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Analysis of Influenced Factors the Reduction of Pig Population in Simanindo District, Samosir Regency

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Abstract. The people in Samosir believe that pigs are livestock that bring many benefits. That is why many people raise pigs. At this time there is a downward trend in pig population.This research was conducted at the people's farm in Simanindo District, Samosir Regency. This study was conducted from May until July 2019 and aimed to investigate the factors that affect the rate of decline in the pig population. The result of research will show dominant factors that causes the rate of decline in the pig population and improvement could be conducted to prevent pig population decline trend. The method used is multiple linear regression analysis with the variable of animal feed limitations, farmer experience, long time raising, local environmental customs, religious holiday production. This research was conducted by asking the farmer directly and giving a randomly selected questionnaire. In total there were 84 pig farmers in 4 villages in each district. The results of this study indicated that the limitations of feed, long time raising, environmental customs around and religious day have a very significant influence on the decline in pig population in Simanindo District Samosir Regency.

Keywords: pigs, decline,population, dominant factors, feed

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Introductions

Pigs have traditionally been raised in Samosir Regency as a sideline business in the farming system that acts as life savings, a waste modifier, ceremonial material, religion, culture and a source of fertilizer [1]. Almost all sub-districts in Samosir Regency are kept pigs as a side source for their needs, one of the sub-districts that has the highest population is the Simanindo sub-district, which has 21 villages [2]. The government stressed that any livestock business should not be allowed to live livestock roaming freely in the streets or yards of people's homes or cause pollution due to waste treatment and other impacts that are not handled properly [3]. This regulation requires farmers to impound the pigs, but it is not easy to change something that has become a habit because the ability to maintain is determined by the way the farmer perceives his business, if the perception is good then the behavior will also be good. In the village of Simarmata, Simanindo District, Samosir Regency, pigs are kept by tying the pigs with a rope as long as 10 m in an open field and made a puddle. The pig feed that is given is not much different from other pigs such as sweet potato leaves (and or) which are finely chopped which some farmers mix with a little bran and cassava which is grated and cooked.

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Some residents also provide kitchen scraps in the form of vegetables and used rice. Feeding pigs by farmers in Simanindo is done twice a day, namely in the morning around 08.00 AM and in the afternoon at 17.00 PM. This study aimed to determine the factors that affect the rate of decline in the pig population in, Simanindo District Samosir Regency.

Research and Methods

Research Location and Time

This research was conducted in Simanindo District, Samosir Regency by collecting data from Simanindo District and the Agriculture Office of Samosir Regency, North Sumatra Province. The study was conducted from March to April 2019.

Data collection technique

Observation

Observation is a method and technique of data collection by systematic observation and recording of symptoms or phenomena that exist on the object of research.

Interview

The interview is a method of collecting data utilizing question and answer that is done systematically and based on the research objectives.

Research variable

In this study, there are two variables, including Dependent Variable (Dependent variable) The dependent variable is a variable that is influenced by the independent variable. The dependent variable of this study is a decrease in the pig population (Y1). Independent variable (Independent variable) The independent variable is a variable that is thought to be independently affecting the dependent variable, namely: limitations of animal feed (X1), length of breeding (X2), livestock disease (X3), the customs of the surrounding environment (X4), and the production of religious holy pigs (X5).

Data analysis technique

Normality test

Data normality testing is used to determine whether the data distribution used in research is normally distributed or not. To test the normality of data, if the netted data is normally distributed, an analysis to test the hypothesis can be done. The multiple linear regression model must assume that the residual variables are normally distributed, which means that the value (for each Xi value) spreads symmetrically. Therefore a good regression model is to follow the normal line. If this assumption is violated, the regression model is considered invalid with the number of samples [3].

Multicollinearity Test

Multicollinearity is the relationship of independent variables between one and the other. The multicollinearity test aims to test whether the regression model found a correlation between independent variables. A good regression model does not occur multicollinearity [4].

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Heteroskedasticity Test

Heterokedastisitas test aims to test whether the regression model occurs in inequalities in the variance of the residual answers between respondents. A good regression model is no heteroskedasticity. Heterokedastisitas cause estimators or estimators to be inefficient and the value of the determinant coefficient will be very high. To find out the presence or absence of heteroskedasticity, that is by looking at the pattern of points in the regression plot scatter. If the points spread with unclear patterns above and below on the Y axis, then there is no heteroscedasticity problem in the regression model [4].

