

The Potency of fish cultivation's development in Agam Regency of West Sumatera

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Abstract

Given a large number of economic activities around Lake Maninjau, it is considered to have water resource potential. The many floating net cages around Lake Maninjau are able to revive the economy in the surrounding community. At this time, Lake Maninjau is not only used for fish cultivation, but also as a tourist attraction. This study aims to determine the potential development of fish culture by using Benefit Cost Ratio analysis. This research is located in Tanjung Raya District, Agam Regency which is rich in water resources. Judging from the result of Benefit Cost Ratio of 1.82, it means that the fish farming business in Lake Maninjau is profitable with a profit of 1.82 greater than the costs incurred by fish farmers. This also indicates that the fish farming business in Lake Maninjau is feasible and provides financial benefits

Keyword : cultivation, benefit cost ratio, floating net cage

Introduction

Economic growth in a country was driving by new industries and education. Beside that, tourism also play a significant role. There exists of tourism destination also giving impact to environmental (Huxham et al., 2015). It was a dilemma because such things can gave degradation impact to environment and benefit to economic growth. As we know, in Developing Countries which is largely depend on natural resources, degradation of environment is a big threat to sustainable development (Krause, Nkonya, & Griess, 2017). The benefit of natural resources are recognized widely but unfortunately it was poorly understood. It was happen because the demand of this natural resources keep increasing, the increasing of population also play an important role to this fact (Pagiola, von Ritter, & Bishop, 2004)

In Lake Maninjau, tourism, fishing and conservation are the two main economic activities. The continued use of this resources without sustainable use practices and conservation measures will lead to bad impact to the environmental condition of these many resources available in the area around this (Rani et al., 2019). That's a way a cost benefit analysis are important to be done to since it creates such dilemma to societies.

Generally, benefit can be define in a market and Non-market benefits. Non market benefits are the benefits which is arising from the natural resource which cannot be measured by the market mechanism, while market benefits are measured by market mechanism (Lavee & Menachem, 2018).

Benefit in terms of economic or market refer to increasing economic value which lead to increase economic welfare, furthermore cost is the opposite condition which refer to reduction in human wellbeing (Jiang & Kim, 2013). For a project to give impact on human welfare the benefit must be exceed its cost (Cook, Davídsdóttir, & Kristófersson, 2016). The cost not only related to money but can be environmental effect or in other words it creates externality which is negative which means one activity incurred to other parties. By having externality, the local communities were asked about willingness to pay. According to Pearce willingness to pay reflect human preferences. But in Low middle income countries where the educational level is low, willingness to pay seems to be misunderstood. Rather than to define it as a money to conserve

the environment, they define it as a contribution of money where it flows to local government (Krause et al., 2017). According to Putri (2019), the activity around Lake Maninjau has positive and negative externality .

According to José Alberto Lara-Pulido, giving regulation to the used of resources is the best things to maintain economic valuation of one tourism destination (Lara-Pulido, Guevara-Sanginés, & Arias Martelo, 2018). Involving the stakeholders to identify the value tourism destination can benefit or increase the economic valuation (Rani et al., 2019). Because if the local government still doesnt provide the regulation, they keep taking advantages of many resources, and willll lead to many ecosystems will be deforested or degraded and then in the long time will affect the tourism, industry or even economic growth. For instance, no or even less visitors because the water will be contaminated. To think about increasing the wellbeing of local people, government need to think not only about short term effect but also long term effect(Lara-Pulido et al., 2018).

The valuation is used to determine the main resources and development of tourism destination. (Laitila, Paulrud, & Waldo, 2018). Mostly the economic valuation also uses bt many advocates or economist to make a decision related to the used of resources and support the ecosystem (Marre et al., 2016), To increase the economic valuation, increasing willingness to pay is also an option(Morton, Knowler, Brugere, Lymer, & Bartley, 2017).

