

Comparative Profit Analysis of Cattle Farming between Pineapple Waste and Elephant Grass Feed in Nunyai Canal District, Central Lampung

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Abstract. Cattle farming in Indonesia is still carried out by small and medium-sized farmers and is done traditionally. Farmers' profits from livestock as a livelihood are still not optimized. This research aims to know the profile of breeder, feeding system, analyzing costs, income and profits as well as analyzing the difference in the business profits of cattle with feed waste pineapple and elephant grass. The study was conducted in Tanjung Anom Village, Nunyai Canal District, Central Lampung. Total respondents were 60 households consisting of 30 cattle farmers with pineapple waste feed and 30 cattle farmers with elephant grass feed. The results of the study showed the revenue of cattle farmers with pineapple waste feed was greater than cattle farmers with elephant grass feed. Each of the profits obtained by cattle breeders with feed waste of pineapple and elephant grass was Rp 1,723,875 and Rp 1,241,751. The difference in profit on the analysis of T-Count obtained the T-calculate value of 0.88 smaller than T-table (2.02269). Using pineapple waste as feed can be a viable option for cattle farmers in terms of profitability and a sustainable solution for utilizing agricultural waste.

1 Introduction

Livestock is one of the subsectors of agriculture that has a strategic role in fulfilling food security. Cattle farming plays a crucial role in providing meat for consumption and contributing to the local economy. In Indonesia, even though the average consumption of beef cattle is quite low, cattle are important livestock in improving the rural economy for smallholder farmers [1, 2]. Cattle production in Indonesia amounted to approximately 18.05 million head and gradually increase year by year from 2013 to 2022. However, with the increasing population and demand for meat, it is essential to explore innovative ways to improve cattle farming practices and maximize profitability in efficiency of beef cattle farming business [3]. One potential avenue for improving profitability in cattle farming business is through the utilization of alternative feed sources.

Currently, cattle farmers in some regions of Indonesia primarily rely on traditional feeding methods, such as grazing on natural pastures and using legume shrubs and trees [4].

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These traditional feeding methods come with certain limitations that hinder profit maximization and productivity in cattle farming. One limitation is the lack of availability and high cost of commercial feeds [5, 6, 7], which can strain the financial resources of cattle farmers. Additionally, relying solely on natural pastures for grazing can lead to fluctuations in feed availability, especially during dry seasons when the quality and quantity of forage are reduced. To address these limitations, alternative feed sources are being explored as a means to improve cattle farming profitability.

Lampung is one of the regions in Indonesia known for its potential in livestock farming, including cattle farming. Cattle population in Lampung province gradually increased every year [8]. Central Lampung is the largest production of beef cattle in Lampung province, about 367,221 heads. Local farmers used mixed crop-livestock systems to produce cattle, i.e., utilizing crop waste for feed, and cattle manure for crops [9, 10].

In Central Lampung, cattle farming is one of the main sources of income for farmers and feed costs can significantly impact the profitability of cattle farming. Pineapple waste and elephant grass feed are two potential feed options for cattle farming, especially in the Nunyai Canal District. The aim of this study is to conduct a profit comparative analysis between cattle farming using pineapple waste and elephant grass feed in the Nunyai Canal District of Central Lampung.

2 Methodology

The study area was located in Nunyai Canal District, Central Lampung. According to the statistical data, Central Lampung is known as the largest production of cattle in Lampung province [8], and the study area of Nunyai Canal District consists of 7 villages, namely Bandar Sakti, Bandar Agung, Gunung Batin Baru, Gunung Batin Ilir, Gunung Batin Udik dan Tanjung Anom village. The total number of cattle farmers in the area was 467 as of the latest data available. The largest number of cattle farmers was found in Gunung Agung village, with a total of 176 farmers. However, all farmers were feeding their livestock using conventional methods, mainly relying on elephant grass and other grass as the primary feed source. In Tanjung Anom village, the total number of cattle farmers was 107, and the percentage of cattle farmers who utilized pineapple waste as a feed source was significantly higher compared to other villages, reaching 49% with a total of 48 farmers. We chose Tanjung Anom village as the study area for our comparative analysis of cattle farming between pineapple waste and elephant grass feed. The total number of farmers who utilized pineapple waste in the study area was 48. While the total number of farmers who utilized elephant grass was 52 and only 7 farmers were utilizing other feeds such as cassava and weeds.