Autocorrelation Test

An autocorrelation test is carried out to test whether in a linear regression there is a correlation between the error of the t disturbing period and the error in the t-1 (previous) period of autokoleration can be measured using the Durbin Watson Test. If there is a correlation then it is called an autocorrelation problem. A good linear regression model does not occur autocorrelation [4].

Measuring Coefficient of Multiple Regression Equations

The coefficient of the regression equation is calculated using the SPSS program. This test is carried out to estimate the magnitude of the relationship of the independent variable (limitations of animal feed, length of breeding, livestock disease, customs of the surrounding environment, and production of pigs on religious holidays) to the dependent variable (decrease in pig population). The shape of the model used [4]:

$$\mathbf{Y = \alpha + \beta 1\ X\ 1 + \beta 2\ X\ 2 + \beta 3X\ 3 + \beta 4X\ 4 + \beta 5X5 + e}$$

Information:

Y = Declining pig population

α = Constant

β1, 2,3,5 = Regression coefficient

e = confounding error

X1 = Limitations of animal feed

X2 = Long time raising

X3 = Animal diseases

X4 = Customs of the surrounding environment

X5 = Production of pigs on religious holidays

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Hypothesis testing

The hypothesis is an assumption or opinion which is accepted tentatively to explain a factor that is used as a basis for research. The hypothesis formulated is the null hypothesis (H0) and the alternative hypothesis (Ha). This hypothesis is called the null hypothesis because this hypothesis has zero difference or has no difference from the actual hypothesis [5]. Hypothesis testing in this study uses a T-test. T-test aims to test the significance of the influence of independent variables (limited animal feed, breeders' experience, livestock diseases, customs of the surrounding environment, and production of pigs from religious holidays) on the dependent variable (decrease in pig population). The testing steps are as follows:

1) Determine the Ho and HaHo formulations: a1, a2, a3 = 0 (limitations of animal feed, duration of raising, livestock diseases, customs of the surrounding environment, and production of pigs for religious holidays).

Ha: a1> 0 (Limitations of animal feed are positive and significant to the decline in pig population in Samosir District).

Ha: a2> 0 (breeding time has a positive and significant effect on the decline in pig population in Samosir District).

Ha: a3> 0 (livestock disease has a positive and significant effect on the decline in pig population in Samosir District).

Ha: a4> 0 (Customs of the surrounding environment have a positive and significant effect on the decline in pig population in Samosir District).

Ha: a5> 0 (the production of religious holy days has a positive and significant effect on the decline in pig population in Samosir District).

2) Determine the level of significant (α) = 5% with a value of confidence level of 95% with degree of freedom (df) = n-k-1

3) Determine the area of acceptance and rejection of the hypothesis. The acceptance criteria are:

Ho cannot be rejected if = t arithmetic <(t table) t α; n-k

Ho is rejected if = t arithmetic> (t table) t α; n-k

4) Determine T calculate with the formula:

T arithmetic = bi / Se (bi)

Information:

Bi = regression coefficient of the independent variable

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Se = standard error

N = Number of observations

K = number of independent variables

5) Conclude by comparing the results of Tcount and Ttable, then determine the area of acceptance and rejection. If Ho is rejected, the limitation of animal feed, breeding time, livestock disease, the customs of the surrounding environment, and the production of pigs on religious holidays, have a positive and significant effect on the decline in the pig population.

Research parameters

The parameters observed in this study are factors that influence the decline in pig population, such as limited animal feed, length of breeding, livestock diseases, customs of the surrounding environment, and production of pigs on religious holidays.

Results And Discussion

Normality test

After conducting the Kolmogorov Smirnov test, if the Sig. > 0.05, then the data is normally distributed if the Sig. <0.05, then the data are not normally distributed.

Table 1. Normality Test Results One-Sample Kolmogorov-Smirnov Test

		Unstandardized Residual
N		84
Normal Parameters[a,b]	Mean	0E-7
	Std. Deviation	,57244638
Most Extreme Differences	Absolute	,101
	Positive	,101
	Negative	-,050
Kolmogorov-Smirnov Z		,926
Asymp. Sig. (2-tailed)		,358

a. Test distribution is Normal.
b. Calculated from data.