Lake Maninjau functions as a tourism, energy and electricity sector, agriculture, services and trade, livestock, fisheries, settlements, protected forests and cultural reserves. One of the functions of Lake Maninjau that has a significant impact on the activities of other sectors is the aquaculture sector using the floating floating net cages. The management of Lake Maninjau's sustainability area is regulated by Agam District Regulation No. 5 of 2014. It is stated that the carrying capacity for new cages in the lake area refers to the ability of Lake Maninjau waters to digest organic waste from fishery activities which is equivalent to 1,500 units or 6,000 plots with a size of 5x5 m2 per cages plot.

However, BPS Agam data shows that, in 2017 the number of a new cages reached 17,000 plots or three times the maximum amount which is set. This causes water pollution due to the accumulation of leftovers in the bottom of the lake which is estimated at 95.34 percent, so that it has an impact on mass fish deaths, namely 160 tons of dead fish in new cages on Lake Maninjau in February 2018 with a loss of around IDR 3.75 billions. Another impact is a decrease in the number of tourists, it is far from the target in 2017, that is around 653,108 people.

Thus, the environmental problems in Lake Maninjau arises from the unbalanced interaction between economic, human and natural resource activities and harmony that causes environmental problems. The high demand for natural resources and the environment tends to cause excessive exploitation of natural resources and the environment, thus threatening the sustainability of the quantity and quality of resources and environmental degradation. In addition, the controversy between the magnitude of the benefits and costs of externalities that arise opens up opportunities for studies of the receipt of compensation funds from externalities that arise. Some parties who feel the loss will certainly receive compensation funds in exchange for the cost of the externalities they receive, but the party that receive benefits will declare refusing to accept the compensation funds provided as such will legitimize the recipient to recognize that there have been negative externalities.

Methods

This study uses data obtained from the West Sumatra agricultural census (ST 2013) obtained from BPS West Sumatra. The sample area is Agam District with 187 respondents. The B / C ratio analysis is then performed to determine the feasibility of a fish farming business in Lake Maninjau. B / C Ratio is a parameter to find out the level of comparison between positive and negative NPV. Fishery activities are worth further development if they have a B / C Ratio of > 1 (one). ROI value calculation using the formula:

$$B/C \text{ ratio} = \frac{\sum_{t=0}^n \frac{(B_t - C_t)}{(1+i)^t} (B_t - C_t) > 0}{\sum_{t=1}^n \frac{(C_t - B_t)}{(1+i)^t} (B_t - C_t) < 0}$$

Where B_t = Revenue (benefit) in the t -year, C_t = Cost (cost) in the t -th year, i = interest rate, $t = 1, 2, 3, \dots, n$, and n = economic age.

Results and Discussion

Characteristics of Farmers Cultivated in Lake Maninjau

Number of household members

Based on data obtained from the results of an agricultural survey about fish farming in Lake Maninjau in 2014 as many as 24% of respondents had a total of 4 household members. it shows that the number of household members of fish farming farmers is not too large. Only a small number have more than 5 members. This condition will certainly affect the welfare of fish farmers in Lake Maninjau. The greater number of household members will certainly reduce their welfare because of the large burden that must be borne.

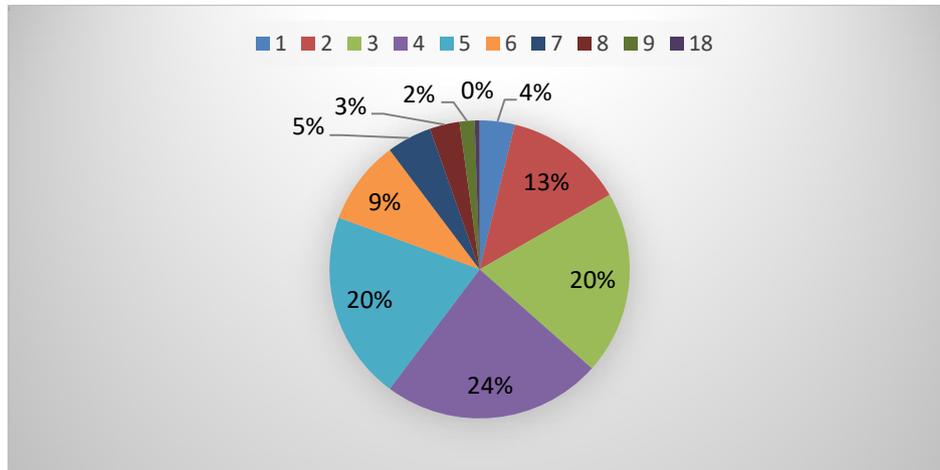


Figure 1. Number of household members

The figure shows that only the head of the household is involved in the fish farming business. it means, the business does not employ household members in its business activities. Most fish farmers in Lake Maninjau employ other people in their business activities. The head of the household is involved as well as the owner of the capital of the fish farming business in which the cultivation work is fully left to the worker.

