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Analysis of the Potential Development of Goats and Sheep in Batu Bara

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Abstract. One of the districts that have the potential to develop goats and sheep in North Sumatra is Batu Bara Regency. For this reason, a study was conducted to determine the potential of livestock resources, the area and capacity of goats and sheep, and alternative strategies that are effective in developing goats and sheep in Batu Bara Regency. This research was conducted in September – November 2021 using the *stratified sampling research method* in the sub-districts in Batu Bara Regency and the *purposive sampling method,* which resulted in the highest population sub-district, namely Laut Tador District, the medium population in Air Putih District, and the low population being Sei Suka District. Sampling using the method of determining the quota of 30 respondents in each sub-district. The respondents were interviewed to obtain information regarding goat and sheep livestock. Data analysis carried out is descriptive analysis, *location quotient,* livestock density, feed concentration index, carrying capacity of agricultural and plantation waste, carrying capacity index of agricultural and plantation waste, capacity to increase the population of ruminant livestock (KPPTR), and SWOT analysis. Based on the research results, Batu Bara Regency has the potential to develop goats and sheep. Five areas each become the basis for goats and sheep in the district. The carrying capacity of goats and sheep in Batu Bara Regency is 168,040.04 ST for goats and 166,236.56 ST for sheep. The right strategy and priority is the SO strategy.

Keywords : Batu Bara, goats and sheep, KPPTR, potential, strategy

1. Introduction

North Sumatra Province is one of the important industrial areas in Indonesia. The development of various essential industries in this area is livestock, agriculture, and plantations (such as oil palm and rubber). The industry's development affects the local people's demand, especially concerning the increasing demand for foodstuffs from livestock such as meat, eggs and milk. As a result, the North Sumatra region's supply of livestock products, including sheep and goats, continues to increase.

The Ministry of Agriculture, together with HPDKI (Indonesian Goat Breeder Association) of the

Republic of Indonesia, seeks to increase its strategic role in developing goats and sheep, which are arranged in five criteria. The first criteria is the cultivation of goats and sheep as an activity to advance the rural economy. Second, the results from goats and sheep are used as a source of protein and a substitute for chicken or beef. Third, livestock development increases the population and productivity of goats and sheep. Fourth, provide food needs for the community, and finally, provide supplies of goats and sheep for countries in Southeast Asia [1].

In line with that, the Governor of North Sumatra is determined to make North Sumatra Province a granary for goats and sheep after seeing such abundant potential. The North Sumatra Provincial Government, through the Food and Livestock Security Service, is collaborating with the private sector, universities, and all goat and sheep farm *stakeholders* in North Sumatra to jointly help realize this idea [2].

Batu bara is one of the regencies in North Sumatra Province that has succeeded in developing sheep and goats according to the plan of the governor of North Sumatra, Edi Rahmayadi, who made Batu Bara a centre for local goats and sheep and even became an exporter of these two types of livestock. In the efforts of the government and local breeders to develop goats and sheep in North Sumatra, farmers fully support the goat and sheep farming business in Batu Bara Regency. This district, consisting of 12 sub-districts, has the potential to develop and market around 34,000 goats and sheep [3].

Districts Batu Bara also had a broad harvest of food crops in 2020, namely reaches up to 30,014 ha. Paddy rice has a harvested area of 28,824.50 ha for food crops, with a production of 166,054.13 tons. There is a harvested area of corn reaching 786 ha with production reaching 4,089.16 ha, and harvested area of cassava has a harvested area of 408.50 ha with production reaching 13,745.70 tons. Then The planted area for oil palm reaches 12,097 ha, with the production of fresh fruit bunches reaching 190,213 tons. This shows that goats and sheep in Batu Bara have the potential for development later. Batu Bara Regency also has 2,664 ha of land available for use in forage planting [4].

Based on this condition, it is necessary to conduct research and studies to assess the potential of livestock resources, the area and capacity of the goats and sheep, as well as alternative strategies that are effective in developing goats and sheep in Batu Bara Regency in the future.

2. Materials and Methods

This research was carried out in September-November 2021 in Batu Bara Regency, North Sumatra Province, in sub-districts with goat and sheep livestock populations. This study uses primary and secondary data sources. Primary data was obtained from respondents, and secondary

data was obtained from relevant agencies such as BPS Batu Bara Regency and the Livestock Service Office of Batu Bara Regency.

The method of analyzing the potential for developing goats and sheep in Batu Bara Regency is carried out in several stages. The first stage is to record the population of goats and sheep in Batu Bara Regency. Then the second is sampling, which is carried out by stratified Sampling of the Batu Bara Regency sub-districts with a population of high, medium and low livestock. Then, *purposive Sampling was conducted* to select the sub-districts from each group. The high livestock population group is Laut Tador District, the medium group is Air Putih District, and the low group is Sei Suka District. Then *purposive Sampling was carried out* to determine the number of respondents from each sub-district selected by the method, which took 30 respondents in each sub-district [3].

