

Driving Factors for Sustainable Livestock Development in Indonesia: Study on Beef Cattle Commodities

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Abstract. Driving factors for the development of smallholder beef cattle farming include consumption needs and market availability, government policies and institutional, social and cultural support from the community, availability of animal feed sources, availability of upstream and downstream industries, as well as regional carrying capacity and the use of appropriate technology. The aim of the research is to analyze the influence of driving factors on sustainable livestock development in beef cattle commodities. The research variables consist of driving factors (X) and the five dimensions of sustainable livestock development, namely the ecological dimension (Y1), the economical dimension (Y2), the social and cultural dimension (Y3), the institutional dimension (Y4), and the technological dimension (Y5). Research data was obtained by means of Focus Group Discussion (FGDs), filling in questionnaires, and interviews. The research respondents consisted of 60 small-scale beef cattle fattening farmers with ownership of 7-60 heads in Bondowoso District. Data were analyzed partially using simple linear regression with SPSS 26.0. The research results showed that driving factors had a positive and significant influence on sustainable livestock development, especially on the ecological dimension of 0.492, the economical dimension of 0.376, the social and cultural dimension of 0.327, and the institutional dimension of 0.442. The research conclusion shows that the driving factors for sustainable livestock development are worthy of the attention of all stakeholders in beef cattle livestock commodities, for example, in the ecological dimension, farmers are able to manage and process livestock waste to be used as plant fertilizer. In the economical dimension, farmers are able to play a role in increasing livestock business income. In the social and cultural dimensions, it is able to encourage the participation of family members in the livestock farming business. In the institutional dimension, farmers actively participate in livestock coaching and extension programs.

Key words: beef cattle, livestock business, ruminants, sustainable livestock development.

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1 Introduction

Sustainable livestock development in Indonesia is one of the strategic issues in Indonesia, especially in the beef cattle cultivation sector, because Indonesia's demand for beef is still very limited compared to Indonesia's population. This condition is exacerbated by the low level of effort to develop the beef cattle farming business [1,2], because beef cattle farming in Indonesia is dominated by smallholder livestock farming on a micro scale, namely the scale of beef cattle business under 5 (five) heads [3,4].

Ironically, the people's beef cattle farming business in Indonesia is not their main job, but rather as rice farmers or plantation farmers, while owning beef cattle is a form of family savings [5,6]. This then becomes one of the main reasons for the low effort in developing the beef cattle farming business in Indonesia [7,8], because the more beef cattle are raised, the greater the allocation of time and energy of farmers to look for grass for animal feed, which will have an impact on their main job [9,10].

However, it is not impossible that sustainable livestock development can be realized, because in Indonesia, beef cattle farming is mostly carried out by rural communities, that is, it is carried out from generation to generation and sustainably [11,12], even though it is done with limited resources, livestock rearing is still traditional, and animal husbandry businesses beef cattle are not yet business oriented. Apart from that, various government efforts through programs, regulations and policies have contributed to efforts to develop sustainable livestock businesses [13,14].

This description shows that sustainable livestock development in the beef cattle commodity subsector can be realized through various influences from driving factors, consisting of strengths and opportunities [15–17]. These driving factors include consumption needs and market availability, government policies and institutional support, social and cultural community, availability of animal feed sources [18,19], availability of upstream and downstream industries, as well as regional carrying capacity and use of appropriate technology [20–22].

This research aims to analyze the influence of driving factors on sustainable livestock development in beef cattle commodities in Indonesia. The novelty of this research is that it first maps the driving factors [23,24] based on the results of the Focus Group Discussion (FGDs), which includes the driving factors for the development of smallholder beef cattle farming, including consumption needs and market availability, government policy and institutional support, social and cultural community, availability of feed sources, livestock, availability of upstream and downstream industries, as well as regional carrying capacity and use of appropriate technology.

2 Materials and Methods

This research was conducted in Bondowoso District, East Java Province, Indonesia. Research data was obtained using the Focus Group Discussion (FGD) method, observation and questionnaires. This research involved 60 respondents from small-scale beef cattle breeders, namely those with 7-60 head of beef cattle for fattening. The research variables consist of driving factors (X) and the five dimensions of sustainable livestock development, namely the ecological dimension (Y1), economical dimension (Y2), social and cultural dimension (Y3), institutional dimension (Y4), and technological dimension (Y5). Research variables are shown in Table 1. Data were analyzed partially using simple linear regression with SPSS 26.0.