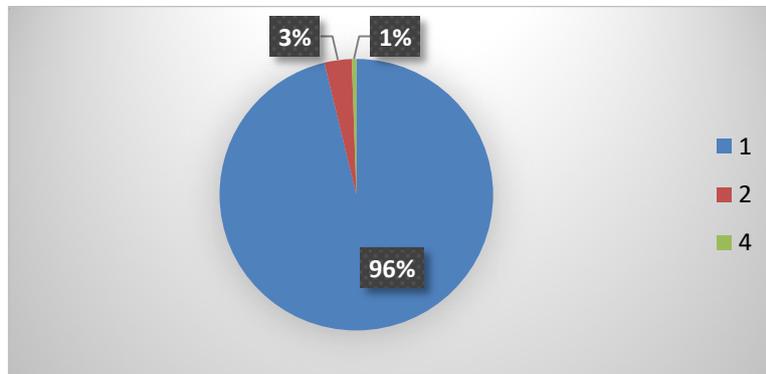


Figure 2. Number of Household Members Involved in the business of fish farming

Education

Based on the data obtained from the survey results, most of the fish farmers in Lake Maninjau have a high school education. Only small proportion of them graduated from high school. This shows that the fish farming business is more in demand by residents who have the last diploma equivalent to high school compared to tertiary institutions. With the education they have, of course, it will affect the field of business they will pursue.

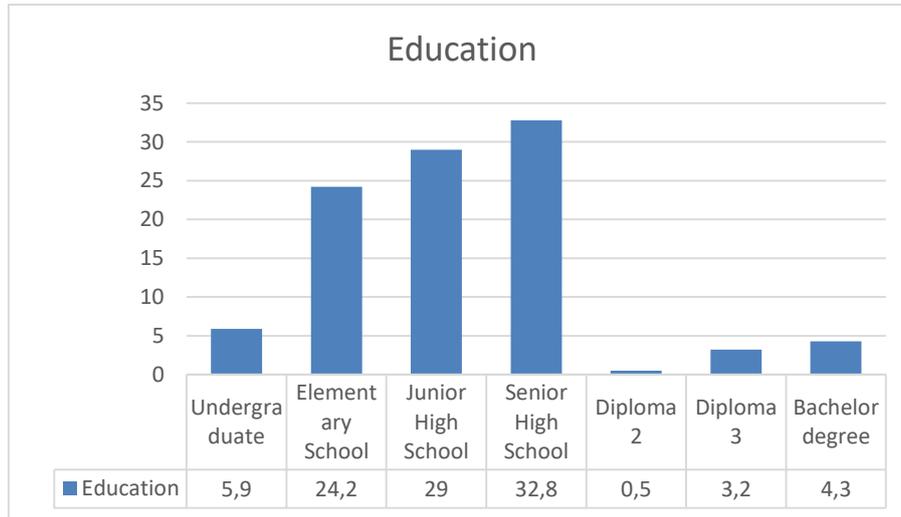


Figure 3. Education of Farmers

Gender

If seen based on the sex of the respondents, as many as 92% of respondents who did fish farming business in Lake Maninjau are male. This is caused by the business of fish farming requires special skills possessed by men.

