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# Potential for Cattle Business Development in the Buffer Zone of Mount Leuser National Park, Bahorok District, Indonesia

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**ABSTRACT**

Local communities in Bahorok District are highly dependent on the agricultural and livestock sectors as their main livelihoods. The environment and abundant natural resources cause a profitable for the community to raise livestock.This study aims to to examine potential development of cattle farming (financial and economic aspects) in the buffer zone *of* Gunung Leuser National Park, Bahorok District.The type of data used in this study is primary data obtained through observation and interviews and secondary data through literature and the North Sumatra Central Statistics Agency. Determination of the sample by Purposive Sampling with 100 cattle breeders. Data analysis was carried out by calculating income, financial analysis of Net Present Value (NPV), Net Benefit-Cost (B/C), Payback Period (PP), and economic analysis. The results of this study indicate that the average income of cattle breeders in the Buffer Zone of Gunung Leuser National Park, Bahorok District is IDR 24,551,421 for semi-intensive and IDR 8,235,155 for extensive per year. The income of breeders can cover production costs so that income is positive or profitable. The cattle farming business shows that by using an interest rate of 8%, the NPV is obtained >0 or has a positive value, the Gross B/C value is obtained 1.97 and the Net B/C value is 1.25,meaning BCR>1 means a positive value, the PP value is 3.1 and 4.2 years, and the economic analysis shows that the cattle farming business has an importantrole in the economy in Bahorok District.

**Keyword:** Buffer zone, Economy, Cattle, Financial, NPV


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## 1. Introduction

Bahorok sub-district is located in the Mount Leuser National Park (GLNP) buffer zone, which is an area adjacent to the GLNP boundary and has an important role in maintaining the ecosystem within the national park. This area often has human activities, including animal husbandry. The National Park buffer zone (GLNP) has an important relationship with the livestock business, especially in the context of environmental preservation, nature conservation, and natural resource management [1].

Local communities in Bahorok Sub-district are highly dependent on the agricultural and livestock sectors as the main livelihood, with a very abundant environment and natural resources that are very profitable if the community is raising livestock. Local communities who raise livestock in the buffer zone area raise

livestock using an extensive system resulting in several conflicts in this area. Farmers in the buffer zone area use 2 types of maintenance systems, namely extensive maintenance and semi-intensive maintenance. There are 85% of farmers who use the extensive system or commonly known as the system of grazing livestock without being stabled [2].

Based on observations in the field, the extensive rearing system can cause conflicts between tigers and livestock, namely disputes over buffer boundaries, and there are also farmers who break the law by entering livestock into people's land without permission or violating environmental regulations. Thus, conflicts arise between landowners and local authorities. Large areas of plantation land make it easy for farmers to find feed for their animals by grazing their animals on community land and conflicts and disputes occur [3].

Extensive and semi-extensive rearing systems in the buffer zone have the potential to provide feed but also the potential to be attacked by tigers. Farmers must also pay attention to this to produce high productivity. A business that has the ability to expand is one that has been tested for feasibility. Business feasibility analysis is very important to do, so that in the future, the business that is run does not fail and is a measuring tool for whether the ruminant livestock business provides long-term benefits for farmers [4,5].

Bahorok District is one of the areas located in Gunung Leuser National Park buffer zone with fertile soil and high availability of forage, so it has great potential and opportunities to develop ruminant livestock and basically the ruminant farming business is attempted to generate maximum income which ultimately improves the standard of living and welfare, especially the people in the area of Gunung Leuser National Park. Ruminant farming in the livestock business is important because it is related to the number of products and income to be obtained [6,7]. Based on the background obtained, the researcher thought to examine the research on the potential development of cattle farming (financial and economic aspects) in the buffer zone *of* Gunung Leuser National Park, Bahorok District.

## 2. Method

### *2.1. Research Approaches*

This research approach is descriptive quantitative which aims to describe the condition and profile of livestock businesses in the buffer zone area of Gunung Leuser National Park, Bahorok District. In addition, this study also aims to analyze the potential of livestock businesses from the aspects of financial and economic feasibility. This research was conducted in Bahorok Subdistrict, which is located in the buffer zone area of Gunung Leuser National Park (GLNP) in May - July 2024.

