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Research Article

Profit and Capacity Analysis of Beef Cattle Business; *Case Study*

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Abstract: This study aims to analyze the profitability and carrying capacity of a beef cattle farm in Mapanget Village, Talawaan District, North Minahasa. The respondent, Mr. Nicolaas Kandowangko, served as the data source for this study and owned 54 cattle. This study utilized a survey method through observation and in-depth interviews with the sample farmers using a prepared questionnaire. The analysis method used the profit analysis formula π = TR – TC, where π was the farmer's profit (IDR/period), TR (Total Revenue) the value of revenue obtained from sales, and TC (Total Cost) the total costs incurred, consisting of fixed costs and variable costs. The study concluded that Mr. Nicolaas Kandowangko's beef cattle farm generated a profit of 94,075,333 IDR. The research demonstrated that profitability determination of a beef cattle business was not only based on total sales revenue but also on the capacity to meet the livestock's feed needs. Production costs per period were also taken into account. The R/C ratio Mr. Nicholas beef cattle business result showed that the business was worthy of further development.

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INTRODUCTION

The need and demand for national meat continues to increase every year, but the availability beef stock is not sufficient. This is the basis for the policy of importing livestock and beef. This import policy is considered detrimental to beef cattle breeders in Indonesia. In addition, livestock imports are feared to carry the risk of dangerous diseases such as Foot and Mouth Disease (FMD) which can harm local breeders. For reducing dependence on imports means that beef cattle productivity and beef production in the regions need to be increased. In the Minahasa area, North Sulawesi Province, beef cattle farming was oriented as a side business for farmers and is also used as savings, so that in the future it can be used to meet the needs of farmers. The beef cattle population in North Minahasa can be seen in Table 1.

Table 1 Cattle Population in North Minahasa

Distric	Number of Cows
Kema	1.136
Kauditan	2.178
Airmadidi	1.180
Kalawat	1.159
Dimembe	1.885
Talawaan	2.028
Likupang Selatan	1.313
Likupang Timur	1.967
Likupang Barat	1.095
Wori	1.730
Total	16.091

Source: BPS, 2023

Efforts to increase production results in the development of livestock areas are activities that are carried out continuously by the government and the community. The development of beef cattle farming businesses is expected to form a broad regional integration based on local resources based on land resources (Elly et al., 2022). One of the local resources in the North Minahasa Regency area is coconut plantation land. Coconut plantation land resources are used for grazing livestock and planting grass for livestock (Salendu et al., 2018).

Land as a system has components that are organized with certain patterns and behave to achieve certain goals. These land components can be considered as resources related to human activities in meeting their life needs (Worosuprojo, 2007). Based on this, there are two main categories of land resources, namely (1) natural land resources and (2) land resources resulting from human activities (human cultivation). Thus, land resources include all land characteristics and the processes that occur in it which in a certain way can be utilized to meet human life needs.

Beef cattle farming is said to be successful if it is able to increase the income of farmers to meet their living needs. Therefore, it is important to know the production costs incurred, the income obtained, and the level of profit of beef cattle farmers (Setiawan et al., 2014). The development of beef cattle farming can be done by utilizing resources optimally and appropriately which are adjusted to natural conditions, local socio-economic conditions, facilities and infrastructure, development of livestock technology, and supporting institutions and policies. Cattle farming is influenced by the availability of land for sources of green fodder, both grass and legumes. Cattle as ruminant livestock whose staple food is green plants, both natural pasture greens and cultivated pastures of superior feed plants with high productivity.

Development in beef cattle farming is better done through an integrated pattern approach with food crops or horticulture and plantations so that waste from the farm can be utilized optimally. On the other hand, beef cattle also produce feces and urine which can be processed into organic fertilizer to be given to coconut plants and become one of the sources of renewable energy (Yusmaniarti et.al., 2022). Mr. Nicolaas Kandowangko's beef cattle farm is a farm in Mapanget Village, Talawaan District, which started raising cattle in 2016. Initially, only around 3 cows were raised and now it has reached 54 cows. Mr. Nicolaas Kandowangko's beef cattle farm uses an extensive maintenance system, namely raising cattle on grazing land with an area of 10 ha.