Based on the results in Table 1, the data is justified for 0.358> 0.005, which means that the data is normally distributed.

Multicollinearity test

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	,445	,152		2,933	,004
	X1	,037	,026	,316	1,434	,155
	X2	-,009	,063	-,027	-,140	,889
	X3	,066	,118	,158	,556	,580
	X4	,026	,071	,120	,362	,719
	X5	-,185	,122	-,393	-1,522	,132

a.Dependent Variable: RES2

After looking at the coefficient table there is a VIF value for each variable, so if the tolerance value> 0.10 means that there is no multicollinearity if the tolerance value <0.10 means that there is multicollinearity. Furthermore, based on a VIF value> 10.00 means multicollinearity occurs, if a VIF

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	,322	,280		1,150	,254		
	X1	,349	,048	,350	7,271	,000	,243	4,113
	X2	,019	,116	,007	,168	,867	,317	3,157
	X3	,762	,218	,217	3,493	,001	,145	6,876
	X4	,395	,132	,217	3,002	,004	,107	9,306
	X5	1,005	,225	,252	4,473	,000	,177	5,645

a. Dependent Variable: Y

value <10.00 means multicollinearity does not occur [6].

Table 2. Multicollinearity Test Results

Based on the test results above, the tolerance value of animal feed limitations, length of breeding, livestock diseases, customs of the surrounding environment and the production of religious holidays> 0.10 then the data does not occur multicollinearity. If the VIF value is limited to animal feed, breeding time, livestock disease, customs of the surrounding environment and the production of religious holidays <10.0, then the data is no multicollinearity.

Heteroskedasticity Test

After doing the graph method and the park test to test heteroscedasticity, it can be concluded that the symptoms of heteroskedasticity are not present in this equation, where the shape of the graph does not show a certain pattern and significant value. If sig> 0.05, heteroscedasticity does not occur and if sig <0.05, heteroscedasticity occurs.

Table 3. Heteroscedasticity Test Results

Based on the test results above, the value of sig is limited animal feed, breeding time, livestock disease, customs of the surrounding environment and the production of religious holidays> 0.05 then the data is not heteroscedasticity.

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Autocoleration Test

To test whether in the linear regression model there is a correlation between the disturbance error in period t and the error in period ti (before). If the value of d <dl or d> 4-dl then there is autokoleration, if the value of du <d <4-du means there is no autocoleration, if the value of dl <d <du or 4-du <d <4-dl means there is no conclusion [7].

Table 4. Results of the Autocoleration Test

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	,978[a]	,956	,953	,59051	1,999

a. Predictors: (Constant), religious holidays, length of breeding, livestock diseases, food limitations, customs
b. Dependent Variable: livestock population
Based on the test results above, the Durbin-Watson value is 1.999 and the dl value is 1.521 and the du value is 1.773 obtained from the Durbin-Watson table of 5%, the 4-dl value is 2.479 and the 4-du value is 2.222. So it can be concluded that 1,773 <1,999 <2,227 there is no autokoleration.

Determination Coefficient Test

R-square value (R^2) is obtained at 0.956. This shows that the independent variable limited livestock feed, length of breeding, livestock disease, the customs of the surrounding environment and the production of religious holidays) can explain the dependent variable (population of pigs) by 95.6 percent, while 4.4 percent is influenced by other factors outside of the equation model.

F Test (Simultaneous Test)

A significant value of F is obtained at 0,000 which is smaller than α of 0.1 (10%). Thus H0 is rejected and H1 is accepted. This shows that the independent variables (limitations of animal feed, breeding time, livestock diseases, customs of the surrounding environment and religious holiday production) simultaneously have a significant effect on the decline in pig population in Simanindo District, Samosir Regency

The t-test (Partial Test)

Variable limitations of animal feed with a significance value of t of 0,000 <0.05 then Ho is rejected and Ha is accepted, meaning that the limitations of animal feed have a very significant influence on the decline in the pig population in Simanindo District, Samosir Regency. Variable experience of farmers with a significance value of t is 0.867> 0.05, then Ho is accepted and Ha is rejected, meaning that the length of farming does not have a very significant effect on the decline in the pig population in Simanindo District, Samosir Regency.