### *2.2. Population and Sample*

The population in this study were all cattle farmers in Bahorok Subdistrict who were in the GLNP buffer zone area. Samples were taken using purposive sampling technique, with the sample criteria being farmers who are active in the cattle farming business.

### *2.3. Data Collection Instruments*

The data collection instruments used in this study are:

1. Questionnaire is a data collection tool in the form of a series of questions prepared to obtain information from respondents. Usually in the form of a form filled in by respondents independently or with the help of researchers. Used to collect data on farmer profiles, maintenance systems, and farm business conditions.

2. Interview is a data collection method in which researchers ask questions directly to respondents to obtain in-depth and detailed information. Conducted to obtain in-depth information about the farmer's business profile and the feasibility of their business.

3. Observation is a data collection method in which the researcher directly asks questions to the respondents.

*2.4. Data Analysis Methods*

Data analysis in this study was carried out with two approaches, namely descriptive quantitative and financial and economic feasibility analysis. Data management was carried out with the help of a calculator and a Microsoft Excel computer program.

1. Quantitative Descriptive Analysis: Data obtained from questionnaires and observations were analyzed descriptively to describe the condition and profile of livestock businesses in the GLNP buffer zone Area, Bahorok District.

2. Financial and Economic Feasibility Analysis:

a. Net Present Value (NPV): calculates the difference between the present value of cash inflows and the present value of cash outflows.

b. Net Benefit-Cost (B/C) Ratio: compares the net benefits with the costs incurred in the livestock business.

c. Payback Period (PP): calculates the time needed to return the capital that has been invested in the livestock business.

d. Descriptive economic analysis of the data obtained related to the economic aspects of farmers' lives, namely household income, welfare changes, living conditions, vehicle assets and household equipment, farm and ranch assets, frequency and reasons for selling livestock.

## 3. Result and discussion

*3.1. Production Cost*

Cattle rearing in the Gunung Leuser National Park buffer zone area of Bahorok sub-district involves fixed costs that are added to the farmer's variable costs. Table 1 provide details on production costs.

Table 1. Average production cost of cattle farming in 1 year

| No | Description | Semi Intensive | Extensive |
|---|---|---|---|
| 1. | Fixed Cost | Rp.2.070.270 | 0 |
| 2. | Variable Cost | Rp. 327,027 | Rp. 322,222 |
| | Total Production Cost | Rp.2,397,297 | Rp. 322,222 |

Source: Processed primary data

The total production costs incurred in the cattle farming business in the buffer zone area of Gunung Leuser National Park, Bahorok District, were summed up to determine the overall production costs. The semi-intensive maintenance system obtained a fixed cost of Rp. 2,070,270 with variable costs of Rp. 327,027, obtained the total production costs of semi-intensive maintenance of cattle farms in the buffer zone of Gunung Leuser National Park, Bahorok District amounted to Rp. 2,397,297, while the extensive maintenance system obtained a fixed cost of Rp. 0 with variable costs of Rp. 322,027. Extensive maintenance system obtained a fixed cost of Rp.0 with variable costs of Rp. 322,222 obtained extensive maintenance of cattle farms in the buffer zone of Gunung Leuser National Park, Bahorok District amounted to IDR.322,222.

*3.2. Acceptance*

Cattle sales, by-product sales, and other business income are all sources of income in the study area for cattle farming in the buffer zone *of* Gunung Leuser National Park in Bahorok Subdistrict. Table 2 show the average income generated by cattle farms in the Buffer Zone area of Gunung Leuser National Park, Bahorok Subdistrict, which for the semi-intensive rearing system amounted to IDR.27,459,459, while the extensive rearing system amounted to IDR. 8,841,270.

Table 2. Average acceptance of cattle business in one year.

| No | Description | Semi Intensive | Extensive |
|---|---|---|---|
| 1 | Cattle Sales Revenue | IDR.27.459.459 | IDR. 8.841.270 |
| 2 | By-Product Acceptance | IDR. 0 | IDR.0 |
| | Total Acceptance | IDR.27.459.459 | IDR. 8.841.270 |

Source: Processed primary data

*3.3. Revenue*

Income is the result of the difference between the salary earned by the farmer and the total production costs incurred by the farmer in maintaining the cattle farming business in 1 year. The amount usually generated by semi-intensive system cattle farmers in the Buffer Zone area of Gunung Leuser National Park, Bahorok District with cattle sales, sales of by-products amounted to 27,459,459 with total production costs of 2,397,297. With details of income can be seen in table 8 and appendix 8 with a total income of IDR. 25,062,162, while the extensive system of revenue amounted to IDR. 8,841,270 with costs of production 8,841,270 with production costs of IDR.322,222 with details of income in table 8 and appendix 9,10 which is IDR. 8,519,048.