Table 1. Research Variables and Indicators

Variables and Indicators
<p>Driving Factor (X)</p> <ul style="list-style-type: none"> a. consumption needs and market availability b. government policies and institutional support c. social and cultural society d. availability of animal feed sources e. availability of upstream and downstream industries f. support the region and use appropriate technology
<p>Ecological Dimension (Y₁)</p> <ul style="list-style-type: none"> a. Providing forage for livestock b. Provide protective plants c. Make use of unused land d. Processing and managing livestock waste e. Utilizing livestock manure f. Pay attention to the slope of the cage g. Pay attention to the height of the cage h. Pay attention to the density of the cage i. Providing clean water to support livestock business j. Pay attention to the humidity of the cage k. Pay attention to the temperature of the cage
<p>Economical Dimension (Y₂)</p> <ul style="list-style-type: none"> a. Providing livestock production facilities b. Marketing of milk and dairy products c. Analyzing the amount of subsidies for livestock production facilities d. Manage production requests e. Distribute labor f. Own a farm g. Owning livestock h. Providing working capital i. Contributing to Regional Original Income (PAD) j. Determining farm labor wages k. Increase livestock business income
<p>Social and Cultural Dimension (Y₃)</p> <ul style="list-style-type: none"> a. Making time for business in the field of animal husbandry b. Supporting family participation in livestock farming c. Managing the environment as a result of the existence of a livestock business d. Determining the number of business actors in the livestock sector e. Respond to community complaints and protests if they are the impact of livestock business f. Responding to the needs of the farming community g. Increase income in the livestock sector h. Improve knowledge and skills in the field of animal husbandry
<p>Institutional Dimension (Y₄)</p> <ul style="list-style-type: none"> a. Participate in livestock coaching/extension programs b. Collaborating with the government in an effort to support sustainable livestock development c. Collaborating with role models in an effort to support sustainable livestock development d. Participate in livestock organizations or institutions e. Collaborating with credit providing institutions in an effort to support livestock development f. Cut the chain of trade (marketing) of livestock commodities g. Empowering livestock institutions h. Creating a marketing network for livestock commodities

Table 1. Research Variables and Indicators (Continued)

Variables and Indicators	
Technological Dimension (Y ₅)	
a.	Managing the biological environment
b.	Having and mastering communication tools to support livestock business
c.	Mastering housing technology
d.	Mastering technology for processing and utilizing livestock waste limbah
e.	Participate in livestock extension program penyuluhan
f.	Improving the formal education of workers/employees
g.	Knowledge of feed and feed processing
h.	Knowing about livestock health
i.	Knowledge of livestock reproduction
j.	Knowledge of livestock rearing management
k.	Knowing about livestock product processing technology
l.	Mastering the vehicle to support the livestock business
m.	m. Own and control livestock product processing machines

3 Results and discussion

The influence of driving factors on the ecological dimensions is shown in Table 2.

Table 2. Test Results

Coefficients ^a					
model	Unstandardized Coefficient		Standardized Coefficient	t	Sig.
	B	Std. Error	Beta		
(Constant)	31.149	5.817		4.113	.000
DF	.492	.471	.528	1.872	.005

a. Dependent Variable : Ecological Dimensions

b. t tabel : 1.670

c. DF : Driving Factors

The results of the linear regression analysis in Table 2 show that the driving factors have a positive effect on the ecological dimension of .492, because the regression coefficient is positive, so the regression equation is $Y = 31.149 + .492X$. These driving factors have a positive and significant effect on the ecological dimension. This is indicated by a significance value of .005, which means it is smaller (<) than .05 (5%), and the calculated t value is also greater (>) than the t table value, namely 1.872. These conditions show that the driving factors have an influence on sustainable livestock development, especially in the ecological dimension, for example the use of livestock manure waste for plant fertilizer and the use of agricultural waste for animal feed [15].