The livestock and coconut plantation businesses in Talawaan District are generally still smallholder livestock businesses, where farmers only utilize natural grazing greens so that the capacity of cattle in coconut land is still limited. The development of the scale of the beef cattle business depends on the capacity of green fodder for livestock. The larger the scale of the business, the more livestock are raised, so the profits obtained by beef cattle farmers are greater. The purpose of this study was to analyze the size of the capacity of beef cattle and its profits.

RESEARCH METHODS

This research was conducted in October 2024 at a beef cattle farm owned by Mr. Nicolaas Kandowangko in Mapanget Village, Talawaan District, North Minahasa Regency. The research method used in this study is quantitative descriptive research using survey methods and field observations using interview techniques on livestock respondents using questionnaires.

The techniques that will be used for data collection are: Location Identification
(1). The location that has been determined is a cattle farm on grazing land owned by Mr. Nicolaas Kandowangko in Mapanget, Talawaan District, North Minahasa. The land area is 10 ha, and the livestock population is 54 heads.
Questionnaire filling interviews
(2). Conducting structured direct interviews with the owner and his workers.
Collection of livestock feed data using the 1x1m² sample plot method (tile) on grass and legumes as follows:

(1) Five examples of corn stalks
(2) Five examples of elephant grass
(3) Five examples of field grass

Data Analysis, calculating Fixed Costs consisting of land rent, guard house, and equipment; Guard house depreciation costs; Income Tax (PBB) in units (Rp/Year), using the depreciation formula, namely:

$$Depreciation/year = \frac{Acquisition\ Cost\ -\ Residual\ Value}{economic\ life}$$

The profit from a beef cattle farming business uses the profit formula according to Soekartawi (2003) as follows:

$$\pi = TR - TC$$

Note:
π : Profit of beef cattle business
TR : Total Income
TC : Total cost or Fixed Cost + Variable Cost

Depreciation of facilities and equipment for the cage is calculated based on linear

depreciation, according to Suratiyah's (2016) suggestion:

$$Depreciation/year = \frac{Acquisition\ Cost\ -\ Residual\ Value}{economic\ life}$$

RESULTS AND DISCUSSION

Beef Cattle Business Profit Analysis

Production costs are the total costs incurred by livestock farmers to finance all production factors used, calculated against revenue to generate profit. Production costs are divided into two parts: (1) fixed costs, which remain constant even if production output changes to a certain extent. Fixed costs include rent, depreciation of pens/guardhouses, equipment purchases and depreciation, taxes/land tax, and others. (2) variable costs, which change as production output changes. These costs include feed (forage cultivation, corn stalks), medication costs, and labor costs. Furthermore, it is explained that in addition to these costs, costs that are not included in traditional livestock farming businesses must also be taken into account, such as the calculation of livestock wages. The results of the production cost calculation consist of fixed costs, variable costs, and total costs (Purba, 2019).

The average fixed costs incurred for a beef cattle business over a one-year period are presented in Table 2.

Table 2. Fixed costs of beef cattle business

Type of cost	Unit	Total	Cost (IDR)	Total cost
Building				
a. Guard house	Unit	1	40.000.000	40.000.000
Sub total				40.000.000
Facility/Equipment				
1. Generator	Unit	1	5.000.000	5.000.000
2. Electric installation	Pack	1	2.500.000	2.500.000
3. Lamp	Piece	5	20.000	100.000
4. Water tank	Unit	1	5.000.000	5.000.000
5. Water pump	Pack	1	10.000.000	10.000.000
6. Stop valve	Piece	3	25.000	75.000
7. Bucket	Piece	6	30.000	180.000
8. Ox cart	Piece	1	7.000.000	7.000.000
9. Sickle	Piece	8	35.000	280.000
10. Pacak machine	Unit	1	3.000.000	3.000.000
11. Vehicle.	Unit	1	40.000.000	40.000.000
12. Tractor	Unit	1	26.000.000	52.000.000
13. Hand-sprayer	Unit	1	750.000	750.000
Sub total				99.710.000
Land				
Land rent	Per year	1	20.000.000	20.000.000

Total	159.710.000

Source: processed research data (2024)

Table 2 shown that the fixed costs of beef cattle business include guard house costs with a total cost of 40,000,000 IDR and equipment such as generators, electrical installations, lights, water tanks, water pumps, stop valves, buckets, ox carts, sickles, pacak machines, four-wheeled vehicles, tractors, handsprayers) with total cost of 99,710,000 IDR and land rental total cost of 20,000,000 IDR. The total overall cost was 159,710,000 IDR. Depreciation costs can be seen in table 3.