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Livestock disease variable with a significance value of t of 0.001 <0.05 then Ho is rejected and Ha is accepted, meaning that livestock disease has a very significant influence on the decline in pig population in Simanindo District, Samosir Regency. Variable of customs of the surrounding environment with a significance value of t of 0.004 <0.05 then Ho is rejected and Ha is accepted, meaning that the customs of the surrounding environment have a very significant influence on the decline in the pig population in Simanindo District, Samosir Regency. Variable production of religious holidays with a significance value of t of 0,000 <0.05 then Ho is rejected and Ha is accepted, meaning that the production of religious holidays has a very significant influence on the decline in the pig population in Simanindo District, Samosir Regency.

Limitations of Animal Feed (X1)

Based on the results of the study, animal feed limitation has a regression coefficient of 0.322, meaning that this value indicates that when the feed given to livestock does not meet the needs, the population of pigs in Simanindo District, Samosir Regency will decrease by 0.322, where other factors are considered constant. A positive sign in the limitation of pig feed shows a positive effect on the decline in the pig population, which means that if the feed consumed is less then the population will also be less. Limitation of feed could be seen among pigs breeders in Samosir. In one way, cause factors for this is limitation of knowledge how to raise pigs. According to [8], the best result of prepare pigs feed by using 50% market organic waste and 50% complete feed/kconsentrate.

Old Breeders (X2)

Based on the results of long-time research on breeding has a regression coefficient of 0.349, meaning that the longer a farmer conduct pigs business has increased knowledge in farmer cultivation, every 1-year decrease will cause a decrease in pig population by 349 head/year assuming other variables are considered constant. A positive sign on the length of breeding shows a positive influence on the number of the declining pig population in Simanindo Subdistrict, Samosir Regency, the longer the breeding, the population can increase. [9] concluded that the skill of raising livestock in rural area is very important and it is depend on how long someone is in the business of raising livestock.

Animal Disease (X3)

Based on the research results of livestock diseases that have a regression coefficient of 0.019, meaning that the more frequent or many livestock diseases in Simanindo District, Samosir District, there will be a decrease in the population of pigs by 0.019 assuming other variables are considered constant. A positive sign of livestock disease shows a positive effect on the number of the declining pig population in Simanindo Subdistrict, Samosir District, the more frequent or many livestock diseases in Simanindo Subdistrict, Samosir District, the population number can decrease. [10] stated that traditional livestock raising systems and sanitation are factors that trigger disease in pigs.

Customs of the Neighborhood (X4)

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Based on the results of the study of the environment around the environment has a regression coefficient of 0.762, meaning that there is a lot of demand for pork at the time of the customary environment around the District Simanindo Samosir Regency, there will be a decrease in the population of pigs by 0.762 with the assumption that other variables are considered constant. A positive sign on the customs of the surrounding environment shows a positive effect on the amount of decline in the population of pigs in Simanindo District, Samosir District, so that more and more pork demand during local customs in Simanindo District, Samosir Regency will decrease the population of pigs in the Subdistrict Simanindo Samosir Regency. According to [11] socio-cultural barriers are one of the factors that cause the productivity of pigs. This is also a trigger for the decline in pig population.

Production of Religious days (X5).

Based on the results of the study of religious days (Christmas) around has a regression coefficient of 1.005 meaning that there is a lot of demand for pork during religious holidays in Simanindo District, Samosir District, there will be a decline in the population of pigs by 1,005 assuming other variables are considered constant. A positive sign on religious days shows a positive effect on the number of pig population decline in Simanindo District, Samosir Regency, so the more demand for pork during religious holidays in Simanindo District, Samosir Regency, there will be a decline in pig population in Simanindo District, Samosir District. This is consistent with research [12] that religious holidays / cultural parties affect fluctuations in pig populations.

Conclusion

It can be concluded that the factors that influence the decline in pig population in Simanindo Subdistrict, Samosir Regency are factors of limited food, livestock diseases, customs of the surrounding environment and religious days have a very real influence on the decline in pig population in the District Simanindo Samosir Regency. The obtained multiple linear regression equation has a significant effect on the decline in the pig population in Simanindo District, Samosir Regency.

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