



Effect of Land Area, Production Amount, Cost and Price on the Income of Vaname Shrimp Pond Farmers in Malaha Village, Samaturu District, Kolaka Regency

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Abstract

This study aims to determine the effect of land area, amount of production, cost and price partially and simultaneously on the income of vaname shrimp pond farmers in Malaha Village, Samaturu District, Kolaka Regency. This research method uses quantitative methods and data analysis methods using multiple linear regression analysis. The results of the study in the partial test showed that Land Area had a positive and partially significant effect on the Income of Pond Farmers with a value of $T_{\text{calculate}} (5,154) > T_{\text{table}} (2,030)$, Total Production had a positive and significant partial effect on the Income of Pond Farmers with a value of $T_{\text{calculate}} (8,802) > T_{\text{table}} (2,030)$, Cost had a negative and partially significant effect on the Income of Pond Farmers with a value of $T_{\text{calculate}} (2,837) > T_{\text{table}} (2,030)$, and Price has a positive and partially significant effect on the Income of Pond Farmers with the value of $T_{\text{calculate}} (3,094) > T_{\text{table}} (2,030)$. Meanwhile, the simultaneous test shows that Land Area, Production Amount, Cost, and Price have a significant effect simultaneously or together on the Income of Pond Farmers with a value of $F_{\text{calculate}} (119.172) > F_{\text{table}} (2.63)$.

Keywords: Pond Farmer Income, Land Area, Production Amount, Cost, Price

Introduction

Southeast Sulawesi is one of the provinces in Indonesia that has very promising marine and fisheries development potential. Data shows that Southeast Sulawesi province has a water area of 114,879 Km² or 70% of the total area of Southeast Sulawesi Province which reaches 153,019 Km². The length of the coastline is 4,106.98 Km. There are 2 large islands (Buton Island and Muna Island), 71 bays, 540 small islands (115 inhabited pieces) and several straits

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and headlands that can support the business development of the marine and fisheries sector including aquaculture (Isamu et al., 2018).

According to Isamu et al. (2018) Kolaka Regency is one of the most important aquaculture development centers in Southeast Sulawesi Province, especially in pond shrimp production. Kolaka District residents recently changed their commodity type to Vaname shrimp farmer after previously becoming tiger shrimp farmer and/or milkfish farmer. One of the areas that cultivates fisheries is Malaha Village, Samaturu District.

Malaha Village is one of the villages in Samaturu District that cultivates simple ponds. Because the geographical location of the village is not too far from the sea, this village is a potential village for fish farming. The livelihoods of Malaha villagers are diverse, but most of them work as farmers, both clove farmers, vegetable farmers, and pond farmers. In this village, many people live from fish pond management. There are 40 fish farmers in Malha Village, the average type of fishery cultivated is Vaname Shrimp.

Malaha Village has the most pond farmers, namely 40 farmers with different amounts of production each year. According to Malha Village Profile Data, shrimp production in 2018: 62 tons, 2019: 30 tons, 2020: 26 tons, 2021: 55 tons, and 2022: 42 tons. In Malaha Village, in the information of one of the pond farmers, the development of pond farmers' income is difficult to determine, often pond farmers get high, low, or even no income at all. This circumstance depends on several factors that directly affect the income of the farmer himself.

According to Utomo (2012), the life of shrimp farmers (ponds) in general is still colored by poverty and financial insecurity due to the difficulties faced by their families. Shrimp farmers are still vulnerable to problems that can lead to poverty. These problems include the lack of capital owned, poor shrimp farming procedures, so that many shrimp die or can be called crop failure. Until the processing and marketing of cultivated products. This does not provide welfare for pond farmers (Sutoyo et al., 2022).

In today's economic life, rising at the regional and national and even international levels, the issue of income has become a serious discussion from various parties, because income is one of the economic indicators to measure prosperity and justice (Suhartini et al., 2021). Speaking of income, it is actually very necessary to know about the benefits of income itself, increasing one's income will create prosperity. The main purpose in trading is to obtain opinions, income obtained from activities carried out to make a profit (Dinni, 2019). The welfare of farmers can be improved if income has increased enough to meet their basic needs (Rahmadani, 2017).

