



Relationship Analysis between Production Factors with Business Production of Beef Cattle Livestock in Binjai Barat District, Indonesia

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Authors' contributions

This work was carried out in collaboration between both authors. Author JM designed the study, performed the statistical analysis, wrote the protocol and wrote the first draft of the manuscript. Author SAS managed the analyses of the study. Both authors read and approved the final manuscript.

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ABSTRACT

Appropriate and efficient management of production factors will affect the income of beef cattle farmers. This study aims to analyze the relationship between the scale of business, breed, feed, medicine and labor with the production of the beef cattle business in West Binjai District. This type of research is quantitative descriptive research. The population in this study were all beef cattle farmers to raise fattening. A survey of 37 farmers conducted the data collection method. The data used in this study include primary data and secondary data. The analytical method used is Chi-Square analysis using SPSS 18.0 software. The results showed that there was a significant relationship between the size of the business area, that there was a significant relationship between the scale of business, breed, feed, medicine and labor with the production of the beef cattle business in Binjai Barat District. With the closeness of the relationship between the scale of business and breedings with the production of 92.1% and the closeness of the relationship between medicine and feed with a production of 88.9% and the close relationship of labor with the production of 73.4%.

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1. INTRODUCTION

The development of the livestock sub-sector business is an integral part of agricultural development, namely in the development and enhancement effort as an effort in the community's need for animal protein that has strategic value. One of the developments is in the field of animal husbandry because it is a livestock business that is mostly done by people in rural areas, namely raising beef cattle in the form of community farming.

The management of smallholder farms in Indonesia, especially in the Province of North Sumatra, has increasingly shown improvements both traditionally and intensively managed. It will accumulate to cause an increase in beef cattle population. West Binjai Subdistrict is one of the areas that shows the development of beef cattle farms in Indonesia. West Binjai Subdistrict is also one of the villages with a high number of beef cattle breeders and a high number of business owners so that the production of beef cattle business is too high.

West Binjai sub-district has increased production every year, and beef cattle farming has a big potential for Indonesian livestock production. Beef cattle production increased from 2011 - 2015, namely 537 to 781. However, large scale business and high production at certain times are not enough as a guarantee if it is not followed by increased productivity. Beef cattle productivity from 2012 to 2015 decreased from 141.14/m² to 117.47/m² [1].

The condition of the level of decline in productivity is thought to result from the use of inefficient production factors at the level of beef cattle farmers. The use of appropriate and efficient production factors affects the income of beef cattle farmers. If production increases, it can ultimately increase the income of beef cattle farmers in the study area. Therefore, research needs to be conducted to see the relationship between the use of inputs with production in beef cattle farming in West Binjai District, which has decreased productivity.

2. METHODOLOGY

This research was conducted through a descriptive quantitative approach, which is a

study that describes the condition of the variables obtained by beef cattle business operators, which are related to the entire data and field studies obtained. This type of research is a descriptive study of researchers who describe the condition of the variables collected by cattle fattening businesses. The scope of this research is in the District of West Binjai. The method used in this study was a direct interview with beef cattle breeders using a questionnaire that had been made beforehand. The research location was taken purposively with the consideration that one of the areas that have great potential in the effort to develop a beef cattle business.

The parameters observed in this study include beef cattle family data, analysis of production factors for beef cattle business, namely scale of business, feed, breed, labor and medicine that will affect the production of the beef cattle business in West Binjai District.

The design of this study was first carried out by making observations to find out the existing problems. The results of the observations are then made scenarios that support and make the flow of the problem. The second stage is the data analysis stage by analyzing the factors of production and business acceptance with the chi-square analysis approach. The third stage is the interpretation of the data by interpreting the predicted values of each variable and comparing them with the theory and the results of previous studies. Interpretation can prove the theory, oppose the theory, and develop a new theory as a reference for the results of research. The next stage is to draw conclusions, where this stage concludes the results achieved and recommends to related parties.

The population in this study was 37 beef cattle farmers in West Binjai District. In this study, the sampling was done by the census. The census method is also known as the complete enumeration method, where all individuals in the population are investigated or interviewed [2].

To find out the relationship between input and output of production activity, a form of the production function is needed. The production function is a mathematical relationship between input and output [3]. Meanwhile, the production function is a physical relationship between input and production [4].

Presentation of the production function can be done in various ways, including in the form of graphs, tables, or in a systematic equation. Systematically, the production function can be shown by the formula:

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

Description:

- \hat{Y} : Cattle Production Results (output)
- X_1 : Business Scale
- X_2 : Breed
- X_3 : Feed (Kg)
- X_4 : Medicine (Rp/Kg)
- X_5 : Labor

Data were analyzed quantitatively using a computer program SPSS 18.0 for Windows (Spread Sheet For Statistics) with the Chi-square analysis test model. Determine the significance of a value of the calculated value using Table 2. in the statistical table with $db = k-1$ and $set = 0.05$. The chi-square analysis is a non-parametric statistical analysis, used to test whether the observed data frequency of a categorical variable matches the expected frequency [5]. Chi-Square Test Formula:

$$X^2 = \sum \left[\frac{(f_0 - ft_{ax})^2}{ft_{ax}} \right]$$

Description :

- X^2 = Chi-Squared
- f_0 = Frequency of Observation Results
- ft_{ax} = Frequency expected in the study population by sharing the number of subjects in the sample and subject categories.

