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Analysis of Factors Affecting Income of Laying Chicken Breeds in Langkat District, North Sumatra

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Abstract: *This study aims to analyze the effect of factors on the income of broiler breeding business in North Sumatra Regency. The data used are primary data and secondary data with 67 respondents. Data collection techniques are conducted by interview, observation, and questionnaire. The results of this study indicate that the number of seedlings, the amount of feed, the area of the cage, and the workforce have a positive and significant effect on the income of laying chicken eggs in Langkat District, North Sumatra. Vaccine and vitamin variables have a negative and not significant effect on laying chicken egg income in Langkat District, North Sumatra. Based on the results of the Cobb-douglass income function, it was found that the factors of income of the number of DOC seeds, the amount of feed, the area of the cage and labor had a positive influence on laying chicken egg income. Whereas for the factor of income of vaccine costs and the cost of vitamins has a negative influence on the income of laying chicken eggs.*

Keywords: *income, the number of seedlings, the amount of feed, the area of the cage, the workforce*

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I. Introduction

The population of laying hens that are high in North Sumatra Province shows that North Sumatra Province is a province with a very promising egg income potential from laying hens. From year to year the income of chicken eggs in the Province of North Sumatra is always increasing, this indicates that the laying chicken breeding business in North Sumatra Province is developing. If the income of chicken eggs can be increased again, North Sumatra can become a sector of egg income bases in Indonesia.

The livestock sub-sector has an increasingly strategic role in fulfilling consumption of animal protein. This is due to public awareness of nutrition. The prospect of laying chicken breeding business in Indonesia is considered very good from the domestic and foreign markets.

Laying hens are one of the livestock businesses that have a great opportunity because of the fairly good market potential in the country. The people who are engaged in laying chicken breeding business are 82.4%. Livestock farming needs to get attention and encouragement to continue to develop its business so that it can contribute, not only to farmers and consumers but also to the national economy (Halim et al, 2007).

Future prospects for agribusiness development for laying hens can be seen from the supply side (demand side) and demand side. Viewed from the demand side of race chicken eggs, in the structure of egg consumption and the nature of demand that is very in accordance with future developments. If income increases, then egg consumption will also increase.

Table 1 Income of Ras Eggs per Regency in North Sumatra Province 2016 (Ton)

No	Regency/City	Egg Income
1	N i a s	-
2	Mandailing Natal	10,842
3	Tapanuli Selatan	-
4	Tapanuli Tengah	3,136
5	Tapanuli Utara	-
6	Toba Samosir	-
7	Labuhanbatu	199,826
8	A s a h a n	24.864,000
9	Simalungun	1 .306,932
10	D a i r i	7,168
11	K a r o	-
12	Deli Serdang	61 .364,325
13	L a n g k a t	31 .988,777

14	Nias Selatan		193,07
15	Humbang Hasundutan		6,362
16	Pakpak Bharat		-
17	Samosir		-
18	Serdang Bedagai		10 .318,721
19	Batu Bara		177,274
20	Padang Lawas Utara		1,676
21	Padang Lawas		-
22	Labuhanbatu Selatan		1 .344,000
23	Labuhanbatu Utara		-
24	Nias Utara		-
25	Nias Barat		27,776
	Kota		
26	S i b o l g a		-
27	Tanjungbalai		-
28	Pematangsiantar		-
29	Tebing Tinggi		-
30	M e d a n		555,52
31	B i n j a i		9 .017,102
32	Padangsidimpuan		-
33	Gunungsitoli		97,108
	Sumatera Utara	**2016**	**141 .483,61**
		2015	**136 .258,10**
		2014	**132 .949,22**
		2013	**140 .710,63**

Source: Livestock Service Office of North Sumatra Province 2017

The Province of North Sumatra contributed to the productivity of chicken eggs at 6.29% of National income. Langkat Regency is a bordering region and part of North Sumatra Province which can be said to be the center of the largest race of chicken eggs and grouped apart from other cities such as Pematang Siantar, Kab. Deli Serdang and others which are also laying hens. Informed in Langkat Regency there are ± 78 Location of breeding cages for laying hens, which based on table 1.3 results can be explained that Langkat Regency is one of the largest chicken egg income centers after Deli Serdang and Asahan Regencies with egg income in 2016 amounting to 31,888,777 Tons.

