Influence of Forage Supply, Concentrate Provision, and Farmer Characteristics with the Number of Cattle in Breeding Village

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Abstract. This study aimed to investigate the influence of forage supply, concentrate provision, and farmers' characteristics on the number of cattle in the breeding village. One hundred and three farmers were selected, in interviews were carried out aiming to characterize the management practices related to forage supply, concentrate supply, and farm labour. A linear model was performed to analyze the significant variables. The result showed that the number of cattle was influenced by forage stock, farmers' experience, and occupation. the correlation analysis showed a weak correlation between forage stock and farmer experience with the number of cattle. The clustering showed the direction effect of forage stock to the right side while the farmers' experience to the bottom of the cluster. It concluded that the forage supply and farmers' experience have influenced the number of cattle.

1 Introduction

In rural communities, raising cattle serves as a source of income, and savings, and has the potential to advance the local economy [1]. This occurs because cattle husbandry can employ agricultural waste and post-harvest rest areas as a source of feed ingredients [2]. Land that is used for agriculture can also be used to grow feed for livestock [3]. Most members of the village focus their livestock efforts on micro-scale beef cattle raising. In general, 1 to 5 head [4] of cattle are produced utilizing intensive techniques, which need farmers to continuously supply feed [5]. Farmers who play a significant part in feeding livestock will work to manage their livestock operations and make wise judgments for their cattle.

Farmers' decision-making processes, including those associated with the raising of livestock, such as the provision of animal feed, can be affected by their socioeconomic features. Ruminant animals require forage as a vital feed source since it helps maintain their natural digestive tract wellness [6]. In the community's micro-scale efforts to raise beef cattle, intensive farming is practiced, and fodder is provided as the main feed, either as a single type

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of forage or as a blend of several forages [7]. Up to 100% of the forage in the ration may be utilized.

Forage sales have already started in several Indonesian districts, and this is unquestionably one of the branches of economic growth resulting from animal production. Farmers now have another option for providing feed thanks to this activity. The purpose of this research is to investigate the influence between forage supply, concentrate provision, and farmers' characteristics on the number of cattle in the breeding village.

2 Material and Methods

This study involved 103 respondents who are part of cattle farming groups in the cattle breeding region of Kebumen Regency, Indonesia. Respondents were selected using purposive random sampling, involving the selection of active and reputable cattle farming groups, followed by the random selection of group members as samples. Data collection was conducted in July and August 2022 and 2023 through well-structured interviews using a carefully designed questionnaire instrument [8]. A linear model was performed to analyze the significant variables. The analysis using Rx64 4.1.0 with package of Rcmdr, agricolae, car, and emmeans.

3 Result and Discussion

3.1 Farmers' characteristics

The respondents used in this study are cattle breeders active in the micro-scale beef cattle breeding industry who are members of the cattle breeders' groups located in the cattle breeding source region of that region. These farmers breed cattle as a type of savings, which they may sell whenever they want [4]. Farmers who responded to the survey range in age greatly. The oldest farmer among the respondents is 72 years old, and the youngest farmer is 29 (Table 1). The respondents' farmers are primarily in the pre-retirement, middle-aged, retirement, senior, and young working age categories in terms of age distribution. These results show that the majority of breeders have passed their prime working age, which is starting to show a decline in physical condition [14]. This can lead to reduced ability to do work that requires high strength or mobility. In the field of beef cattle farming, obtaining feed which still relies on physical energy and high mobility can certainly reduce the amount of feed collected. To overcome this, farmers need help from families to find feed and buy cattle feed.

The income from the cattle business fails to meet the farmers' daily necessities; instead, their principal occupations or professions are accomplished [9]. According to this study, most cow breeders are also farmers. It is common knowledge that farmers have access to their farmland, which provides feed, enabling them to seamlessly combine the care of their cattle with their farming operations [10].

Ownership of livestock by respondents ranges between 1-6 animals, with an average of 2 animals. This is still a small scale. Thus, according to the Ministry of Agriculture Regulation No. 14 of 2020, respondents in this study started micro livestock companies with ownership of up to five producing females. For farmers to make educated decisions about their livestock farming operations, farming expertise is a crucial component [2]. Livestock ownership is very important in deciding the sustainability of livestock in society [15]. This concerns the capital that must be provided and the farmer's ability to meet their feed needs. So it is very important to determine livestock ownership based on the characteristics of the breeder [16].