In this study, researchers took several factors that affect income, namely land area, amount of production, costs and prices. The difference in variables in this study with previous research is in the type of pond that is careful, in previous studies the type of pond studied was an intensive pond while in this study it was a simple pond. Based on the description above, the author is interested in examining several factors that affect the income of pond farmers in Malaha Village by raising the research title "The Effect of Land Area, Total Production, Cost

and Price on the Income of Vaname Shrimp Pond Farmers in Malaha Village, Samaturu District, Kolaka Regency".

Literature Review

1. Pond Farmer's Income

According to Hernanto (1994), the level of income from agricultural activities depends on several influencing factors such as land area, production level, corporate identity, planting, and efficiency of labor use. In agriculture, farmers hope that there will be an increase in income to be able to cover their daily needs (Haryadi, 2019). Farmer income is the difference between revenue and all expenses, or in other words income includes gross income or total receipts and net income. Gross income or total receipts is the value of production of agricultural commodities as a whole before deducting costs. To calculate the income of farmers can be used the following formula:

$$Pd = TR - TC$$

Where:

Pd : Farmer's Income

TR : Total Receipts

TC : Total Cost

According to Anggraini (2019) revenue can be measured by indicators: Sales Results. Sales activities are additional activities from purchases that allow transactions. The total sales obtained by farmers are determined by several factors, namely the quality of results, product selling prices, product management and marketing systems as well as the market structure faced

2. Land Area

Land area is the total area cultivated, land area guarantees the amount or yield obtained by farmers. In an agricultural country like Indonesia, land is the most important factor of production compared to other factors. The area of agricultural land affects the scope of management which ultimately affects the efficiency of management carried out (Silaen, 2019). According to Yasin & Nurjaya (2021), land can be measured by indicators: Land Area. The land area in question is the large area of land managed by pond farmers to produce production.

3. Production Amount

According to Kasmin et al (2020), the amount of production is an indicator of the success of a farming activity. A farming activity will be said to be successful if the amount of production produced can provide revenue greater than the production costs incurred. . According to Isamu et al (2018) Total Production can be measured by an indicator of the amount of production of vaname shrimp cultivation expressed in kilograms (kg).

4. Cost

Cost is one aspect that can affect revenue. If the cost is greater than the income, the farmer will experience a loss, but if it is smaller than the income, the farmer will experience a profit (Arrasyid, 2021). The costs incurred by pond farmers are usually divided into two,

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namely, fixed costs and variable costs. To calculate the costs incurred by farmers, the following formula can be used:

$$TC = FC + VC$$

Where:

TC : Total Cost

FC : Fixed Cost

VC : Variable Cost

5. Price

The effect of price on income is an important factor for farmers, if the selling price of the products produced by farmers is high, then automatically the farmer's income will increase, and this situation can facilitate the daily needs of farmers. Conversely, if the price of products produced by farmers is low, then farmers' income will also decrease and farmers will find it difficult to meet their needs (Silaen, 2019). According to K. Sari (2022), the price indicators that characterize prices are: Selling Price. The price given by pond farmers for their products can be reached by consumers. Appropriate and affordable prices will certainly be a consideration for consumers to buy their products.

Research Method

The research method used is quantitative research method. The research location that will be used as a research site is in Malaha Village, Samaturu District, Kolaka Regency. This research activity was carried out for 2 months, namely May and June 2023. The operation of this study consists of two variables, namely the independent variable and the dependent variable. The independent variables in this study are land area, amount of production, cost and price while the dependent variable in this study is the income of pond farmers. The population in this study was 40 pond farmers in Malha Village. In this study using the census method, which takes the entire population of the study sample. So that the sample in this study is all pond farmers in Malaha Village, Samaturu District, Kolaka Regency as many as 40 pond farmers. The primary data in this study are observations and questionnaires while secondary data can be obtained from various sources such as the Central Bureau of Statistics (BPS), books, reports, journals, and others. Data collection techniques in this study are observation, questionnaires, and documentation to pond farmers about land area, amount of production, costs and prices as well as the income they get. The analysis technique used in this study is Multiple Regression Analysis.