Yunus (2009) explains that the combination of the use of income factors is cultivated in such a way that a certain amount produces maximum income and the highest profit. The availability of income factors does not mean that the productivity of eggs obtained by petenak will be high. But how farmers do their business efficiently is a very important effort. Farmers must be able to combine income factors such as cages, feed, labor, vaccines, drugs and vitamins, and seeds to obtain maximum income. The income factor is an input to produce output.

The total number of chicken eggs per district in Langkat only accounted for 20.61 percent of the income of North Sumatra province. When compared with Deli Serdang and Asahan Regencies, Langkat Subdistrict is included in the category of low-race chicken egg producers because the total income of chicken eggs in Asahan Regency is still below the average total income of broiler eggs in North Sumatra Province. the low egg income of Ras Chicken in Langkat District is one of them caused by the use of income factors that are not optimal. Income factors consist of seeds, feed, cage area, vaccines, drugs and vitamins, and labor.

II. Method

In this study the determination of respondents using census techniques. Census is the whole process of gathering, compiling, processing, and publishing data that is demographic, economical, and social in nature from a particular region or country and at a certain time (Sugiyono, 2005). This is because the total population of farmers is only 67 people, so that all members of the population become respondents.

The analysis used refers to the formulation of the research objectives. The purpose of this study was to determine what income factors influence the income of broiler egg breeding businesses in Langkat Regency and to determine the effect of income factors on the income of broiler egg breeding businesses in Langkat Regency.

To measure the magnitude of the influence of independent variables on dependent variables and predict dependent variables using independent variables multiple linear regression equations using the Ordinary Least Square (OLS) method are used. Gujarati (2006) defines regression analysis as a study of the relationship of one variable called a variable explained by one or two variables that explain. The first variable is also called the dependent variable and the second variable is also called the independent variable. If there are more than one independent variable, then the regression analysis is called multiple linear regression. It is called multiple because the influence of several independent variables will be imposed on the dependent variable. The multiple linear models used in this study are as follows:

$$Y=\lambda+\beta_1 X_1+\beta_2 X_2+\beta_3 X_3+\beta_4 X_4+\beta_5 X_5+\beta_6 X_6+\varepsilon \qquad (3.1)$$

Information :
Y = number of eggs produced by laying hens for one period
X1 = number of seeds
X2 = the amount of chicken feed given in one period
X3 = Extent of enclosure
X4 = the amount of vaccine costs used in one period
X5 = the amount of vitamin and drug costs in one period
X6 = number of labor λ = intercept
β1 - β6 = the amount of parameter to be predictedε = *disturbance term*

The difference in units and the magnitude of the independent variables, the regression equation must be made with the natural logarithmic model. So that the linear equation model used becomes:

$$LnY = \lambda + \beta_1 \ Ln\,X1 \ + \beta_2 \ Ln\,X2 \ + \beta_3 \ Ln\,X3 \ + \beta_4 \ Ln\,X4 \ + \beta_5 \ Ln\,X5 \ + \beta_6 \ Ln\,X6 \ + \ \varepsilon$$

The reason for choosing the natural logarithmic model (Ghozali, 2005) is: 1) Avoiding heterokesdatisitas, 2) Knowing the coefficients that show elasticity 3) Bringing the scale of data closer.

III. Research Results and Discussion

F Test

The F test basically shows that all the independent variables included in the model have a joint effect on the dependent variable. The entire independent variable is said to have a joint effect on the dependent variable if the value of Fcount is greater than the level of error.