Chi-Square test results produce the value of Asympotic Significance (Asymp. Sig.) This indicates whether there is a relationship between the two factors studied and then compared with the value (0.05). Benchmark of decision making based on Asymp values. Sig. If it is smaller than the value (0.05), then H_0 is rejected:

H_0 : There is no significant relationship between business scale, breed, feed, medicine, and labor with the production of the beef cattle business.

H_1 : There is a significant relationship between business scale, breed, feed, medicine and labor with the production of the beef cattle business.

3. RESULTS AND DISCUSSION

3.1 Characteristics of Respondents

Characteristics of respondents are the description of beef cattle breeders in West Binjai District covering age, education, number of children, and experience in the beef cattle business. Respondent characteristic data can be seen in Table 1.

Table 1 shows the age range of respondents in the beef cattle business in the study area ranged from 32 to 68 years, with an average age of the sample being 49 years, indicating that the sample is classified as productive. A person's age affects the decisions and abilities of his physical activities. Age is related to performance and productivity. As a person ages, the ability to do work tends to decrease—classified productive ages as those in the 15-55 years age group. In the productive age group, the ability to conduct a beef cattle business is estimated to be relatively high [6].

Human resources, as measured by education level, are important factors in accommodating technology and skills in the beef cattle business. The education category includes formal education, which is quantitatively measured by the number of years of attending education, which is then equated with the stages of general education level. The discussion on education is intended to determine the level of ability of the sample in managing their business. This is related to various information, including the knowledge of farmers on the selection and maintenance of seedlings, control of beef cattle disease in the Binjai Barat District. The data presented shows that the average education of farmers is nine years or the equivalent of junior high school education. So the management of beef cattle business only focuses more on the technical capabilities obtained from generation to generation, in addition to getting technical training from relevant agencies so that armed with that experience can affect the production of beef cattle.

The number of children who are dependent greatly influences the expenditure of farmers. The more the number of family dependents, the higher the expenditure on consumer goods.

Table 1. Respondents characteristic

No.	Description	Unit	Range		Average
			Lowest	Highest	
1.	Age	Year	32	68	49
2.	Education	Year	6	12	9
3.	Number of Children	Person	1	5	3
4.	Experience	Year	5	16	9

Source: Primary Data (Processed), 2019

If it is not supported by adequate household income, farmers will reduce the amount of expenditure for beef cattle business and this will also affect the pattern of beef cattle business managed by farmers. The average number of sample dependents is three people. In other words, the number of dependents of the workers in the beef cattle business is not too much and can save the income received.

Beef cattle breeders have varied experiences in their cultivation business, ranging from 5-16 years. The average beef cattle breeder has nine years of experience in the beef cattle business. It can be said that beef cattle breeders are quite experienced because they have worked from the beginning of the beef cattle business began to have endeavored.

The results of this study are the same as those of the thesis [7], in which the respondent's characteristics include age, education, number of children, and experience. The average age of respondents was 48 years, which showed that the sample was classified as productive. The education level of the respondent is equivalent to a junior high school. The average number of children covered is 4. The number of dependents shows the availability of labor in a family that is ready to be used in business. The level of experience will provide a change in one's work skills towards better.

3.2 Analysis of the Relationship between Production Factors and Beef Cattle Business Production

Beef cattle production has a relationship with various factors, namely the use of production facilities consisting of business scale, breeds, feed, medicines, and labor. The scale of cattle fattening business in the study area is quite large, namely investment or capital spent by beef cattle breeders in West Binjai Regency per

period. The largest period is on the scale of raising six cattles, which is Rp. 61,530,333, - and the smallest is on the scale of livestock raising. 1-2 cattles, e.g., Rp. 5,713.76. The feed used by cattle ranchers is commercial feed that is easily available and sustainable. The medicines used to consist of worm medicines such as albendazole and vitamins that are used in the form of special supplements for animals, namely viterna, poc nasa, probiotics and hormonal resilience. This product uses amino acid technology that is made with the physiological approach of the cattle body, namely by examining various nutrients needed by livestock. Labor that is used comes from within and outside the family. The results of Chi-Square analysis using SPSS software version 18.0 obtained the following results:

3.2.1 The relationship between business scale and production

Chi-Square analysis results for the business scale shows a value of 237 with a significance of 0,000. The significance value is smaller than $\alpha 0.05$. Thus it can be concluded that H_0 is rejected, and H_1 is accepted. This means that there is a significant relationship between the scale of the business and the production produced by the beef cattle business in the study area.