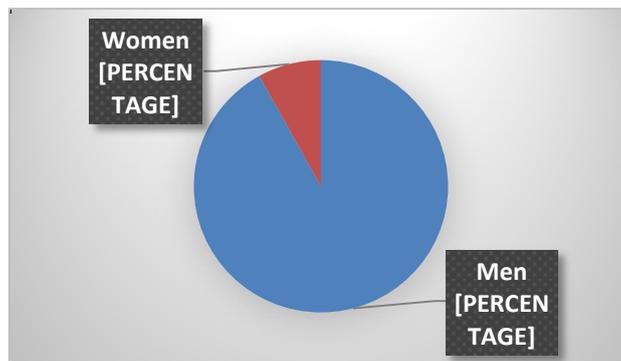


Figure 4. Gender Distribution of Fish Farmers in Lake Maninjau

Age

When viewed based on the age of the respondents, as many as 22.58% of respondents aged 36-42 years. This shows that farmers who conduct fish farming business are still young and still in their productive age. Only 6.99% of respondents aged 22-28 years. At the age of 22-28 years, farmers usually only continue the

business that has been passed down from the family. Based on the survey results, most of the farmers who did fish farming are aged 36-56 years. This age is of course still in the productive age.

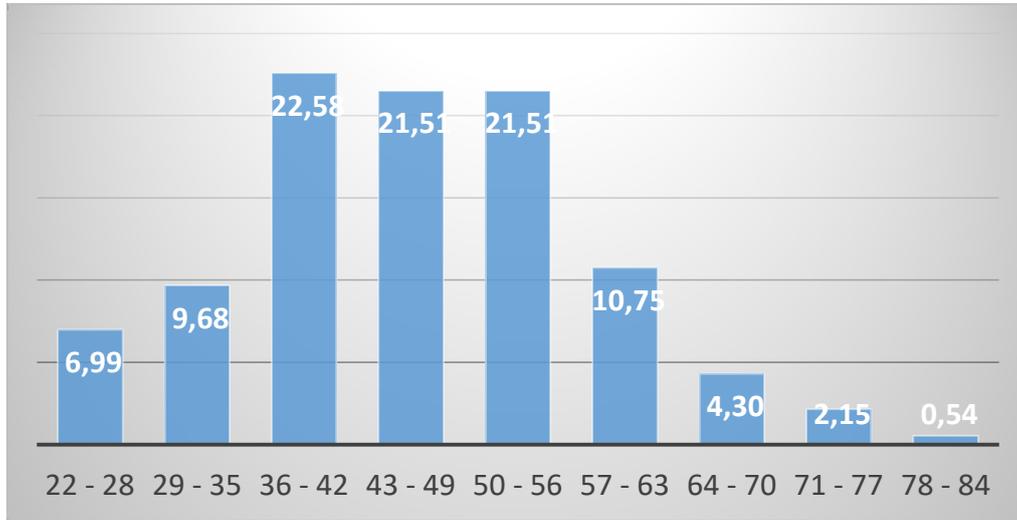


Figure 5. Distribution of Respondents by Age

Analysis of Fish Farming Business in Lake Maninjau

Table 1. Cost Analysis of Lake Maninjau Fish Farming

Indicators	Value
Land Productivity/ m2	IDR 308.279,76
Cost/m2	IDR 192.749,84
Profit /m2	IDR 160.883,45
BC Rasio	1,82

Judging from the BC value of 1.82, it means that the fish farming business in Lake Maninjau is profitable with a profit of 1.82, greater than the costs incurred by fish farmers. This also indicates that the fish farming business in Lake Maninjau is feasible and provides financial benefits.

It provides the benefit for floating net cage farmers and can improve the welfare of farmers, especially the communities around Lake Maninjau. Lake Maninjau has great potential for the development of fish farming. This is because the lake is quite extensive, and the community has also been doing business in fish farming for a long time. Besides that, the high demand for fresh fish originating from various regions both inside and outside the province of West Sumatra also contributed to the development of this type of aquaculture.

Conclusion

Based on the results of the processed data, it can be concluded that the fish farming business in Lake Maninjau is feasible to develop. Judging from the BC value of 1.82, it means that the fish farming business in Lake Maninjau is profitable with a profit of 1.82 times the costs incurred by fish farmers. This also indicates that the fish farming business in Lake Maninjau is feasible and provides financial benefits. This of course will benefit the floating net cage farmers and can improve the welfare of farmers, especially the communities around Lake Maninjau.

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