Analysis of Relationship between Production Factors and Production Tilapia Farming Business in Toba Samosir Regency

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ABSTRACT : This study aims to analyze the relationship between floating net cage size, labor, feed, seeds and medicine with tilapia production in Toba Samosir Regency. The selection of the study area was carried out purposively because Toba Samosir district was a tilapia aquaculture area that had the largest harvest area in North Sumatra. The data used are secondary data and primary data obtained in the study area. The analytical method used is Chi-Square analysis using SPSS 18.0 software. The results of this research are floating net cage areas, labor, feed, seeds, and medicines used in relation to the production of tilapia fish in floating net cages in Toba Samosir District significantly. With the closeness of the relationship between the extent of Floating Net Cages, feed, medicine with a production of 78.7%, and the closeness of the relationship of seeds with production 89.2 and the closeness of labor relations with a production 70.4%.

Keywords: Floating Net Cages, Production, Production Factors, Tilapia.

INTRODUCTION

Tobasa Regency is one of the regions that have the largest tilapia production. Most of the main livelihoods of residents in the area are tilapia farmers with floating net cages. The prospect of developing the production of aquaculture commodities in this area is quite good. Supported by the location factor of the area which is located on the outskirts of Lake Toba, making the residents use it to cultivate tilapia.

The total production of tilapia in Toba Samosir district in 2016 was in the first quarter of 3,150,000 tons, in the second quarter was 2,416,000 tons, the third quarter was 1,723,000 tons and the fourth quarter was 2,075,600 tons (Fisheries Service of Toba Samosir, 2017) However, high production at certain times is not enough as a guarantee if it is not followed by an increase in productivity. The condition of the level of decline in productivity is thought to result from the use of inefficient production factors at the level of fish cultivators.

Tajerin and Noor's research (2005) which states that the factors of production that affect fish production are the extent of the floating net cage area, seeds and fish feed. In addition to being very significant, the parameter coefficient value is the biggest (each at 0.4479, 0.2261 and 0.6253). Human labor for both maintenance and harvesting activities has a positive but no real effect. Meanwhile, according to Supriana and Marisa (2016), floating cage net area, seeds, feed, medicines, and labor used were significantly (significantly) related to the production of grouper

aquaculture in Floating Net Cages in Pulau Sembilan.

The use of appropriate and efficient production factors influences the income of farmers. If production increases, it will increase the income of Tilapia farmers. This study aims to analyze the relationship between floating net cage area, seeds, feed, medicine and labor with the production of tilapia cultivation in floating net cages in Toba Samosir regency.

RESEARCH METHODS

Location Selection

The study was conducted on Pulau Sembilan, Toba Samosir Regency. The choice of location in this study was carried out purposively because Toba Samosir Regency was the place for tilapia aquaculture which had the largest harvest and production area in North Sumatra.

Data Collection

Data collection methods were carried out in a survey of 25 tilapia farmers. The data used in this study include primary data and secondary data. Primary data was obtained through interviews and filling out questionnaires by respondents, which aimed to obtain information and input about the constraints and efforts that must be done in the development of tilapia aquaculture in Toba Samosir Regency. Whereas secondary data was obtained from the Fisheries Office of Toba Samosir Regency and related institutions as well as the literature that supports this research.

Data Analysis Method

Production Function

To see the relationship between the input and output of a production activity, a form of production function is needed.

According to Nicholson (2004), the production function is a mathematical relationship between input and output. Meanwhile, according to Soekartawi (2003), the production function is a physical relationship between input and production. Presentation of the production function can be done in various ways, among others in the form of graphs, tables or in a systematic equation. Systematically, the production function can be shown by the equation:

$$\hat{Y} = f(X_1, X_2, X_3, X_4, X_5)$$

Description :

$\hat{Y}$: Production of Tilapia (*output*)
X_1 : Total area floating net cages (Ha)
X_2 : Fish seeds
X_3 : Fish feed (Kg)
X_4 : Medicine (Kg)
X_5 : Labor

The production function shows that the amount of production depends on the factors of production which are a function of the factors of production used in the production process. In conducting agricultural business, a farmer will always try to allocate the inputs he has as efficiently as possible to be able to produce maximum output (profit maximization).

Chi-Square Analysis

Data were analyzed quantitatively using SPSS 18.0 for Windows (Spread Sheet For Statistic) with Chi-square analysis test model. Determine the significance of a value equal to the calculated value estimated using Table C in the statistical table with db = k-1 and set = 0.05. in chi-square analysis, H0 is rejected and H1 is accepted if the calculated value is greater than the table value. The Chi-square analysis is a non-parametric statistical analysis, used to test whether the observed data frequency of a category variable corresponds to the

frequency of expectations (Uyanto, 2009). Chi-Square Test Formula:

$$X^2 = \sum \left[\frac{(f0 - ft_{ax})^2}{ft_{ax}} \right]$$

Description :

X^2 = Chi Square

f_0 = Frequency of Observation Results

ft_{ax} = The expected frequency in the study population, by sharing the number of subjects in the sample and subject categories.

Chi-Square test results produce the value of Asymptotic Significance (Asymp. Sig.) Which shows whether there is a relationship between the two factors studied and then compared with the value (0.05). Decision-making standards Based on Asymp values. Sig. is Asymp. Sig. smaller than the value (0.05), then Ho is rejected.

The decision-making criteria are :

H$_0$ accepted if X2 ≤ X2

H$_1$ accepted if X2 ≥ X2

RESULTS AND DISCUSSION

Analysis of the Relationship between Production Factors And Production.

