



PRODUCTION AND INCOME ANALYSIS OF MANGROVE CRAB (*Scylla serrata*) FARMING IN TANJUNG REJO VILLAGE PERCUT SEI TUAN DISTRICT DELI SERDANG DISTRICT

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Abstract

*Analysis of Production and Revenue of Mangrove Crab Pond (*Scylla serrata*) Tanjung Rejo Village, Percut Sei Tuan District, Deli Serdang Regency". The purpose of this study was to analyze the effect of the production factors of pond area, seeds, feed and labor on the production of mud crabs. The selection of research locations was carried out purposively. data collection by distributing questionnaires and interviews. The data sources used are primary data sources and secondary data sources, the sampling method in this study is to use the saturated/census sample method, namely by taking the entire population as a sample. The results showed that the variables of land area and seeds had a significant effect on the production of mud crabs, while the variables of feed and energy did not significantly affect the production of mud crabs. The business income from mangrove crab enlargement in the research area is Rp. 12,503,903.5. with a production period of 3 months. Where the revenue from the mangrove crab enlargement business is Rp. 20,004,736.9 and a total cost of Rp. 11,145,570,16.*

Keywords: *Production, Income, Mangrove crabs.*

1. INTRODUCTION

Since the 1980s, mud crabs have become an important fishery commodity, have important economic value, and have high prices in both domestic and foreign markets, including in Asia (such as Singapore, Thailand, Taiwan, Hong Kong and China) (Rusdi and Hanafi, 2010). as well as in America and Europe. In international trade, this type of mud crab is known as Mud Crab or *Scylla* spp. in Latin. The development of the mangrove crab trading business continues to increase due to the wide open export market opportunities (with more than 10 consumer countries), the potential for mangrove land which is their habitat is quite large, knowledge and technology are increasing both for cultivation (seeding, enlargement). This sizable market opportunity at high prices has caused the crab business to develop in many places in our country such as in Kalimantan (East Kalimantan, South Kalimantan, North Kalimantan), Sulawesi (South Sulawesi, Southeast Sulawesi, Central Sulawesi), Java (Subang, Indramayu , Cilacap, Pemalang, Gresik, Sidoarjo), Sumatra (Riau, Jambi, North Sumatra, Lampung), Papua, West Papua and others, with local and export marketing targets (including Japan, Hong Kong, South Korea, Taiwan, Singapore , Malaysian,

The production of mud crab ponds often experiences increases and decreases in production, this is caused by various factors, including natural factors and the use of production factors that have not been optimal. Considering that crab pond production often experiences increases and decreases, this will have a direct impact on the income earned by mangrove crab pond business actors. There are several factors that affect the level of production of mud crab ponds, including pond area, crab seeds, feed and use of labor. The use of production factors for mangrove crab ponds that are not optimal will result in a decrease in production. In addition to the use of production factors that are not optimal, the crab pond business management system can also affect

production levels. Increased production of mud crab ponds will be achieved if the use of production inputs is optimal.

Based on Mastia's research (2019) it states that the factors that affect the production level of crab ponds include seeds, feed and labor. The research results obtained increase in mud crab production was influenced by factors of pond land (0.231), seeds (0.459), feed (0.155) and labor (0.238) and had a positive and significant effect on mud crab production. Potential development can be done by reducing the factors of labor production, especially foreign workers who require high costs. (Gustina S, et al, 2022) Based on the survey in Percut Sei Tuan District, the problem faced by mud crab farmers is the difficulty in obtaining mud crab seeds, so this has an impact on the disproportionate number of crabs cultivated with the area of the pond. Feeding mud crabs in the form of ruca fish and plantonema also creates problems for farmers. where many mangrove crabs that are undergoing molting are unable to obtain food properly. the use of labor that is not yet optimal also has an impact on the level of income of farmers, where in the processing process the labor used is still mostly sourced from within the farmer's family, so that the work carried out is not as effective as using labor outside the family.

The level of income or profit earned by mud crab farmers is strongly influenced by the amount of production costs incurred by farmers. The income of mud crab farmers is obtained from the difference between the total income and the total costs of the crab pond business. High income will affect farmers' decisions in carrying out their business activities. In the process of implementing mangrove crab pond activities there are still many obstacles faced by mud crab farmers, these obstacles include, obstacles originating from the farmer's internal environment, such as lack of capital and management in the process of farming activities. Capital or costs in farming activities are the most important means of production in the successful process of a mangrove crab pond business. In farming activities, the costs incurred by farmers consist of the cost of providing factors of production. In terms of income, crabs in the Tanjung Rejo Region are only marketed abroad in the form of export goods where prices are not certain due to air transportation and Chinese New Year holidays make prices very volatile, therefore the amount of production fluctuates in the price of these mangrove crabs.