Table 3. Total Income of Farmers in the Gunung Leuser National Park Buffer Zone, Bahorok District

| No | Description | Semi Intensive | Extensive |
|---|---|---|---|
| 1 | Total Penerimaan | IDR.27.459.459 | IDR. 8.841.270 |
| 2 | Total Biaya Produksi | IDR.2.397.297 | IDR. 322.222 |
| | Total Pendapatan | IDR. 25.062.162 | IDR. 8.519.048 |

Source: Processed primary data

3.5. *Net Present Value* (NPV)

*Net Present Value* serves to calculate the discount or interest rate to estimate the value of the company in the future. The very buffer zone of Gunung Leuser National Park Bahorok District helps to determine whether a company can be operated or not in the buffer zone area of Gunung Leuser National Park Bahorok District.

Table 4. Criteria for financial analysis of cattle business in the Buffer Zone area of Gunung Leuser National Park, Bahorok District

| No | Description | Semi Intensive | Extensive |
|---|---|---|---|
| 1 | NPV | 294.075.984 | 15.257.396 |
| 2 | PP | 36,42 | 48,37 |
| 3 | Gross B/C | 2,04 | 2,04 |
| 4 | Net B/C | 1,31 | 1,31 |

Source: Processed primary data

According to Table 4 the Net Present Value (NPV) value of the semi-intensive rearing system is IDR. 294,075,984, while the Net Present Value (NPV) value of the extensive rearing system with a discount factor of 8%. Present Value (NPV) extensive maintenance system with a discount factor of 8%. The NPV value of IDR.15,257,396 and NPV > 0 indicate that the cattle farming business in the Buffer Zone area of Gunung Leuser National Park, Bahorok District, is feasible and has the potential to be developed [8].

3.6. *Payback Period* (PP)

ThePayback Period conducted on cattle farming in the buffer zone area of Gunung Leuser National Park, Bahorok District, revealed that cattle farming with a semi-intensive maintenance system takes

3.0 years or 36.42 months to cover its capital expenditure, while cattle farming with an extensive maintenance system takes 4.0 years or 48.37 months. A company can determine its payback period by working out how much time it takes to recoup its investment costs from cash flow.

### 3.7. *Net Benefit Cost Ratio* (B/C)

B/C is the ratio between the level of profit obtained and the total costs incurred. Livestock business in the buffer zone area of Gunung Leuser National Park, Bahorok District will be profitable if the B/C value is > 1. The greater the B/C value, the greater the benefits that will be obtained from the business [9,10]. The benefit cost ratio obtained by farms in the buffer zone area of Gunung Leuser National Park, Bahorok Subdistrict. Table 9 shows that the Grost (B/C) value is 2.04 and the Net (B/C) value is 1.31. The BCR value > 1 means that livestock farming in the buffer zone area of Gunung Leuser National Park, Bahorok District is profitable.

This is in accordance with the opinion of [11,12] which states that the Benefit Cost Ratio (BCR) is a comparison between the present value of benefits and the present value of costs. Thus the benefit cost ratio shows the benefits obtained for every additional one rupiah of expenditure. BCR will illustrate the benefits and feasibility of implementation if it has BCR> 1. BCR = 1, then the business is not profitable and has no loss, so it is up to the business owner to decide whether the business is profitable or not. BCR = 1, then the business is not profitable and has no loss, so it is up to the decision-making appraiser to implement or not. If BCR < 1 then the business is detrimental so it is better not to be implemented. To find out the details obtained from the total value of revenue received by farmers.