The influence of driving factors on the economical dimension is shown in Table 3. The results of the linear regression analysis in Table 3 show that the driving factors have a positive effect on the ecological dimension of .376, because the regression coefficient is positive, so the regression equation is $Y = 25.143 + .376X$. These driving factors have a positive and significant effect on the economical dimension. This is indicated by the significance value of .005, which means it is smaller (<) than .05 (5%), and the calculated t value is also greater (>) than the t table value, namely 2.471. This condition shows that the driving factors have an influence on sustainable livestock development, especially in the economical dimension, for example breeders provide livestock production facilities and breeders have beef cattle farming businesses [17].

Table 3. Test Results

Coefficients ^a					
model	Unstandardized Coefficient		Standardized Coefficient	t	Sig.
	B	Std. Error	Beta		
(Constant)	25.143	2.115		5.016	.000
DF	.376	.119	.312	2.471	.001

- a. Dependent Variable : Economical Dimensions
- b. t tabel : 1.670
- c. DF : Driving Factors

The influence of driving factors on social and cultural dimensions is shown in Table 4.

Tabel 4. Test Results

Coefficients ^a					
model	Unstandardized Coefficient		Standardized Coefficient	t	Sig.
	B	Std. Error	Beta		
(Constant)	28.164	3.670		4.189	.000
DF	.327	.238	.414	2.019	.001

- a. Dependent Variable : Social and Cultural Dimensions
- b. t tabel : 1.670
- c. DF : Driving Factors

The results of the linear regression analysis in Table 4 show that the driving factors have a positive effect on the ecological dimension of .327, because the regression coefficient is positive, so the regression equation is $Y = 28.164 + .327X$. These driving factors have a positive and significant influence on the social and cultural dimensions. This is indicated by the significance value of .005, which means it is smaller (<) than .05 (5%), and the calculated t value is also greater (>) than the t table value, namely 2.019. This condition shows that the driving factors have an influence on sustainable livestock development, especially in the social and cultural dimensions, for example farmers can spend time on livestock businesses and support family participation in livestock businesses [25].

The influence of driving factors on institutional dimensions is shown in Table 5.

Table 5. Test Results

Coefficients ^a					
model	Unstandardized Coefficient		Standardized Coefficient	t	Sig.
	B	Std. Error	Beta		
(Constant)	30.173	4.114		5.289	.000
DF	.442	.235	.371	2.247	.005

- a. Dependent Variable : Technological Dimensions
- b. t tabel : 1.670
- c. DF : Driving Factors

The results of the linear regression analysis in Table 5 show that the driving factors have a positive effect on the ecological dimension of .442, because the regression coefficient is positive, so the regression equation is $Y = 30.173 + .442X$. These driving factors have a positive

and significant effect on the institutional dimension. This is indicated by the significance value of .005, which means it is smaller (<) than .05 (5%), and the calculated t value is also greater (>) than the t table value, namely 2.247. These conditions show that the driving factors have an influence on sustainable livestock development, especially in the institutional dimension, for example breeders actively participate in breeder development and empowerment programs, and farmers participate in breeder organizations or institutions [26].

The influence of driving factors on the technological dimensions is shown in Table 6

Table 6. Test Results

Coefficients ^a					
model	Unstandardized Coefficient		Standardized Coefficient	t	Sig.
	B	Std. Error	Beta		
(Constant)	12.118	1.127		2.169	.000
DF	.105	.145	.238	1.519	.005

a. Dependent Variable : Technological Dimensions

b. t tabel : 1.670

c. DF : Driving Factors

The results of the linear regression analysis in Table 6 show that the driving factors have a positive effect on the ecological dimension of .105, because the regression coefficient is positive, so the regression equation is $Y = 12.118 + .105X$. These driving factors have a positive but not significant effect on the technological dimension. This is indicated by a significance value of .005, which means it is smaller (<) than .05 (5%), but the calculated t value is also smaller (<) than the t table value, namely 1.519. This condition shows that the driving factors have not fully influenced sustainable livestock development, especially in the technological dimension, for example, farmers do not always have beef processing machines, farmers do not know livestock reproduction management, farmers do not know about livestock health management and livestock diseases [27].

4 Conclusion

Driving factors have a positive and significant influence on sustainable livestock development, especially on the ecological dimension of 0.492, the economical dimension of 0.376, the social and cultural dimension of 0.327, and the institutional dimension of 0.442. The driving factors for sustainable livestock development are worthy of the attention of all stakeholders in beef cattle farming commodities in Indonesia.

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