Multiple linear regression analysis in this study to obtain more targeted results, the researchers used the help of the Microsoft Excel program and the SPSS (*Statistical Package for the Social Sciens*) application. The stages of hypothesis testing using multiple linear regression are taken by determining the regression equation (Amril et al., 2021):

$$Y = a + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + e$$

For the estimation of regression coefficients, it is transformed into a linear form using natural logarithms (Ln) to calculate the elasticity value of each independent variable to the dependent variable in the model so that the following equation is obtained:

$$\text{Ln_Y} = \text{Ln_a} + \text{Ln_X}_1 + \text{Ln_X}_2 + \text{Ln_X}_3 + \text{Ln_X}_4$$

Keterangan :

- Y = Causeway Farmer's Income
a = Constant
b = Regression Coefficient
X₁ = Land Area
X₂ = Production Amount
X₃ = Cost
X₄ = Price
e = error / residual

The use of multiple linear regression analysis methods requires classical assumptions that must be statistically satisfied. These classical assumptions include the assumptions of normality, multicollinearity, and heteroscedasticity. Test the hypothesis in this study using F test (Simultaneous), T test (Partial), and R² test (Coefficient of Determination).

Result/Findings

Description of Research Variables

1. Land Area (X1)

Table 1. Land Area of Malaha Village, Samaturu District (2023)

Land Area (Are)	Frequency	Percentage (%)
100-150	22	55
160-200	18	45
Sum	40	100%

Based on the table above, the distribution of respondents based on land area shows the highest number, namely land area of 100-150 acres with a percentage of 55% compared to farmers who have a land area of 160-200 acres with a total of 6 farmers with a percentage of 45%. This shows that the average farmer uses large areas of land in the production process of cultivated products. With the area of land owned, you can get maximum production results

2. Production Amount (X2)

Table 2. Production Amount of Malaha Village Pond Farmers (2023)

Total Production (kg)	Frequency	Percentage (%)
160-175	15	37,5
180-200	17	42,5
210-250	8	20
Sum	40	100%

The table above shows the distribution of respondents based on production results in one harvest, with the highest number being as many as 17 people producing as much as 180-

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200 Kg. This shows that the level of farmer welfare is quite good because the production obtained by farmers is between 180-200 Kg. The amount of production is the most awaited thing by pond farmers, what they hope is an increase in the amount of production in each harvest period. When the amount of shrimp production is maximum, the income that will be obtained by farmers will also be maximum or in other words will get a lot of profit.

3. Cost (X3)

Table 3. Malaha Village Pond Farmer Cost (2023)

Cost (Rp)	Frequency	Percentage (%)
Rp 3.584.600 – Rp 4.527.266	16	40
Rp 4.603.762 – Rp 4.804.066	14	35
Rp 5.118.847 – Rp 6.166.533	10	25
Sum	40	100%

The table above shows the distribution of respondents based on farmers' costs, the costs in question are feed costs, fertilizer costs, seed costs, pesticide costs, and depreciation costs of tools used by farmers to increase their production yields. With the highest value of IDR 3,548,600 – IDR 4,527,266 with a frequency of 16 people. The cost they incurred was seen from the land area.

4. Price (X4)

Table 4. Selling Price of Malaha Village Pond Farmers (2023)

Selling Price (Rp)	Frequency	Percentage (%)
Rp 45.000 – Rp 48.000	35	87,5
Rp 49.000 – Rp 55.000	5	12,5
Sum	40	100%

In the table above, it can be seen that the price offered varies depending on the collector. The most shrimp price is set at Rp 45,000 – Rp 48,000, which is 35 farmers with a percentage of 87.5%. This shows that the price of the shrimp they sell at that price is because they sell shrimp with shrimp collectors that match the quality of the shrimp.

5. Income (Y)

Table 5. Income of Malaha Village Pond Farmers (2023)

Revenue (Rp)	Frequency	Percentage (%)
Rp 8.500.000 – Rp 9.500.000	29	72,5
Rp 10.000.000 – Rp 12.000.000	11	27,5
Sum	40	100%

Based on the table above, it shows that the distribution of respondents based on farmers' income in one harvest period is farmers with the most income of Rp 8,500,000 - Rp 9,500,000 with a frequency of 29 people with a percentage of 72.5% compared to farmers with an income of Rp 10,000,000 - Rp 12,000,000 with a frequency of 11 people and a percentage of 27.5%.