Table 3. Depreciation costs of beef cattle business

Type of cost	Depreciation				
	Initial value	Present value	Economics life	Depreciation value per year	Depreciation value per month
	(IDR)		Year	(IDR)	(IDR)
Building					
a.Guard house	40.000.000	28.000.000	10	2.800.000	233.333
Facilty/Equipments					
1. Generator	5.000.000	3.500.000	3	1.166.667	97.222
2. Electric installation	2.500.000	3.500.000	4	875.000	72.917
3. Lamp	100.000	1.750.000	3	583.333	48.611
4. Water tank	5.000.000	70.000	5	14.000	1.167
5. Water pump	10.000.000	3.500.000	3	1.166.667	97.222
6. Stop valve	75.000	7.000.000	5	1.400.000	116.667
7. Bucket	180.000	52.500	3	17.500	1.458
8. Ox cart	7.000.000	126.000	3	42.000	3.500
9. Sickle	280.000	196.000	3	65.333	5.444
10. Pacak machine	3.000.000	2.100.000			
11.Vehicle	40.000.000	28.000.000	3	9.333.333	777.778
12. Tractor	26.000.000	18.200.000	3	6.066.667	505.556
13. Handsprayer	750.000	525.000	3	175.000	14.583
Land					
Land rent	20.000.000			20.000.000	1.666.667
Total				42.474.667	3.539.556

Source: processed research data (2024)

Table 3 shown that the depreciation costs of the beef cattle business include a guard house with a total cost of 233,333 IDR per month and 2,800,000 IDR per year, equipment such as generators, electrical installations, lights, water tanks, water pumps, stop valves, buckets, ox carts, sickles, pacak machines, four-wheeled vehicles, tractors, handsprayers) and total land rent have depreciation cost of 20,000,000 IDR per year and 1,666,667 IDR per month. The total depreciation cost was 3,539,556 IDR per month and 42,474,667 IDR per year. Variable Costs are costs incurred by beef cattle farmers that directly affect production levels, including animal feed

(corn stalks, elephant grass, field grass/legumes), vaccines, medicines, labor, and the purchase of cattle seeds. These costs can be seen in Table 4.

Table 4. Variable cost

Cost Components	Unit	Number of Units	Unit Price (IDR)	Total Cost / cycle (IDR)	Multiplier	Cost per year (IDR)
Animal Feed						
a. Corn Stalks	Ha	5	4.430.000	22.150.000	4	88.600.000
b. Elephant Grass	Ha	3	1.100.000	3.300.000	4	13.200.000
c. Field Grass/Legumes	Ha	7	814.286	5.700.002	4	22.800.008
Subtotal				31.150.002		31.150.002
Vaccines and Medicines	Package	4	2.500.000	10.000.000	2	20.000.000
Labor	HOK	2	2.500.000	5.000.000	12	60.000.000
Cattle Purchase	Tail	10	8.000.000	80.000.000		80.000.000
Total				95.000.000		315.750.010

Source: processed research data (2024)

Table 4 shown that variable costs in beef cattle business such as animal feed, i.e. Corn Tebon amount 5 ha unit price 4,430,000 IDR cost/cycle, 22,150,000 IDR with a multiplier factor of 4 times total per year 88,600,000 IDR. Elephant Grass unit amount 3 ha unit price 1,100,000 IDR cost/cycle, 3,300,000 IDR with a multiplier factor of 4 times total per year 13,200,000 IDR, and Field Grass/Legumes amount 7 ha unit price 814,286 IDR cost/cycle, 5,700,000 IDR with a multiplier factor of 4 times total per year 22,800,008 IDR. Total feed costs of 31,150,002 IDR per cycle and 124,600,008 IDR per year. Variable costs in the beef cattle business such as vaccines and medicines, unit quantity 4 packages, unit price 2,500,000 IDR cost/cycle, 10,000,000 IDR with a multiplier factor of 2 times the total per year 20,000,000 IDR, labor unit quantity 2 hok, unit price 2,500,000 IDR cost/cycle, 5,000,000 IDR with a multiplier factor of 12 times the total per year 60,000,000 IDR, and the purchase of cattle unit quantity 10 head, unit price 8,000,000 IDR cost/cycle, 80,000,000 IDR total per year. The total variable costs were 95,000,000 IDR per cost/cycle and 160,000,000 IDR per year.