The number of livestock observed was 212 cattle with pineapple waste feed and 100 cattle with elephant grass feed, where for each farmer the number of cattle was converted into 3 cattle, this was done so that the number of cattle from both feeds was the same. Knowing the costs incurred by farmers will provide intensive cost savings in the Simental cattle business.

The study aimed to compare the profitability of cattle farming using pineapple waste as feed versus elephant grass. We collected data through a structured questionnaire survey from the selected cattle farmers in Tanjung Anom village. We selected 30 farmers who utilized pineapple waste and also 30 farmers who utilized elephant grass as a feed source to represent the two groups for comparison. The collected data included information on the profile of the respondent (i.e. age, education, number of family members, experience of cattle farming, number of cattle, livelihoods, and main income source), input price (i.e. cost for feed source, labor, and assets for production), output price (i.e. income from selling their livestock). Furthermore, we conducted field observations to assess the condition of the cattle and their growth performance.

We conducted a profit comparative analysis using the collected data to evaluate the profitability of cattle farming using pineapple waste as feed compared to elephant grass. To know the production cost of each feed source, we calculated the total cost incurred by farmers for feed sources, labor, and production assets. We also calculated the income generated by farmers from selling their livestock. Then, we calculated the total profit of each group by subtracting the production cost from the generated income.

3 Results and Discussions

3.1 Socio-Economic Conditions

In terms of socio-economic conditions (See Table 1), the study found that the majority of cattle farmers who utilized pineapple waste and elephant grass in Tanjung Anom village were male, with a range of age of 40-49 years old with a percentage of 40%. This shows that most cattle farmers in the Village fall into the age category that has good physical abilities in conducting cattle business and with this age, cattle farmers can optimize Simental cattle business and can reduce labor costs outside the family. They had an average education level of primary school and an average family size of 5 members. Despite the level of education being relatively low, the farmers had a significant level of experience in cattle farming, with a range of 2-7 years. The number of cattle owned by farmers in both groups varied and mostly ranged from 2-6 cattle per household, with pineapple waste users having 23 households and elephant grass users having 29 households. Based on the data on socio-economic conditions, it can be observed that the majority of cattle farmers in Tanjung Anom village who used pineapple waste as feed for their cattle had similar socio-economic characteristics to those who used elephant grass.

3.2 Feeding system by local people

The two farmers with pineapple waste feed and elephant grass have different feeding systems, as well as different types of feed. Forage feed consists of pineapple waste feed and elephant grass as the staple diet of cows. The pineapple waste feed consists of pineapple stem by-products, while the elephant grass feed primarily consists of Napier grass. The feeding system employed by local farmers in the study area is crucial for understanding the profit comparative analysis between pineapple waste and elephant grass feed in cattle farming. In the study area, the feeding systems employed by local farmers using pineapple waste and elephant grass differed. Those using pineapple waste feed employed a cut-and-carry system, where they would harvest the pineapple waste and feed it directly to the cattle. The number of feeding times per day was not specified in the available sources. However, usually farmers provide two to three feedings per day for their cattle in the morning, noon, and evening. Combination of feed for pineapple waste users consists of 75% pineapple waste and 25% other feed ingredients such as rice bran or corn bran.