Multiple Linier Regression Analysis

Normality Test

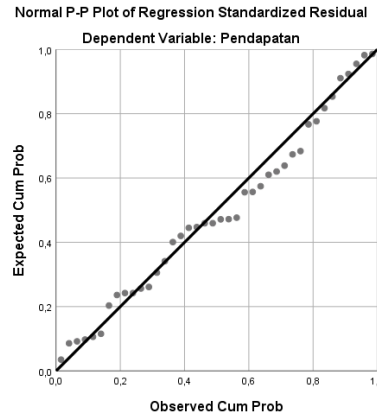


Figure 1. Normality Test

Based on the normal probability plot graph, it shows that the points on the graph seem to follow the diagonal line, so that based on the graph, the data used is normally distributed so that the normality test is met

Multicollinearity Test

Table 6. Multicollinearity Test

Collinearity Statistics	
Tolerance	VIF
,250	4,004
,234	4,272
,799	1,036
,177	5,287

Based on the table above, it can be known that the *Tolerance value* is more than 0.1 for each independent variable (land area, amount of production, cost and price) and the VIF value is less than 10, it is stated that there are no symptoms of multicollinearity

Heterokedasticity Test

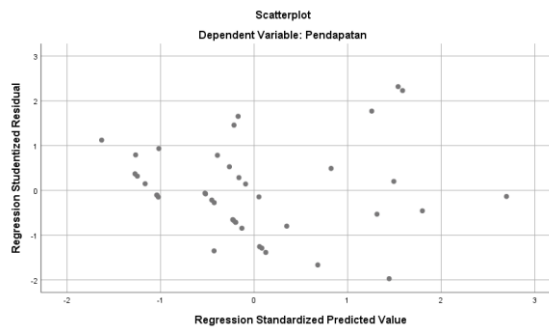


Figure 2. Heterokedasticity Test

Based on the figure above, it can be seen that the data spreads randomly and does not stack up to form a clear pattern but is scattered and above 0 and below 0, so that heterokedasticity does not occur.

After all assumptions are met, multiple linear regression analysis is used to obtain the influence of independent variables (land area, amount of production, cost and price) on the

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dependent variable (income). In data processing using multiple linear regression analysis, several stages are carried out to look for relationships between independent and dependent variables. Based on the results of data processing using SPSS 25 software, the following results are obtained.

Table 7. Multiple Linier Regression Coefficients^a

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
	B	Std. Error	Beta			Tolerance	VIF
1 (Constant)	9,454	1,373		6,884	,000		
Land Area	,769	,072	,691	5,154	,003	,250	4,004
Production Amount	,690	,078	,804	8,802	,000	,234	4,272
Cost	-,125	,262	-,067	-2,837	,031	,799	1,036
Price	,411	,038	,385	3,094	,006	,177	5,287

a. Dependent Variable: Income

From the results of multiple linear regression tests for the variables of land area (X1), amount of production (X2), cost (X3), and price (X4) to income (Y) are as follows:

$$Y = 9,454 + 0,769X_1 + 0,690X_2 + 0,125X_3 + 0,411X_4 + e$$

From the regression equation above, it can be explained as follows: A constant value of 9.454 means that if the land area, amount of production, cost and price are 0 or constant then the income value is 9.454. The land area value of 0.769 states that every 1% increase in land area causes an increase in the income of pond farmers by 76%. The total production value of 0.690 states that every 1% increase in the amount of production causes an increase in the income of pond farmers by 69%. The cost value of -0.125 states that an additional 1% of the cost causes a decrease in the income of pond farmers by 12%. The price value of 0.411 states that a 1% increase in price causes a 41% increase in the income of pond farmers.

Hypothesis Test

Test T (Partial)

Table 8. Test T (Partial)

Model	t	sig
Land	5,154	,003
Production amount	8,802	,000
Cost	2,837	-,031
Price	3,094	,006

The value of t_{table} with significance $0.5/2 = 0.025$ with $df = n-k-1$ (n = number of samples and k = number of independent variables) then obtained $df = 40-4-1 = 35$ then obtained t_{table} of 2,030.

The calculated value of the Land Area variable (X1) is 5.154 with a significant level of 0.003. Because the value of $T_{calculate}$ is greater than T_{table} , which is $(5.154 > 2.030)$ and the significant value is $0.00 < 0.05$. So H_0 is rejected and H_a is accepted. So that the variable Land

Area affects the income of vaname shrimp pond farmers partially in Malaha Village, Samaturu District.