1. Production

Agricultural production occurs because of a combination of natural production factors, labor, capital, which are managed by farmers (humans). In increasing the production and productivity of farming in Indonesia, it is influenced by the factors of production used by farmers. In conducting their farming business, farmers always try to use available natural resources coupled with external production factors so that the activities carried out in maximizing farmers' income are achieved (Kasmir and Jakfar, 2012). The change in attitude that was identified was a change in caring more about the surrounding environment, namely with an attitude that did not want to participate to become willing, from previously not wanting to do entrepreneurship to being very enthusiastic about running this business in a sustainable manner because of the promising market potential. The changes that have occurred can be said to be 100% (Yudha AP, 2019)

Production is an activity in creating and adding to the utility of an item or service for activities where production factors are needed which in economics consist of capital, labor, and management or skills. Factors of production are inputs used to produce goods and services. The production factor really determines the size of the production obtained (Kusuma, 2016). Production facilities are inputs sacrificed by farmers in farming, while farming production costs include labor costs, production inputs and land taxes (PBB) (khairunnisa R, et al, 2016)



2. Income

Income according to (Sukirno 2012) is income received by all households in the economy from payments for the use of the factors of production they own and from other sources. From personal income, disposable income can also be calculated, namely the part of personal income that can actually be used by households to finance consumers or other needs. Income is the result in the form of money or other material results obtained from the free use of wealth. Income is generally the receipts of individuals or companies. There are two types of income, namely:

- a. Gross income is the receipt of a person or business entity for a certain period before deducting expenses.
- b. Net income (net income) is the remaining income and profit after deducting all costs, expenses and allowances for depreciation and possible losses. Income is the difference between revenue (Revenue) and total expenses (Cost) expressed in Rp./month. From the results of the study it was found that production, production costs, receipts and income received by non-diversified fishermen and diversified fishermen were very much different, this was because the receipts and income of diversified fishermen were greater than non-diversified fishermen (Yolanda, et al, 2013).

2. IMPLEMENTATION METHOD

2.1 Research methods

The research method used is a case study. In case studies, the research to be studied is more directed or specific and does not apply in general. According to Hanafie (2010), this method is limited by certain cases, locations, places, and times and cannot be concluded in certain areas or other cases.

2.2 Research Area Determination Method

This research was conducted in the VillageCapeRejo with mud crab farmers as the study population. The method of taking the location is by purposive method, which is a technique for determining research samples with certain considerations that aim to make the data obtained later be more representative, namely Tanjung Rejo Village with the reason that this area is one of the potential places for the development of mangrove crab ponds. .

2.3 Sampling Method

The population in this sampling is all pond farmers who cultivate mangrove crabs, a total of 19 farmers in the village.CapeRejo, Percut Sei Tuan District. The method of determining the sample was carried out using the saturated/census sample method, namely by taking the entire population as a sample without regard to strata, because according to Sugiono (2010) if the population is less than 30, then the entire population is used as a sample.

2.4 Method of collecting data

The data collected in this study are primary data and secondary data. Primary data were obtained from direct observation at the research location and interviews with mud crab farmers using a list of questions that had been prepared beforehand. Secondary data collection carried out in this study was from the literature, related agencies or government agencies that have links with pond business.

1. Primary Data, data obtained directly from the source, namely the research site. Primary data was obtained by means of surveys and interviews with a guide to the questionnaire, in addition to interviews using documents by way of observation.

2. The secondary data collected was obtained from various related agencies, such as the Central Bureau of Statistics and the Regional Government at the research location. In addition, other supporting data were also obtained via the internet, literature and journals relevant to this research.