Tilapia production has a relationship with various factors, including the use of production facilities consisting of floating net cages, seeds, feed, medicine, and labor. The seeds used by farmers, in general, are superior seeds. The feed used by fish cultivators is commercial feed and feeds for fresh trash or small fish that are easily available and continuous. The medicines used to consist of Furazolidone and Multivitamins. The labor used comes from inside and outside the family, for every one floating net cages requires an average number of workers as many as 3-5 people. Based on the results of Chi-Square analysis using SPSS software version 18.0, the following results were obtained:

Table 1. Results of Chi-Square Analysis Relationship between Production Factors.

Variabel	Chi-Squre Value	Nilai Signifikan	*Contingency Coefficient*
Total Area	127	0,000	0,787
Seed	219	0,000	0,892
Feed	127	0,000	0,787
Medicine	127	0,000	0,787
Labor	35	0,000	0,704

Source: Primary Data (processed), 2018.

The Relationship between Total Area of Floating Net Cages and Production

Chi-Square analysis results for the area of floating net cages shows a value of 127 with a significance of 0,000. The significance value is smaller than α0.05. Thus it can be concluded that H0 is rejected and H1 is accepted. This means that there is a significant relationship between the extent of floating net cages and the production produced by tilapia aquaculture in the study area.

Chi-Square value only states whether there is a relationship or not, but does not state the strength of the relationship. To determine the strength of the relationship between the two variables, we can see the output contingency coefficient (Supriana and

Barus, 2010). The value of the contingency coefficient is 0.787. This means the closeness of the relationship between the extent of floating net cages and tilapia production is 78.7%.

The results of this study are the same as those of Lindawati (2005) which states that the factors of production that affect the level of production of aquaculture are the area of land. This factor is quite important because it is related to the place of cultivation business activities.

Relationship between Seeds and Production

The results of Chi-square analysis showed a value of 219 with a significance of 0.000. The significance value is smaller than $\alpha 0.05$. Thus it can be concluded that H0 is rejected and H1 is accepted. There is a real relationship between fish seeds and production produced by tilapia aquaculture in the study area. To determine the strength of the relationship between the two variables, we can see the output contingency coefficient (Supriana and Barus, 2010). The value of the contingency coefficient is 0.892. This means the closeness of the relationship between seeds used with tilapia production is 89.2%. Seeds used by farmers, in general, are superior seeds obtained from outside the area. the price of tilapia fish is sold by size by Production facilities stall in cooperation with local agricultural agencies.

The Relationship between Feed and Production

The value of chi-square analysis is 127 with a significance of 0,000. this means that the significance value is smaller than α 0.05, so H0 is rejected. This means that there is a real relationship between fish feed and production produced by tilapia cultivation in the study area. According to

Supriana and Barus (2010) to determine the strength of the relationship between two variables, the output contingency coefficient can be seen. The contingency coefficient value is 0.787. This means that the close relationship between food used and fish production is 78.7%. The feed used in this study is commercial feed and waste food. However, according to Akbar's (2012) study which showed that tiger grouper (Ephinephelus fuscoguttatus) in floating net cages, which were fed pellets, produced a greater influence on the amount of feed consumption compared to those who consumed trash fish. Feed pellets with different energies produce a daily growth rate, feed efficiency, fat content, and survival is not significantly different in duck grouper because the essential amino acid content and essential fatty acids found in protein and fat are not met so that fish growth is inhibited, small feed efficiency and increased mortality.

Relationship between Medicines and Production

The value of chi-square analysis is 127 with a significance of 0,000. this means that the significance value is smaller than α 0.05, so H0 is rejected. This means that there is a real relationship between medicines and production produced by tilapia aquaculture in the study area. The value of the contingency coefficient is 0.787. This means the closeness of the relationship between medicines used with tilapia production is 78.7%. The medicines used by tilapia cultivators consist of PK (Potassium Permanganate) and Multivitamin solutions. soak in a solution of PK (Potassium Permanganate) for 30-60 minutes with a dose of 2 g / 10 liters of water, the treatment is repeated 3 days then soaked in Negovon (Potassium Permanganate) for 3 minutes at a dose of 2-3.5%. This treatment aims to prevent

skin diseases, gill disease with swollen gill symptoms, pale gill/ eucorrhoea, internal organs with symptoms of a swollen fish stomach, scales standing, fish not agile.

Relationship between Labor and Production

Chi-Square analysis results show a value of 35 with a significance of 0,000. The significance value is smaller than α0.05. the conclusion is H_0 is rejected and H_1 is accepted. This means that there is a significant relationship between labor and production produced by tilapia cultivation in the study area. To determine the strength of the relationship between the two variables, the output contingency coefficient can be seen. The value of the contingency coefficient is 0.704. This means the closeness of the relationship between labor and tilapia production is 70.4%.

The results of this study are the same as those of Tajerin and Noor (2009) which states that in the production function, factors that directly affect the number of products produced are human labor. Labor is one of the important production factors in an effort to produce a product that is expected because labor also influences the income to be earned. Expertise and skills possessed by a worker will affect the level of good and bad quality produced by a business.

CONCLUSIONS

Based on the results of the research that has been done, it can be concluded that: The size of floating net cages, seeds, feed, medicines, and labor used are significantly related to the production of tilapia aquaculture in Toba Samosir Regency. With the closeness of the relationship between the extent of floating net cages, feed, medicine with a production of 86.6%, and the closeness of the relationship of seeds with the production of 91.3% and the closeness of labor relations with the production of 70.7%.

Suggested to the farmers of tilapia in Toba Samosir to perform a correlation analysis of factors of production to the production of tilapia that work done more efficiently and increase profits.

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