On the other hand, farmers using elephant grass feed employed a grazing system, where the cattle would graze on the elephant grass in the pasture. The farmers also provide two to three feedings per day for their cattle in the morning, noon, and evening. The combination of elephant grass users consists of 50% elephant grass and 50% other feed ingredients. The choice of feeding system is influenced by factors such as the availability and accessibility of feed resources, labor requirements, and the preferences and knowledge of the farmers regarding feeding practices. Additionally, the choice of feeding system may also be influenced by the cost and profitability of each type of feed.

Table 1. Profile of cattle farmers in Tanjung Anom Village, Nunyai District, Central Lampung

Descriptions	Pineapple Waste		Elephant Grass	
	Total (person)	Percentage (%)	Total (person)	Percentage (%)
1. Age (Years)				
30-39	7	23.3	7	23,3
40-49	12	40.0	12	40,0
50-59	9	30.0	7	23,3
60-68	2	6.7	4	13,4
Total	30	100	30	100
2. Level of Education				
No education	2	6.7	1	3,3
Elementary school	11	36.7	9	30,0
Junior high school	7	23.3	11	36,7
Senior high school	5	16.7	3	10,0
Vocational secondary school	4	13.3	6	20,0
Diploma	1	3.3	0	0,0
Total	30	100	30	100
3. Experience of Cattle Farming				
2-7	20	66.7	15	50
8-13	5	16.7	8	26,7
14-19	3	10.0	3	10
20-25	2	6.6	4	13,3
Total	30	100	30	100
3. Number of Family Members				
1-2	1	3.3	1	3,3
3-4	24	80.0	21	70,0
5-7	5	16.7	8	26,7
Total	30	100	30	100
4. Number of Cattle				
2-6	23	77	29	97
7-11	4	13	1	3
12-16	1	3	0	0
>17	2	7	0	0
Total	30	100	30	100

3.3 Profit Comparative Analysis Between Pineapple Waste and Elephant Grass Feed

In terms of socio-economic characteristics, the farmers who used pineapple waste as feed for their cattle had similar characteristics to those who used elephant grass. Depending on how many cattle a farmer owns, different amounts of feed are used in Tanjung Anom. The more cattle a farmer has, the more feed is needed. In addition to the number of cattle, gender also affects the amount of feed given. Female cattle have less feed compared to male cattle. This is done by farmers to avoid overweight or obesity in female cows which will cause infertility for female cattle.

Table 2 shows that the average feed cost incurred by cattle farmers with pineapple waste feed was greater than farmers who use elephant grass feed. The cost of forage feed in cattle farming in Tanjung Anom Village for cattle farmers with pineapple waste feed was 1,046,590 IDR and for cattle farmers with elephant grass feed at a cost of 561,750 IDR. The use of additional feed in cattle businesses of cattle farmers with pineapple waste feed is about 737.83 Kg and 68.85 Kg for additional feed used by cattle farmers with elephant grass feed. While the average use of salt in cattle with pineapple waste feed was 0.38 kg and 6.44 Kg for farmers with elephant grass feed. The use of salt was useful to increase the cattle's appetite.

Table 2. Cost and benefit of Cattle farm business in Tanjung Anom Village

No	Description	Pineapple Waste		Elephant Grass	
		Total	Cost (IDR)	Total	Cost (IDR)
Explicit Cost					
1	Feed				
	Main Feed	3228,54 kg	1.046.590	140,44/tie	561.750
	Additional Feed	737,83 kg	1.846.051	68,85/tie	169.695
	Salt	0,38 kg	1.196	6,44 kg	19.755
	Total		2.893.837		751.200
2	Labor				
	Searching for feed sources (day=8hr)	0	0	0	0
	Feeding	1.8	87,412	0	0
	Cleaning the cage	0.5	30,634	0	0
	Total	2.3	118,046	0	0
3	Asset Depreciation	-	61,115	-	74,105
4	Electricity, gasoline and medical purpose	-	89,333	-	165,167
	Total	-	3,162,905	-	428,722
Implicit Cost					
1	Labor from family member				
	Main Feed	0	0	8,58	323.864
	Additional Feed	2,6	122.403	3,32	114.202
	Salt	1,2	59.155	3,13	143.750
	Total	3,8	181.558	15	581.816
2	Others	-	18,016	-	3,111
	Total		199,574		584,927
Income from Cattle business farm					
	Weight difference before the treatment (kg), with the price of cattle IDR 42,000/kg.	121.09	5,085,780	53.7	2,255,400
	Profit = Income - Cost	-	1,723,875	-	1,241,751