2.5 Data analysis method

The formulation of the problem (1) is analyzed using the Cobb Douglas function. This analysis is used to find out how the influence of production level variables is related to the variables of pond area, seed, feed, and labor, using the formula:

$$Y = aX^{\beta}$$

$$Y = aX_1^{\beta_1} \cdot X_2^{\beta_2} \cdot X_3^{\beta_3} \cdot X_4^{\beta_4} \cdot e \text{ (Soekartawi, 2001)}$$

To facilitate the estimation of the above equation, the equation is converted into a multiple linear form by logarithm of the equation, so that it becomes

$$\log Y = \log a + \beta_1 \log X_1 + \beta_2 \log X_2 + \beta_3 \log X_3 + \beta_4 \log X_4 + e$$

Information :

Y = Mangrove crab pond business production periodharvest (Kg/Ha)

a = constant

X1 = Area of ponds used in one production (Ha)

X2 = seed used in one production (tail)

X3 = feed used in one production (Kg)

X4 = Amount of labor used in one production (HK)

e = error

β_1, \dots, β_5 = Elasticity value

To test whether these variables affect simultaneously, the F test formula is used, namely by using the formula:

$$F_{hitung} = \frac{jk_{reg/k} - 1}{jk_{\frac{sis}{n}} - 1}$$

Information :

jk reg = Sum of the squares of the regression

If left = Number of variables

N = Number of samples

K = Number of variables

1 = Constant Number

With decision criteria:

H_0 = There is no effect of the use of the variable production factors of pond area, seeds, feed, and labor) on the production of mangrove crab ponds.

H_1 = There is an effect of the use of production factor variables (pond area, seeds, feed, and labor) on the production of mud crab ponds.

If $>$ then rejected accepted 95% confidence level $F_{hitung} > F_{tabel} H_0 H_1$

If $<=$ then accepted rejected 95% confidence level $F_{hitung} < F_{tabel} H_0 H_1$

To test these four variables partially affect the production level of mangrove crab ponds,



the t test is used, namely:

$$t_{hitung} = \frac{b_i}{se(b_i)}$$

Where :

- b_i = Regression coefficient
- Se = Standard Deviation (standard deviation)
- If $t_{hitung} > t_{tabel}$ then accepted H_0 ditolak H_1

If $t_{hitung} < t_{tabel}$ then accepted is H_1

The second problem formulation is analyzed using a simple tabulation method, namely using the income analysis formula based on:

$$Pd = TR - TC$$

Information :

- Pd : Income
- TR : Total receipts
- tc : Total production costs

Revenue from the crab pond business, namely the production of mangrove crabs multiplied by the price of mud crabs, with the following formula:

$$TR = Q \cdot P$$

Information :

- TR = Total Revenue (Rp)
- Q = Amount of Production produced (Kg)
- P = Selling Price (Rp/kg)

The total cost of the mangrove crab pond business is the sum of the total costs in the pond business activities per season:

$$TC = TFC + TVC$$

Information :

- TC = Total Cost (Rp)
- TFC = Total Fixed Costs (Rp)
- TVC = Total Variable Costs

3. RESULTS AND DISCUSSION

3.1 Effect of Production Factors on Production

From the results of research in the field it can be seen that the production produced by farmers in the study area varies, this is due to the different levels of ability of the farmers. It is also influenced by production factor variables such as pond area, seeds, feed, and labor. Factors of production are production inputs such as pond area, seeds, feed, and labor. The term factor of production is often also called the sacrifice of production, because production factors or inputs are sacrificed to produce products. Factors of production are factors that are absolutely necessary in production consisting of 4 components namely land, labor, capital and management. While the means of production are the means needed in the production process consisting of: pond area, seeds, feed and labor. All of the above will ultimately determine the output of a farming business. Based on the results of research in the field, it will be known how the influence of production factors on the production of Mangrove Crab Farms. The following are the results of Douglas cob analysis

which has been regressed between production factors on the production of mangrove crab ponds in the study area.

Table 1 Regression Analysis Results

Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
	B	std. Error	Betas		
(Constant)	-176,515	50,712		-3,481	,003
Land area	37,231	12,169	34,578	4,033	,004
Number of Seeds	36,629	11,794	32,152	3.106	,006
Feed Amount	-1,630	4,567	-1,422	-,357	,726
Kindergarten number	-2,381	6,387	-2,632	-,591	,261

Source: Primary Data Processed, 2022

From table 1 it can be seen that the regression function equation is as follows:

$$Y = \text{Log} + b_1 \text{Log } X_1 + b_2 \text{Log } X_2 + b_3 \text{Log } X_3 + b_4 \text{Log } X_4 + e_{a_0}$$

$$Y = \text{Log} - 176,515 + 37,231 X_1 + 36,629 X_2 - 1,630 X_3 - 2,381 X_4$$

Then the Cobb-Douglas equation of the above equation is:

$$Y = 10^{-176,515} \cdot X_1^{37,231} \cdot X_2^{36,629} \cdot X_3^{-1,630} \cdot X_4^{-2,381}$$

