to be helpfully during the midst of the Covid-19 virus outbreak for Alur Cucur community.

¹⁰ Tibert Verhagen and Willemijn Van Dolen, "The Influence of Online Store Beliefs on Consumer Online Impulse Buying: A Model and Empirical Application," *Information & Management* 48, no. 8 (2011): 320-327.

¹¹ KKP Kementerian Kelautan dan Perikanan, *Laporan Tahunan* (Jakarta, 2019).

¹² Edi Suharto, "Development of Social Welfare in Indonesia: The Rise of Conditional Cash Transfer," in *Routledge Handbook of Sustainable Development in Asia* (Routledge, 2018), 345-353.

¹³ DKP Aceh Tamiang, *Laporan Tahunan* (Aceh Tamiang, 2019).

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