Table 2 F Test

ANOVA[a]

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	25.934	6	4.322	68350.154	.000[b]
	Residual	.004	60	.000		
	Total	25.937	66			

a. Dependent Variable: Ln_Y1
b. Predictors: (Constant), Ln_X6, Ln_X3, Ln_X1, Ln_X4, Ln_X5, Ln_X2

Source: Primary Data Processed, 2019

Based on table 2, it can be explained that the significance value of F is 0,000. The significance value of the F test is smaller than 0.05 so that it can be concluded that H1 is accepted and H0 is rejected, meaning that the independent independent variable as a whole can be said to be significant. Thus, simultaneously or together the independent variables consisting of the number of DOC seeds (X1), the amount of feed (X2), the area of the cage (X3), the cost of vaccines (X4), the cost of vitamins (X5) and the amount of labor (X6) significant effect on the dependent variable of laying chicken income (Y).

R^2 Test

The coefficient of determination test is carried out to determine the proportion of the influence of independent variables on the dependent variable indicated by the coefficient of determination that has been adjusted and expressed in percentage. To find out the proportion of the influence of independent variables on the dependent variable can be in table 2.

Table 3 R^2 Test

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.966[a]	.984	.925	3.32751	2.321

a. Predictors: (Constant), Ln_X6, Ln_X3, Ln_X1, Ln_X4, Ln_X5, Ln_X2
b. Dependent Variable: Ln_Y1

Source: Primary Data Processed, 2019

The test results of the determination coefficient show the value of R2 from the regression model is 0.984. This shows that the ability of the independent variables together can explain the variance of the dependent variable at 98.40%. The determination of the coefficient of determination (R2) is 98.40%, meaning that the independent variables in this model, namely the number of DOC seeds (X1), amount of feed (X2), cage area (X3), vaccine costs (X4), vitamin costs (X5) and the number of workers (X6) is able to explain the variation of the dependent variable, namely the income n of laying chicken for 98.40% percent. While the remaining 1.60% is influenced by other variables outside the model. In this regression model, the value of R2 is relatively high because the research uses primary data, so it has a R2 value that tends to be high.

t Test

The t test basically shows how far the influence of an independent variable individually on the dependent variable. Independent variables are considered to have an influence on the dependent variable if the significance value is smaller than the error rate (0.05).

Table 4 t Test

Coefficients[a]

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	-1.615	.351		-4.598	.000
Ln_X1	.066	.022	.063	3.053	.003
Ln_X2	1.470	.119	1.472	12.370	.000
Ln_X3	.035	.037	.003	.075	.000
Ln_X4	-.038	.025	-.037	-1.520	.134
Ln_X5	-.491	.112	-.493	-4.398	.212
Ln_X6	.021	.007	.010	2.808	.007

a. Dependent Variable: Ln_Y1

Source: Primary Data Processed, 2019

Based on the testing of the regression coefficients seen in Table 4, multiple linear equation models can be arranged, as follows:

$$\mathbf{Ln\hat{Y}i = -1.615 + .066\ LnX_1 + 1.470\ LnX_2 + .035\ LnX_3 - .038\ LnX_4 - .491\ LnX_5 + .021\ LnX_6 + \mathcal{E}}$$

This research was conducted to see the effect of variable number of DOC seeds (X1), amount of feed (X2), area of cage (X3), cost of vaccine (X4), cost of vitamins (X5) and number of labor (X6) on income of laying chicken ($\hat{Y}$). Testing of the presence or absence of the influence of each independent variable on the dependent variable can be explained, as follows:

1. Effect of the Amount of DOC Seeds (X1) on Laying Chicken Breeds

DOC is a chicks aged 0-14 days. Tests on the Number of DOC Seeds (X1) have a t-count significance value of 0.003 <α (0.05). This test shows that H1 is accepted and H0 is rejected, then variable X1 is stated to be very significant and has an effect on the income of laying chicken ($\hat{Y}$). Based on the regression results from table 46, the regression coefficient for the number of DOC seeds is 0.066. This means there is a positive relationship between the number of DOC seedlings and the income of laying chickens, which means that every 1% increase in the average number of DOC seeds will increase the income of 0.066% chicken eggs if other independent variables are considered constant.

