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Social Engineering To Floating Net-Cage Fish Farmers In Ranu Klakah Lumajang, East Java

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ABSTRACT

Apart from being a tourist destination, Ranu Klakah, is also used as a fishing business location for capture and aquaculture. Local people use it as a place for fish farming using the floating net cage (KJA) method which has quite a large potential. Currently problems faced by floating net cage fish farmers in Ranu Klakah is the unavailability of adequate fishery facilities and infrastructure, both fisheries and aquaculture, the low application of fishery technology in the field of aquaculture and marketing of fishery products and the low quality of human resources for fisheries sector business. The Doctoral Community Service Program (Doktor Mengabdikan/DM) Universitas Brawijaya offers several programs to help solve some of the problems encountered by fish farmers. These solutions, aimed to improve community knowledge about best management practice of aquaculture using floating net-cage system, increasing community knowledge about digital product marketing and improving the quality and quantity of fish production in floating net cage systems in Ranu Klakah to attract consumers with wider coverage area and high time flexibility.

KEYWORDS

floating net-cage, Ranu Klakah, aquaculture, Tilapia, digital marketing

INTRODUCTION

Tilapia is a popular fish cultured in warm waters. This fish is the second most widely cultivated fish species in the world, after carp/carp. Tilapia is cultivated in tropical, subtropical and temperate climates.

Tilapia meat taste is very popular with the community. It also has the advantage of a fast growth and breeding rate. Tilapia is easy to cultivate so that among fish breeders, tilapia is used as a superior commodity. (Diansari et al., 2013). Moreover, Tilapia in the export market is very high in demand. Tilapia is sold in various forms, one of which is tilapia fillet. The demand for the export market of tilapia fillets, especially in America, has increased every year. Increased

market demand encourages cultivators to increase the productivity of tilapia.

Tilapia production from 2017 - 2021 has increased quite well with an average increase of 5.05% (KKP 2021/performance report) of the total national freshwater fishery production. However, along with the uncontrolled use of the number of floating net cages, many adverse events have occurred as a result of the decline in the quality of the environmental factors of the open waters used. Mass mortality and the breakout diseases or epidemics with a level of loss that is not small has been experienced in several reservoirs or lakes [Nugroho et al 2020].

During culture on floating net cages things that happens regularly is upwelling, which can kill tons of fish in a short time (Elisdiana et al 2022)

Moreover, the number of floating net cages that are not controlled and only prioritizes increasing production without paying attention to the carrying capacity of the lake ecosystem will deteriorate the water quality of Ranu Klakah.

The lack of public knowledge about good aquaculture practices and in accordance with the carrying capacity of the lake can also affect the production of Tilapia. Good aquaculture practices need planning, implementation and evaluation of every aquaculture action taken, for example: determination of stocking densities, feed management, and grading. Excess feed can lead to a buildup of organic matter at the bottom of the lake. As a result, the decomposition process by bacteria can reduce dissolved oxygen levels in the water.

The most common cause of mass fish death is hypoxia (lack of oxygen), mainly due to upwelling, an algae population explosion, which is also triggered by weather changes. A small proportion of mass deaths are caused by fish diseases and pollution from waste discharged into the aquatic environment. The environmental carrying capacity (carrying capacity) that has received less attention has also triggered mass fish mortality (Dwiyitno 2018).

The same phenomenon is also found at Ranu Klakah Lumajang. Ranu Klakah is one of the lake ecosystems which is located at an altitude of 900 m with an area of ± 22 ha and a depth of 28 m. The surrounding community utilizes the fields of tourism, agriculture and fisheries (PEMDA Lumajang, 2012 in Gunadi 2015). In its development, the local community used Ranu Klakah as a place for tilapia culture using floating net-cage. However, it requires good management to get optimal results. Several problems encounter in the aquaculture systems were lack adequate fishery facilities and infrastructure, both for fishery and aquaculture; the technology used was relatively low for aquaculture and the product is marketed locally. Moreover, the qualification of human resources in the aquaculture sector is still lack. Keterampilan dan pengetahuan kelompok budidaya ikan Nila KJA

With the above problems, the Community Service Doctoral team Universitas Brawijaya offers several programs to help solve some of the problems faced by floating net-cage fish farmers in Ranu Klakah. To overcome the low application of aquaculture technology and marketing of fishery products and the low quality of human resources for fishery sector business actors, the following steps were taken:

1. Assistance and education about business models to increase public knowledge about the floating net cage system in Ranu Klakah.
2. Assistance and education on the marketing system of fishery products using digital methods to increase public knowledge about digitizing marketing of aquaculture products in Ranu Klakah.