### *3.8. Economic Analysis of Cattle Farming in the buffer zone of Gunung Leuser National Park, Bahorok District*

Based on the results of the data survey of 100 respondents, the following is a descriptive analysis of the data provided regarding the economic aspects of the lives of cattle farmers in Bahorok District, buffer zone area of Gunung Leuser National Park:

#### *3.8.1. Household Income*

The household income of the 100 respondents varied widely, with the lowest value being around IDR 25,800,000 per year and the highest value reaching IDR 96,000,000 per year. According to [13, 14], income is classified into 4 levels, namely, income > IDR.120 million per year ( Higher Income ), IDR. 60-120 million per year ( Upper Middle Income ), IDR.36-60 million per year ( *Lower Middle Income* ), < IDR. 36 million per year ( Lower Income), so household income in the buffer zone Area of Gunung Leuser National Park, Bahorok District is classified as lower middle come.

#### *3.8.2. Living Conditions*

The majority of respondents, about 72%, live in permanent houses, while the remaining 28% live in semi-permanent houses. This indicates that most farmers have stable and decent living conditions. This permanent living condition can be indicated as a form of investment or the result of a fairly good income, including from the sale of cattle.

#### *3.8.3. Vehicle and Household Equipment Assets*

All respondents own at least one vehicle, a motorcycle, and most also own household appliances such as a TV and refrigerator. The ownership of these vehicles and household appliances indicates a fairly good level of welfare among farmers, where they have access to adequate means of transportation and household facilities. Vehicles may also play an important role in economic activities and mobility, including for livestock transportation.

#### *3.8.4. Agricultural and Livestock Land Assets*

Of the 100 respondents, only a small proportion owned agricultural land and livestock land of widely varying sizes, ranging from 10,000m² to 15,000m². Most respondents did not own any farm and ranch land (around

64%). This suggests that the majority of farmers do not rely on agriculture as their main source of income and may focus more on cattle farming as an additional activity that supports their finances.

*3.8.5. Reason for selling livestock*

All respondents sold their livestock once every year, and the reason for selling was to meet monetary needs. This confirms that cattle are viewed as liquid assets or "life savings", which are sold when there is an urgent or large need. Cattle, in this case, serve as a form of financial security for farmers, providing flexibility in household financial management.

From this analysis, it can be concluded that cattle play an important role in the household economy in Bahorok sub-district. Although not the main source of income, cattle significantly contribute to farmers' welfare and economic stability. The benefits of raising cattle are seen in improved welfare and the ability to own assets such as vehicles and household appliances. In addition, the regular frequency of sales and uniform reasons for sales indicate that farmers use cattle as a reliable financial backup in case of emergency or critical needs. This economic aspect of cattle farming shows that even on a small scale, cattle enteIDRrises can have a significant positive impact on the economic livelihoods of communities in the buffer zone of Gunung Leuser National Park. With the potential for further development, for example by increasing the scale of the farm or optimizing livestock management, the welfare of these farmers can continue to be improved.

## 4. Conclusion

*4.1 Conclusion*

1. Cattle farming in the buffer zone area of Gunung Leuser National Park in Bahorok Sub-district is said to be profitable or feasible from the results of financial analysis calculations so that it can be one of the references as a people's livelihood.

2. Cattle farmers in the buffer zone area of Gunung Leuser National Park, Bahorok District, earn an average income of IDR.24,551,421 per year for the semi-intensive system and IDR. 8,557,377 per year for the extensive system.

3. The Economic Analysis concluded that cattle have an important role in the household economy in Bahorok Sub-district. Although not the main source of income, cattle contribute significantly to the welfare and economic stability of farmers, therefore cattle farming should be developed.

*4.2 Suggestions*

1. The owners of cattle farms in the buffer zone area of Gunung Leuser National Park, Bahorok District are advised to record the production and sale of business products and record all costs incurred in cash flow so that farmers can compare their income properly in one production.

2. The cattle farming business in the buffer zone area of Gunung Leuser National Park, Bahorok District is still lacking in maintenance management such as feeding, housing systems and others. So that the results of cattle production are not effective. So it is recommended that extension workers can operate in the buffer zone area of the Gunung Leuser National Park, Bahorok District.

3. Cattle farmers in the buffer zone area of Gunung Leuser National Park, Bahorok District should help each other and form cattle groups so that each farmer can exchange information to help expand the cattle business in the buffer zone area of Gunung Leuser National Park, Bahorok District.

4. Farmers with semi-intensive maintenance systems are expected to improve cattle management such as providing concentrates to cattle so that the products produced are more optimal.

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