The calculated value of the Production Amount variable (X2) is 8.802 with a significant level of 0.000. Because the value of $T_{\text{calculate}}$ is greater than T_{table} , which is $(8.802 > 2.030)$ and the significant value is $0.00 > 0.05$. So H_0 is rejected and H_a is accepted. So that the variable Production Amount affects the income of vaname shrimp pond farmers partially in Malaha Village, Samaturu District.

The calculated value of the Cost variable (X3) is 2.837 with a significant level of 0.031. Because the value of $T_{\text{calculate}}$ is greater than T_{table} , which is $(2.837 > 2.030)$ and the significant value is $0.03 > 0.05$. So H_0 is rejected and H_a is accepted. So that the variable cost affects the income of vaname shrimp pond farmers partially in Malaha Village, Samaturu District

The calculated value of the Price variable is 3.094 with a significant level of 0.006. Because $T_{\text{calculate}}$ is greater than T_{table} , which is $(3.094 > 2.030)$ and a significant value of $0.00 > 0.05$. So H_0 is rejected and H_a is accepted. So that the price variable affects the income of vaname shrimp pond farmers partially in Malaha Village, Samaturu District.

F Test (Simultaneous)

Tabel 9. F Test (Simultaneous)

ANOVA ^a					
Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	,387	4	,097	119,172	,000 ^b
Residual	,028	35	,001		
Total	,415	39			

a. Dependent Variable: Income

b. Predictors: (Constant), Price, Land Area, Production Amount, Coxt

Based on the table above, it can be known that the $F_{\text{calculate}}$ value is 119.172 and the significant value is 0.000. It can be known that F_{table} is 2.63. Then the $F_{\text{calculate}}$ value $> F_{\text{table}}$ $(119.172 > 2.63)$ and the significant value $0.00 < 0.05$. It is concluded H_0 was rejected and H_a was accepted.

Test R^2 (Coefficient of Determination)

Tabel 10. Test R^2 (Coefficient of Determination)

Model Summary ^b					
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	,900 ^a	,810	,788	477186,807	1,590

a. Predictors: (Constant), Price, Land Area, Cost, Production Amount

b. Dependent Variable: Income

Based on the table above, R^2 has a value of 0.810. This means that 81% of Vaname Shrimp Pond Farmer Income can be explained by independent variables namely Land Area, Production Amount, Cost and Price. While the remaining 19% was explained by other variables outside the variables described in this study.

Discussion

The effect of land area on the income of vaname shrimp pond farmers

The value of land area in multiple linear regression analysis of 0.769 states that every 1% increase in land area causes an increase in pond farmers' income by 76%, the calculated value of the variable Land Area (X1) is 5.154 with a significant level of 0.003. Because the value of $T_{\text{calculate}}$ is greater than T_{table} , which is $(5.154 > 2.030)$ and the significant value is $0.00 < 0.05$. So H_0 is rejected and H_a is accepted. So that the variable Land Area affects the income of pond farmers partially in Malaha Village, Samaturu District.

This is because if the area of pond land is getting wider or increasing, the greater the income of pond farmers and the opportunities obtained can increase the productivity of production products besides that resources must also be maintained, especially water media, aspects of soil fertility to increase high productivity. In accordance with Hikmawati's research (2018) on the Effect of Land Area, Capital and Labor on the Income of Shrimp Pond Farmers in Tamuku Village, Bone-Bone District, North Luwu Regency, which states that land area affects the income of pond farmers.

The effect of the production amount on the income of vaname shrimp pond farmers

The value of the production amount in the multiple linear regression analysis of 0.690 states that every 1% increase in the production amount causes an increase in the income of pond farmers by 69%, the calculated value of the variable Total Production (X2) is 8.802 with a significant level of 0.000. Because the value of $T_{\text{calculate}}$ is greater than T_{table} , which is $(8.802 > 2.030)$ and the significant value is $0.00 > 0.05$. So H_0 is rejected and H_a is accepted. So that the variable Production Amount affects the income of vaname shrimp pond farmers partially in Malaha Village, Samaturu District.