Based on the explanation above, this activity was carried out with the aim to improve community knowledge about best management practice of aquaculture using floating net-cage system, increasing community knowledge about digital product marketing and improving the quality and quantity of fish production in floating net cage systems in Ranu Klakah to attract consumers with wider coverage area and high time flexibility.

MATERIALS AND METHODS

The implementation method that will be used in this Serving Doctoral Grant (HDM) activity with the title Social Engineering Model Fish Culture using Floating Net Cage System (KJA/Karamba Jaring Apung) & Digital Marketing in the Fish Farmers Group assisted by the Department of Marine Affairs and Fisheries in Ranu Klakah, Lumajang Regency, East Java is PRA (Participatory Rural Appraisal). PRA (Participatory Rural Appraisal) is an activity that involves direct community participation so that program effectiveness is expected to be achieved (Chambers R, 1996; Gitosaputro, S. 2006). The activity is carried out using a Participatory Rural Appraisal (PRA) approach. PRA is an extension and application of anthropological thinking, approaches, and

methods, especially regarding the concept of flexible learning in the field, the importance of observation-participation, the importance of approach (rapport), differentiating ethical (researcher's) and emic (researcher's) perspectives. point of view of community members), as well as the validity of local knowledge (Chambers, 1994:955).

Through the PRA method, the village community is no longer the object that receives the program from the top (top-down), but becomes the subject of development who designs development programs from the bottom (bottom-up) by continuing to be active in the planning process, determining program priorities, budgeting, implementation, and utilization of development outcomes controlled at the village level. High citizen participation in the village-scale development process makes the program can be implemented based on self-reliance and can be more successful for welfare (Hudayana et al, 2019). The justification of the proposer and partners in solving priority scale problems is carried out concretely through the following implementation methods: 1) preparation; 2) technology application; 3) training; and 4) monitoring and evaluation. Based on the problems faced by partners, the solutions that can be provided are divided into several stages of activity, the first is preparation, then identification of problems faced by Ranu Klakah fish farmers, then continued with education about the business model of the KJA culture system, good fish farming methods (CBIB). The third activity is education regarding financial administration and marketing of digital crops, the fourth is the reconstruction of the culture cycle. The method of the activity is to provide material in the form of counseling and mentoring practices for the application of good fish farming practices (CBIB), reconstruction of the culture cycle

This service activity starts with coordination with partners in the field, namely the Department of Fisheries and Marine Affairs of Lumajang District and the Head of the Klakah Sub-district, Lumajang Regency and a survey conducted prior to the implementation of the training activities.

Field survey or site survey is a very important initial stage in planning an activity. The survey was carried out in floating net cages in Ranu Klakah to observe water quality parameters of the lake. The activity be held in July-September 2022 at Ranu Klakah, Lumajang Regency.

RESULTS AND DISCUSSION

Coordination activities with partners are carried out with zoom meetings, with explanations related to the background and objectives of the activities to be carried out. The results of the survey in the field, namely to measure water quality parameters (Figure 1), show the results of temperature measurements in the range of 27-30°C. The pH value ranges from 7, DO ranges from 11-13 mg/L. BOD values ranged from 1-3 mg/L, ammonia was obtained <0.15 mg/L. Nitrate measured ranged from 25-50 g/L and nitrite obtained was 0 mg/L and was safe for fish life, especially tilapia (*Oreochromis niloticus*).

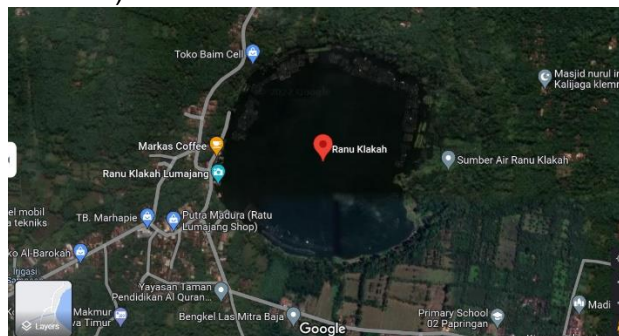


Figure 1. Location of Ranu Klakah Lumajang

Further education and mentoring activities are carried out as follows.

a. Exploration of problems faced by Partners

Exploration of partner problems through communication with the Lumajang Fisheries Service together with the KJA fish cultivator group at Ranu Klakah Lumajang. Communication was carried out online and followed by a survey of the HDM site. The survey results show that the location of the KJA is on the edge of the lake (Ranu Klakah) where Ranu is also a water tourism and culinary tourism. The problem faced by cultivators is the upwelling phenomenon which generally occurs in June-August. However, this incident greatly affects the condition of water quality in the lake. According to Lukman et al.