In the results of this study indicate that the number of DOC seeds has a significant influence on chicken egg income. This reflects a difference if the number of DOC seeds is high or low. In accordance with the research conducted by Yunus (2009), it was explained that the addition of the number of DOCs would increase the amount of income produced. This is because, the yield of chicken eggs obtained depends on the amount of DOC that is maintained, the more DOC is maintained, the more the amount of chicken egg income produced. From the explanation above, it can be seen that the chicken population will always decrease until the income period ends. So that in the maintenance of laying hens the race chicken population is very influential in the number of chicken eggs produced. The more initial DOC is maintained, the higher the population for the layer and the more eggs produced will be as much. Nugraha (2011) explains that the use of DOC significantly influences the increase in broiler income even though the comparison of the average cage density owned by the respondent farmers exceeds ideal amount of density.

2. Effect of Variable Number of Feed (X2) on Chicken Egg Income

Testing of the variable number of feed (X2) has a significance value of t-count of 0,000 <α (0.05), then this test shows that H1 is accepted and H0 is rejected, then X2 variable is stated to be very significant for chicken egg income ($\hat{Y}$). Based on the regression results, obtained a regression coefficient for the variable amount of feed of 1,470. This means that there is a relationship between the variable number of packages and the income of chicken eggs, which means that every increase in the average number of feeds by 1% will increase the income of chicken eggs by 1.470%, if other independent variables are considered constant.

In the results of this study indicate that the variable amount of feed has an influence on chicken egg

income on laying chicken farms. Thus, the reality in the field shows that the more feed used in the income process, the income of chicken eggs will increase. The importance of feed needs in the income of race chicken eggs in accordance with the results of parameter estimates in the income function equation which shows that the feed variable shows a positive sign. Feed is one of the important factors in laying chicken breeding business. The amount and content of feed ingredients needed must be sufficient to achieve optimal growth and income. But if viewed from an economic standpoint, the costs incurred for feed needs are very high from the total income costs paid.

The results of this analysis have similarities with the research conducted by Rita (2009), namely, feed has a positive influence on the amount of income produced. According to Mulyantini (2011), livestock growth is determined by the quantity and quality of feed. Growth or weight gain is also an interaction between genetic potential and environmental factors. If everything interacts well, then the growth of livestock that is maintained will be optimal.

3. Variable Effect of Enclosure Area (X3) on Chicken Egg Income

Testing of the enclosure area variable (X3) has a significance value or 0,000 smaller than 0.05, this test shows that H1 is accepted and H0 is rejected, where the variable X3 is significant and influences the income of chicken eggs ($\hat{Y}$). Based on the regression results, obtained a regression coefficient for the enclosure area variable of 0.035. This means that there is a positive relationship between the broad variable of the cage with chicken egg income, which means that every increase in the average area of the cage is 1%, it will increase egg income by 0.035%.

In the results of this study indicate that the broad variable enclosure has a significant effect on the variables of chicken egg income on laying chicken farms. Thus, the reality in the field shows that if the area of the cage increases, the income of chicken eggs will also increase. This is according to Mulyantini (2011), in a cage with a good environment with adequate cage area, it can reduce the density of the cage so can increase the income that will be produced.

4. Effect of Vaccine Cost Variables (X4) on Chicken Egg Income

Testing of the vaccine cost variable (X4) has a significance value of 0.134 greater than 0.05, this test shows that H1 is rejected and H0 is accepted, the variable X4 is declared insignificant and has no effect on chicken egg income ($\hat{Y}$). Based on the regression results, obtained a regression coefficient for the variable variable cost of large - 0.038. This means that there is a negative relationship between the variable cost of vaccination and chicken egg income, which means that each increase in the average vaccine cost by 1% will reduce the income of chicken eggs by 0.038% if other independent variables are considered constant.