The results of this study are in accordance with previous research conducted by Nursakinah (2020) on the Effect of Production Amount, Rice Quality and Price on Farmer Income in Dua Koto District, Pasaman Regency. Which states that Total Production has a positive and significant effect on farmers' income. According to Laelasari (2018), the amount of production is the number of results from production activities. If the demand for the amount of production is high, the price at the farmer level will also be high, so that at the same cost farmers will get a higher income. This shows that the amount of production is related to farmers' income.

The effect of cost on the income of vaname shrimp pond farmers

The cost value in multiple linear regression analysis of -0.125 states that the addition of 1% cost causes a decrease in the income of pond farmers by 12%, the calculated value in the variable cost (X3) is 2.837 with a significant level of 0.031. Because the $T_{\text{calculate}}$ value is greater than T_{table} , which is $(2.837 > 2.030)$ and the significant value is $0.03 < 0.05$. So H_0 is rejected and H_a is accepted. So that the variable cost affects the income of vaname shrimp pond farmers partially in Malaha Village, Samaturu District.

The results of this study are in accordance with previous research conducted by Tuti Laelasari (2018) on the Effect of Production Costs, Production Amounts, and Selling Prices on Farmer Income in Saleh Jaya Village, Banyuasin. Which states that costs affect farmers'

income. Cost is one aspect that can affect revenue. If the cost is greater than the income, the farmer will experience a loss, but if it is smaller than the income, the farmer will experience a profit (Arrasyid, 2021).

The effect of price on the income of vaname shrimp pond farmers

The price value in the multiple linear regression analysis of 0.411 states that an increase of 1% in price causes an increase in the income of pond farmers by 41%, the calculated value in the Price variable is 3.094 with a significant level of 0.006. Because $T_{\text{calculate}}$ is greater than T_{table} , which is $(3.094 > 2.030)$ and a significant value of $0.00 > 0.05$. So H_0 is rejected and H_a is accepted. So that the price variable affects the income of vaname shrimp pond farmers partially in Malaha Village, Samaturu District.

The results of this study are in accordance with previous research conducted by Irsan and Khairil Anwar (2019) on the Effect of Prices on the Income of Milkfish Pond Farmers in Bantayan Village, which stated that prices have a partial or significant influence on the income of pond farmers. The effect of prices on income is one of the important factors for farmers, if the selling price of production produced by farmers is high, then automatically the income obtained by farmers will also increase, and this situation can make it easier for farmers to be able to meet their daily needs. But on the contrary, if the price of production produced by farmers is low, the income obtained by farmers will also decrease and make it difficult for farmers to meet their needs (Silaen, 2019)

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The partial test results showed that three variables from four independent variables had a significant influence, namely Land Area (X_1), Production Amount (X_2), and Price (X_4) had a significant effect on the income of Vaname Shrimp Pond Farmers (Y) partially. It can be seen from the results of the T test that the three independent variables used in this study have a partial influence on income because the significant value is less than 0.05 and the calculated value is greater than the T_{table} value which is 2.030. While one variable out of four independent variables has no partial effect, namely Cost (X_3) because the significant value is more than 0.05 and the $T_{\text{calculate}}$ value is smaller than the T_{table} value.

While the Simultaneous Test or F Test shows that independent variables simultaneously or together have a positive effect on the income of Vaname Shrimp Pond Farmers. This is because $F_{\text{calculate}} (119.172) > F_{\text{table}} (2.63)$ and a significant value of $0.00 < 0.05$. This means that land area, amount of production, cost and price have a positive effect on the income of Vaname Shrimp Pond Farmers in Malaha Village, Samaturu District.

Conclusion

Based on the results of research that has been conducted on the influence of land area, amount of production, costs and prices on the income of pond farmers in Malaha Village, Samaturu District, Kolaka Regency, it can be concluded that: Partially, the variables Land Area, Production Amount and Price have a positive and significant effect on the income of

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vaname shrimp pond farmers, while the Cost variable has a negative and significant effect on the income of vaname shrimp pond farmers. And simultaneously Land Area, Production Amount, Cost, and Price have a positive and significant effect on the Income of Vaname Shrimp Pond Farmers. Further researchers are expected to develop this research by examining other factors that can affect the income of pond farmers. Of course, there are still other factors that affect the income of vaname shrimp pond farmers.

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