A large percentage of the responders to this study are seasoned farmers. This is demonstrated by the fact that 26.21% of respondents have experience spanning from 5 to 15 years and that 40.78% of respondents have more than 15 years of farming experience. 33.01% of farmers, meanwhile, have less than five years' worth of experience. Experience in animal husbandry illustrates the farmer's understanding in running his livestock business. Most breeders rely on experience to make decisions in selecting feed, the amount of feed given, maintenance management, handling livestock health, and buying and selling livestock.

Table 1. Farmers' characteristics.

Variable	Count (person)	Percentage (%)
Age group (years old)		
25-34 (young working age)	8	7,77
35-44 (middle-age working age)	31	30,10
45-54 (pre-retirement working age)	32	31,07
55-64 (retirement age)	21	20,39
>64 (elderly)	11	10,68
Primary occupation		
Laborer	4	3,88
Farmer	80	77,67
Employee	3	2,91
Village official	14	13,59
Government employees	2	1,94
Number of cattle ownership (head)		
1-2	65	62,14
3-4	32	32,04
>4	6	5,83
Cattle breeding experience (year)		
<5	34	33,01
5-15	27	26,21
>15	42	40,78

3.2 Influence of forage supply, concentrate provision, and farmer characteristics.

The result showed a significant influence variable on the number of cattle, there were forage stock, farmers' experience, and occupation (Table 2). The forage stock was the total available

forage in the farm that was ready for cattle. The farmers usually prepared the forage based on the number of cattle, however, the limited labor on the farm also restricted the number of cattle to rear. This research showed that the increase in forage stock is related to the increase in the number of cattle (0.024). The result was different from the previous research [11] that reported the forage production area has a higher influence on animal production due to the differences in forage feeding management. This can happen because breeders in rural areas in the Kebumen area still use traditional management in providing forage [17]. The collected forage is given directly to the livestock without any prior processing, so the amount of forage must be in accordance with the number of beef cattle owned. Apart from that, collecting forage is the activity that takes up most of the farmer's time [18]. With limited time, this will limit the amount of forage collected and affect the number of beef cattle owned. To improve the capacity of beef cattle ownership, one can facilitate the collection of forage by planting high-productivity forage and processing feed when there is excess production. This can reduce the workload and time for farmers in gathering livestock forage.

Table 2. Influence of forage supply, concentrate provision, and farmer characteristics on the number of cattle based on the linear model.

Variables	Estimate	Std. Error	t value	Pr(>|t|)	Sig.
Forage					
- stock	0.024	0.003	7.965	5.84×10^{-12}	***
- diversity	-0.091	0.109	-0.833	0.406	
- cultivation area	0.00008	0.00007	1.194	0.236	
Concentrate					
- supply	0.078	0.057	1.360	0.177	
- variant	0.303	0.200	1.517	0.1328	
Farmers' Characteristics					
- age	0.006	0.008	0.758	0.451	
- experience	-0.012	0.007	-1.724	0.088	.
- occupation	2.432	0.951	2.557	0.012	*

Farmers' experience was the duration of the farmer rearing the cattle. The longer duration of cattle rearing influences the number of cattle due to the older farmer's lack of preparation the forage and farm management [12]. Thus, the oldest farmer might reduce the number of

cattle (-0.012). Additionally, the farmer's experience also influences knowledge in the livestock trading business. Experienced farmers will be quicker in selling matured cattle as well as marketing calves [19]. Therefore, experienced farmers will play a more significant role in reducing the cattle ownership. On the other hand, the primary occupation influence significantly on the number of cattle (2.432). The influence might relate to the farm modal to expand the number of cattle, both capital and connection [13]. This can be caused by the increasing amount of capital, which will enhance the farmers' desire to invest more by increasing the number of beef cattle. Production costs can be minimized by expanding the livestock population, and the employment of workers can be facilitated. Additionally, there will be more cattle buyers due to increased connections, making the operation of the beef cattle business more accessible and efficient.

4 Conclusion

The development of beef cattle farming in rural areas is crucial for increasing the beef cattle population in Indonesia, even though traditional farming methods still dominate. This research concludes that farmer characteristics can influence the number of livestock ownership, such as the experience and the farmer's primary occupation. Meanwhile, the availability of forage has a significant impact on the livestock count. Therefore, innovation to enhance forage availability, especially high-quality forage, becomes essential in increasing livestock ownership and improving the sustainability of beef cattle farming in rural areas.

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