In the results of this study indicate that the variable cost of vaccines does not have a significant effect on the variables of chicken egg income on laying chicken farms. Thus, the reality in the field shows that if the cost of vaccines gets bigger, chicken egg income will decline. In laying chicken breeding, disease prevention programs must be carried out properly. When birds are infected or infected with parasites will result in the income of chicken eggs produced is low, chicken growth decreases, conversion of rations is high and mortality will increase. Giving vaccines has a function to form and increase immunity to chickens to avoid and immune to various diseases so that they can produce optimally.

But in this study the vaccine variable had no effect and was negative in income. Allegedly due to several factors, the administration of vaccines needs several things to consider such as the type of vaccine used, the dosage / dose of vaccine used, the vaccination schedule, the time of vaccine administration, and the storage of vaccines. All of these can affect the success rate of the function of the vaccine. In addition, this variable is only used as an antibody / immunity so that chickens are not susceptible to disease so it does not stimulate productivity.

5. Effect of Variable Cost of Vitamins (X5) on Chicken Egg Income

Testing of the vaccine cost variable (X5) has a significance value of 0.212 greater than 0.05, this test shows that H1 is rejected and H0 is accepted, then the variable X5 is declared insignificant and has no effect on chicken egg income ($\hat{Y}$). Based on the regression results, obtained a regression coefficient for the variable cost of vaccines of - 0.491. This means that there is a negative relationship between the variable cost of vitamins with chicken egg income which means that every increase in the average vaccine cost by 1% will reduce the income of large eggs - 0.491% , if other independent variables are considered constant.

In the results of this study indicate that the variable cost of vaccines does not have a significant effect and is negative with respect to the income of ayampada egg laying poultry farms. These results are similar to the research conducted by Kusuma (2005). This is presumably due to the use of drugs that are not in accordance with the goals and recommendations for their use (Kusuma, 2005). According to Tamalludin (2014), the use of drugs that are not in accordance with the goals and recommendations for their use can result in bad effects on chickens, such as diseases that do not heal, increase mortality, and resistance to certain types of antibiotics.

6. Effect of Variable Amount of Labor (X6) on Chicken Egg Income

Testing of the variable number of labor (X5) has a significance value of 0.007 smaller than 0.05, this test shows that H1 is accepted and H0 is rejected, then variable X5 is significant and influences the income of chicken eggs. Based on the regression results, obtained a regression coefficient for the variable number of workers of 0.021, This means there is a positive relationship between the variable number of labor with chicken egg income which means that every increase in the average number of labor by 1% will increase chicken egg income by 0.021%, if other independent variables are considered constant.

In the results of this study indicate that the variable number of workers has a significant influence on chicken egg income on laying chicken farms. This reflects a difference if the cost of the vaccine is high or low. Labor is a income factor that is quite important for laying hens. Labor variable has a positive sign, meaning that the more labor used in the income process, the income of chicken eggs will increase.

The results of this analysis have similarities with the research conducted by Ardilawati (2012) about the analysis of factors that influence the income of laying chicken. In the results of the study explained that the amount of labor used has a positive influence on the amount of income produced. Ardilawati (2012), explained that the regression results obtained a feed regression coefficient of 0.110. This means that every one percent increase in the number of HOK will increase chicken egg income by 0.110 kg. This shows that at the stage of chicken egg income in this study, the increase in the number of workers in laying poultry farms cultivated by respondent farmers will increase chicken egg income.

IV. Conclusion

Egg laying egg income is simultaneously influenced by factors of income of DOC seeds, amount of feed, cage area, vaccine costs, vitamin costs and the number of workers. But partially egg income of eggs is influenced by factors of income of number of DOC seeds, amount of feed, area of cages and number of workers, while factors of income of vaccine costs and cost of vitamins do not affect egg laying egg income.

Based on the results of the Cobb-douglass income function, it was found that the factors of income of the number of DOC seeds, the amount of feed, the area of the cage and the workforce had a positive influence on laying chicken egg income. Whereas for the factor of income of vaccine costs and the cost of vitamins has a negative influence on the income of laying chicken eggs.

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