3.2 Coefficient of Determination

The coefficient of determination is one of the regression tests that functions to find out how close the relationship between the independent variable and the dependent variable is that the regression coefficient value can be seen in the R Square column as in the following table:

Table 2 Determination Coefficient Value

Regression Statistics	
multiple R	0.885a
R Square	0.784
Adjusted R Square	0.733
Standard Error	0.16707
Observations	19

Source: Primary Data Processed, 2022

Based on the results of data processing through SPSS for the coefficient of determination (R²) in the table above, the R Square value is 0,784 which means it shows that the production of pond business is influenced by the area of land, seeds, feed and labor that is equal to 78.4%, while the remaining 21.6% is influenced by other factors outside the variables studied.

3.3 Simultaneous Test or Together (Test F)

Simultaneous test (Test F) is a test used to determine the significance of the contribution between the independent variables as a whole and the dependent variable. To find out how the contribution of the independent and dependent variables to the mangrove crab pond business can be seen in the table below.



Table 3 Value of Test Results - F Based on Regression Analysis

Model		Sum of Squares	Df	MeanSquare	F	Sig.
1	Regression	1,723	4	,431	15,433	,000b
	residual	,474	15	,028		
	Total	2,198	19			

Source: Primary Data Processed, 2022.

From the results of Table 3 based on the simultaneous test it is known that a significant value is $0.000 < 0.05$ at the 95% confidence level. From the SPSS calculation results above, it shows that H_0 is rejected and H_1 is accepted. That is, simultaneously there is influence between land area, seeds, feed and labor on mangrove crab production.

3.4 Partial Testing (t test)

This partial test is intended to determine whether each independent variable has an influence on the dependent variable. In this study, a partial test is used to determine how much pond area, seeds, feed and labor partially influence the production of mangrove crabs. Mud crab ponds in Tanjung Rejo Village. The results of the analysis can be seen in the following table:

Table 4 Regression Coefficient Effect of Using Production Factors

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	std. Error	Betas		
(Constant)	-176,515	50,712		-3,481	,003
Land area	37,231	12,169	34,578	4,033	,004
Number of Seeds	36,629	11,794	32,152	3.106	,006
Feed Amount	-1,630	4,567	-1,422	-,357	,726
Kindergarten number	-2,381	6,387	-2,632	-,591	,261

Source: Primary Data Processed, 2022.

The results of calculations using the SPSS program can be seen how the relationship between the independent variables (land area, seeds, feed and labor) one by one with the dependent variable production of Mangrove Crab Farms, obtained a T table value of 2.131 with a 95% confidence level. The following is an explanation of the relationship between production factors and the production of mud crab ponds.

3.5 Production cost

The production costs of the mangrove crab enlargement business are the costs incurred at the time business implementation. The production costs of the mud crab enlargement business are divided into two, namely, fixed costs and variable costs. Fixed costs are costs incurred by business actors that are not affected by the size of the production of the mud crab growing business. Variable costs are costs incurred by business actors that are affected by the size of the production amount. The following are the components of production costs incurred by the mud crab enlargement business in the study area.

Table 5 IncomeMud crab enlargement businessPer Production Season

Description	Amount (IDR)
Reception	20,004,736.8
Total cost	7,500,833.3
Income	12,503,903.5

Primary Data Source processed in 2021

Data From table 5 above acceptance mud crab enlargement business Rp. 20,004,736.8 and the total cost of farmers is IDR 7,500,833.3. Hence income mud crab enlargement business in the research area, namely Rp. 12,503,903.5. with a production period of 3 months

4. CONCLUSION

Based on the results of research that has been conducted on mud crab farmers in Tanjung Rejo Village, several conclusions can be drawn as follows:

1. From the results of the partial test (t test) the results of the variable land area and seeds significantly influence the production of mud crabs while the feed and labor variables do not significantly affect the production of mud crabs.
2. Income mud crab enlargement business in the research area is Rp. 12,503,903.5. with a production period of 3 months. Where is the reception mud crab enlargement business Rp. 20,004,736.9 and a total cost of Rp. 11,145,570.16.



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