Total costs are the costs required for all production, but of the two production costs, variable costs are very large costs, this shows that variable costs are the cost of raw materials for a business. The average total costs are presented in Table 5 below:

Table 5. Total cost

Cost	Value
a). Fixed cost (IDR)	42.474.667
b). Variable cost (IDR)	160.000.000
Total cost (IDR)/PP	202.474.667

Source: processed research data (2024)

Table 5 shows that fixed costs were 42,474,667 IDR and variable costs were 160,000,000 IDR, resulting in a total cost of 202,474,667 IDR for the beef cattle business.

Revenue for the beef cattle business was the result of cattle sales over the past year, and the selling price of the cattle was calculated in units of IDR/year, as seen in Table 6.

Table 6. Business revenue

Revenue	Value
Sale: (Head)	
Cattle sold (Head)	20
Average cattle price per head	14.827.500
Total sales (IDR)	296.550.000

Source: processed research data (2024)

Based on Table 6, 20 cattle were sold with an average price of 14,827,500 IDR per cattle, resulting in a total sales price of 296,550,000 IDR. The profit from the beef cattle business is the total revenue minus the total costs of the beef cattle business (IDR/year). The profit calculation for Mr. Nicolaas Kandowangko's beef cattle business can be seen in Table 7.

Table 7. Business profit

Profit	Value
Revenue rer year (IDR)	296.550.000
Total cost per year (IDR)	202.474.667
Profit per year (IDR)	94.075.333
R/C ratio	1,46

Source: research result (2024)

Based on Table 7, it can be seen that with a total income of 296,550,000 IDR per year using production costs of 202,474,667 IDR per year, thus providing a profit for Mr. Nicolaas Kandowangko's beef cattle business of 94,075,333 IDR per year, with an RC Ratio or the ratio between income and production costs of 1.46, which means that Mr. Nicolaas Kandowangko's beef cattle business is a profitable business and is worth continuing. The results of this study are almost the same as the results of Muhtar et., al (2016) research that beef cattle income is influenced by the population of beef cattle they own.

Beef Cattle Business Carrying Capacity Analysis

Carrying capacity, or the maximum number of cattle that can be raised on a given plot of land, is calculated in units of animals per year. This was shown in Table 8.

Table 8. Carrying capacity

No	Description	Volume
1	Beef cattle (ST)	46
2	Feed potential (Kg/Thn)	467,500
3	Feed consumption (Kg/Thn)	503,700

4	Lack of feed stock (Kg/Thn)	36,200
5	Lack of carrying capacity (ST)	6

Source: processed research data (2024)

Based on Table 8, a standard carrying capacity of 46 beef cattle was calculated at 300 kg using Animal Units (AU). The potential feed per kg/year was 467,500 tons, resulting from three types of feed: 257,100 kg of corn stalks, 126,330 kg of elephant grass, and 84,070 kg of field grass/legumes. The annual feed requirement was 503,700 tons, resulting from 46 cattle x 30 percent x 365 days. The annual feed shortage was 63,700 tons, resulting from 503,700 - 467,500. The carrying capacity was 6 head, so the carrying capacity is still insufficient to accommodate Nicolas Kandowangko's 54 cattle.

CONCLUSION

The research concluded that Mr. Nicolaas Kandowangko's beef cattle business in Mapanget Village, Talawaan District, wa profitable. This research also demonstrates that determining the profitability of a beef cattle business was not only based on total sales revenue or revenue but also on the capacity to meet the livestock's feed needs. Production costs per period were also taken into account. The R/C ratio of 1.46 means that Mr. Nicholas beef cattle business is worthy of further development.

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