The Chi-Square value only states whether there is a relationship or not, but does not indicate the strength of the relationship. To determine the strength of the relationship between the two variables, it can be seen the output contingency coefficient [8]. The contingency coefficient value is 0.921. This means that the close relationship between business scale and beef cattle production is 92.1 percent. Production factors that influence the level of livestock farming production are business scale. This factor is quite important because it relates to where livestock business activities take place [9].

Table 2. Results of chi-square analysis between production factors and beef cattle business production in West Binjai District

No.	Variable	Chi-square value	Chi-square table	Significant value	Contingency coefficient
1	Business Scale	237	The real level	0,000	0,921
2	Breed	237	(α) of 0,05 and	0,000	0,921
3	Feed	183	df = 1 obtained	0,000	0,889
4	Medicine	183	a value of	0,000	0,889
5	Labor	80	3,841	0,000	0,734

Source: Primary Data (Processed), 2019

3.2.2 Relationship between breed and production

Chi-Square analysis results showed a value of 237 with a significance of 0,000. The significance value is smaller than $\alpha 0.05$. Thus it can be concluded that H_0 is rejected, and H_1 is accepted. This means that there is a significant relationship between breeds and production produced by beef cattle business in the study area. To determine the strength of the relationship between the two variables, it can be seen the output contingency coefficient [8]. The contingency coefficient value is 0.921. This means the close relationship between breeds used and beef cattle production is 92.1 percent. The need for cattle breeds at this time must not only be met in increasing quantity but also in increasing quality. To produce cattle breeds that meet technical requirements as to quality breeds, a standard is needed. Cattle breeds can be classified as foundation stock, breeding stock, and commercial stock. Good quality breed cattle procurement programs can be done with artificial insemination using sperm from superior cattle [10].

3.2.3 Relationship between feed and production

Chi-Square analysis results showed a value of 183 with a significance of 0,000. The significance value is smaller than $\alpha 0.05$. Thus it can be concluded that H_0 is rejected, and H_1 is accepted. This means that there is a real relationship between cattle feed and the production produced by beef cattle fattening in the study area. To determine the strength of the relationship between the two variables, it can be seen the output contingency coefficient [8]. The contingency coefficient value is 0.889. This means that the close relationship between the feed used and beef cattle production is 88.9 percent. The feed used in this study is

commercial feed. Nutritional quality in feed ingredients will affect the growth of beef cattle [11].

3.2.4 The relationship between medicine and production

Chi-Square analysis results showed a value of 183 with a significance of 0,000. The significance value is smaller than $\alpha 0.05$. Thus it can be concluded that H_0 is rejected and H_1 is accepted. This means that there is a real relationship between drugs and production produced by beef cattle business in the study area. To determine the strength of the relationship between the two variables, it can be seen the output contingency coefficient [8]. The contingency coefficient value is 0.889. This means that the close relationship between medicine used and beef cattle production is 88.9 percent. The drugs used to consist of worm medicines such as albendazole and vitamins used in the form of special supplements of livestock namely viterna, poc nasa, tough probiotics and hormones. This product uses amino acid technology that was created with the physiological approach of the cattle body, namely by examining various nutrients that are livestock needed. How to Application Product Mix Viterna, Poc Nasa, Hormone, and Tough Probiotics into one solution first then take ten cc mixed with 5 L of drinking water given once a day. Product Adjustment Process 1-7 days. Benefits of using this medicine are:

1. Increase appetite for livestock.
2. Essential amino acids, namely Arginine, Hyistidine, Leucine, Isoleucine and others as constituents of body proteins, forming cells and organs.
3. Complete vitamins that function for the normal physiological processes of the body and increase the body's resistance to disease.

4. Complete minerals, namely N, P, K, Ca, mg, Cl and others [12].

3.2.5 Relationship between labor and production

Chi-Square analysis results show a value of 80 with a significance of 0,000. The significance value is smaller than $\alpha 0.05$. Thus it can be concluded that H_0 is rejected and H_1 is accepted. This means that there is a real relationship between labor and production produced by the beef cattle fattening business in the study area. To determine the strength of the relationship between the two variables, it can be seen the output contingency coefficient. The contingency coefficient value is 0.734. This means the close relationship between labor and beef cattle production is 73.4 percent.

In the production function, the factors that directly affect the number of products produced are human labor [13]. Labor is one of the important factors of production in an effort to produce a product that is expected because labor also influences the income that will be obtained. Expertise and skills possessed by a worker will affect the level of good and bad quality produced by a business. The beef cattle industry has the potential to increase job vacancies, so it is very good to be developed in Indonesia [14].

4. CONCLUSION

There is a significant relationship between the scale of business, breed, feed, medicine, and labor with the production of the beef cattle business in Binjai Barat District. With the closeness of the relationship between the scale of business and breed with the production of 92.1% and the closeness of the relationship between medicine and feed with the production of 88.9%, and the close relationship of labor with the production of 73.4%.

Research results can be recommended as information for stakeholders and farmers to develop beef cattle business, especially in Binjai Barat District. In addition, the research results can be used as a reference to the next study.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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