(2013), stratification patterns of temperature, dissolved oxygen and total organic matter (TOM) in the lake characterize waters with conditions that are prone to aquatic biota life, especially fish kept in KJA. The temperature stratification pattern that is close to homogeneous shows a tendency for the turnover process, which will distribute anoxic conditions from the deep to the surface waters. Eutrophic conditions in this lake can also cause plankton blooms which will limit the brightness and availability of oxygen in the water column, even low to anoxic DO levels were recorded at a depth of 10 m.

b. Education on prevention of fish mortality and the factors that cause it and Good Fish Culture Practices (CBIB)

Education or counseling is one method of increasing the knowledge and skills of the community, especially to plan and implement fish farming in KJA properly (Figure 2). The counseling was held on June 18, 2022 which was attended by the Head of the Lumajang Fishery Service, the Camat of Ranu Klakah, the DM Team, students and a group of 20 fish cultivators in Tegalrandu Village, Klakah Lumajang District. At this meeting, the DM team introduced them to farmers. Counseling on the prevention of fish mortality and the factors that cause it was delivered by Dr. Yuni Kilawati S.Pi., M.Sc. Education on prevention of fish mortality was delivered by the dedicated Doctoral team by explaining the factors that caused it, which included fish health, a good environment and controlled disease transmission. Most tilapia cultivators who are members of partner groups do not understand the importance of monitoring environmental quality. Partners observe environmental quality by physically monitoring the color and smell, while for chemical and biological parameters monitoring is rarely carried out. This educational activity aims to provide information about when and how to monitor aquaculture water quality so that it can maintain fish health. Education about good fish farming was delivered by Dr. Yunita Maimunah, S.Pi., M.Sc. regarding aquaculture planning starting from the preparation of infrastructure, the implementation of aquaculture includes good water quality conditions for tilapia culture in KJA

feed management, pest and disease control and harvesting. It was explained that water quality can decrease, one of which is due to excessive feeding and the amount of uneaten feed. Feeding that does not follow the technology of feeding, then the amount and dose of feed given is not in accordance with the needs of the fish. Excessive feeding results in the food eaten by fish cannot be digested properly and not all feed can be consumed by fish (Ardi, 2019).

The success of floating net cages system needs to be supported by efforts to improve training for fish farmers on feed management, control feed quality on a regular basis, and use superior seeds or look for commodities that are in accordance with the environmental conditions of the reservoir waters.

c. Education about marketing with a digital marketing strategy

One indicator of the progress of the SME business is the success of marketing. The cause of SMEs in Indonesia being difficult to develop is a poor marketing system, this is because most SME entrepreneurs do not understand and implement their marketing channels. The definition of a marketing channel is a set of interdependent organizations involved in the process of making a product or service ready for use or consumption (Khotler and Keller, 1996).



Figure 2. Educational documentation of Doctoral Service activities

Technological progress is something that cannot be avoided in today's life, because technological progress will run in accordance with scientific advances. Every innovation is created to provide positive benefits, provide many conveniences, as well as a new way of

doing activities for human life. Especially in the field of technology, society has enjoyed many benefits brought about by the innovations that have been produced in the last decade (Urmila Dewi, M.H. et al., 2018; Wijoyo, H. et al., 2020). Micro, small and medium enterprises are one of the business units that benefit greatly from online marketing techniques. Therefore, the use of digital marketing needs to be maximized by all MSME actors. Education about digital marketing procedures will help cultivators to be able to market their crops more broadly without relying on middlemen (Abdurrahman, G. et al., 2020; Munarsih, M. et al., 2020; Novianti, K.R., 2020).

CONCLUSIONS and SUGGESTION

Conclusions that can be drawn from DM activities in an effort to empower groups of fish farmers in Ranu Klakah Lumajang is:

- Efforts to increase public knowledge about good fish farming methods (CBIB) can indirectly help overcome the problems faced by farmers in Ranu Klakah every year, namely mass deaths due to natural upwelling phenomena that occur every year bring the remaining organic matter from aquaculture that is at the bottom to the surface

- Efforts to increase marketing reach through digital marketing are expected to be able to boost and stabilize the price of fish harvests for cultivators

Suggestions offered to increase effort to empower fish farming groups in Ranu Klakah Lumajang are:

- Continuing cooperation between cultivators, institutions, academics and the private sector is very necessary to realize good farming methods so as to produce optimal fish production.

- Continued DM program is needed so that program continuity to increase the production of partner groups and monitor the results of programs that have been implemented in the long term can be carried out

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