The average non-family labor cost for cattle farmers using pineapple waste feed was 118,046 IDR, while for cattle farmers using elephant grass feed, the average non-family labor cost was 0 IDR. The average non-family labor in cattle farmers using pineapple waste feed was greater than the non-family labor of cattle farmers using elephant grass feed, this was because cattle farmers with elephant grass feed do not use non-family labor. Cattle farmers with elephant grass feed have been able to carry out cattle business activities without labor

from outside the family. Another cost was depreciation of equipment. the largest of it in the cattle business with pineapple waste feed and elephant grass in Tanjung Anom Village was the cage, because the cage was the main thing that cattle farmers must have in the cattle business.

Other costs of cattle business are from electricity, gasoline and medical purposes. The average total other costs incurred by cattle farmers feeding pineapple waste and elephant grass are Rp 89,333 and Rp 165,167 per month, respectively. We also calculated the implicit cost of cattle business. The average total implicit cost incurred by cattle farmers feeding pineapple waste and elephant grass are Rp 199,574 and Rp 584,927 per month, respectively.

The results of the comparative analysis indicate that cattle farmers using pineapple waste feed incur higher feed costs compared to farmers using elephant grass feed. The difference in feed costs between cattle farmers using pineapple waste feed and those using elephant grass feed was significant. The difference in profit on the analysis of T-Count obtained the T-calculate value of 0.88 smaller than T-table (2.02269). The revenue of cattle farmers with pineapple waste feed was greater than cattle farmers with elephant grass feed. The revenue of cattle farmers with pineapple waste feed amounted to 5,085,780 IDR, while the revenue of cattle farmers with elephant grass feed amounted to 2,255,400 IDR. Although cattle farmers using pineapple waste feed incur higher costs compared to farmers using elephant grass feed, the profit generated from cattle farming with pineapple waste feed was higher. This is due to several factors such as improved rumen degradability and digestibility of silage when pineapple waste is included in the ensiling of elephant grass [11, 12]. The profit obtained by cattle farmers with pineapple waste feed was Rp 1,723,875. The profit obtained by cattle farmers with elephant grass feed was Rp 1,241,751. Based on the comparative analysis, it is evident that cattle producers who feed their livestock pineapple waste make more income than those who feed their cattle elephant grass. The result was also proven by the previous research that in terms of animal performance and cost-effectiveness, using pineapple waste as cattle feed has produced encouraging results [12, 13]. Using pineapple waste as feed can be a viable option for cattle farmers in terms of profitability. environment, ecology and a sustainable solution for utilizing agricultural waste [14].

4 Conclusion

In conclusion, the comparative profit analysis of cattle farming between pineapple waste and elephant grass feed in the Nunyai Canal District of Central Lampung shows that pineapple waste feed leads to higher profits for cattle farmers. This discovery emphasizes the potential for using pineapple waste as a viable and affordable option for feeding livestock in the area. By utilizing pineapple waste, farmers can not only improve their profitability and viable livelihood sources [15] but also help sustainable farming methods by turning waste into valuable feed. The performance of animal growth and the profitability of agricultural operations can both be enhanced by adding pineapple waste to the feed. Additionally, pineapple waste can be used as a feed alternative with favorable environmental effects by reducing agricultural waste and promoting the circular economy. Further analysis and studies on benefits of pineapple waste composition and its effect on environmental issues, organic farming and animal health, as well as its long-term impact on cattle farming business, are needed to fully understand the potential of pineapple waste as a feed option for cattle farming.

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