The data analysis used is a descriptive analysis which aims to describe the livestock resources in Batu Bara Regency. In addition, analysis of *Location Quotient,* Livestock Density, Feed Concentration Index, Agricultural and Plantation Waste Carrying Capacity, Agricultural and Plantation Waste Carrying Capacity Index, Ruminant Livestock Population Increase Capacity (KPPTR), and SWOT Analysis were also carried out.

3. Results and Discussion

a. Livestock Resources

Livestock resources can be seen in human resources, natural resources, and livestock management. The existing livestock resources will determine the SWOT and suitable strategies to be developed later. Human resources are one of the main factors in the running of a livestock business because a livestock business is influenced by the decisions of farmers [5].

1. Human Resources

Analysis of human resources can be seen from the age of the breeder, the experience of raising livestock, and the purpose of raising livestock. According to [6], the productive age of breeders is 15-55 years old, while that outside of that is included in the unproductive category. Based on the survey results, 90% of the respondents are aged 15-55 years, while the other 10% are outside the age of 15-55 years. The survey results show that 22% of respondents have 11-20 years of experience raising livestock, while the other 78% are under 11 years old. In terms of the purpose of raising livestock, there are still many breeders (as many as 88% of respondents) who make their business only as a side business, not their primary business. In comparison, the other 12% make raising livestock their primary business.

2. Natural resources

Analysis of natural resources can be seen from water sources and land ownership to feed processing technology. Based on the survey results, 100% of the respondents used water from the wells of each farmer. This is because healthy water is readily available and is always available. The majority of land owners (93%) have their land for raising livestock, while the rest use other people's land. Furthermore, the feed processing technology used by farmers is still very minimal. Based on the survey results, 97% of respondents have not used feed processing technology.

3. Maintenance Management

According to [7], to maximize livestock's potential, its maintenance management can be improved. Maintenance management consists of maintenance systems, labour, housing and equipment, feed management, capital, animal health, marketing, waste management, and institutions.

Based on the results of the survey, the maintenance system carried out by the majority of farmers uses an intensive system. The labour used by farmers also comes from their own families. The cages and equipment used are still traditional, which can be seen in Figure 1. Feed management by farmers is still not optimal. Farmers do not know whether the feed provided is sufficient or not. The capital used by breeders is their capital. Livestock health is also often a problem for farmers. Diseases that often occur are bloating and intestinal worms. The marketing of livestock is usually sold to agents, and some sell to consumers directly. Then livestock waste managed by farmers is still not being used optimally. Whereas livestock waste, such as faeces, can be used as compost. Finally, institutions such as related agencies, animal markets, and capital support livestock development in Batu Bara Regency.

Figure 1. Sheep for goats and sheep in Batu Bara

b. *Location Quotient* (LQ) analysis

Based on h result Based on the research, Batu Bara Regency has five base sub-districts for goats,

namely Sei Balai, Fifty, Fifty Pesisir, Datuk Lima Puluh, and Laut Tador sub-districts. At the same time, the base sub-districts for sheep are Sei Balai, Datuk Fifty, Fifty, Datuk Tanah Datar, and Laut Tador sub-districts. The other sub-districts are classified as non-basic areas.

A base area is an area that can meet the needs of livestock. Meanwhile, non-basic areas have not been able to meet the needs of livestock because the number of livestock is still very minimal while the population is already dense.

c . Goat and Sheep Livestock Density

The density of goats and sheep in Batu Bara Regency is divided into three, namely, economic density, farming, and area. The economic density in Batu Bara Regency is classified as dense, which means that the demand for livestock is high due to the busy population. The density of farming is classified as moderate because farming is still extensive and has not been utilized by farmers. The area's density is relatively rare because the area in Batu Bara is still extensive, but the livestock is still tiny. [8] states that an area included in the rare category can still be added to livestock based on the aspect of natural resources carried out intensively in its development.

d . Feed Concentration Index

The feed concentration index aims to see the level of feed availability in a sub-district compared to the district level. Each sub-district has a relatively high index, namely the average index for each sub-district is above 1, which means that the availability of feed for goats and sheep in each sub-district is still more than the availability of feed in Batu Bara Regency. It can be concluded that the feed availability in each sub-district can still meet the needs of their livestock.

e . Analysis of Agricultural and Plantation Waste Production

Waste production analysis aims to see how much waste is produced by agriculture and plantations in Batu Bara Regency. [9] revealed that the new production of agricultural waste is primarily determined by the area of the harvested area, which is calculated from the harvested area multiplied by the production of agricultural waste. Agricultural waste that is used is waste rice straw, corn straw, and cassava leaves. For plantation waste, palm oil and cocoa husks are used. The amount of waste produced per year in the form of dry matter for agricultural waste is 209,021.94 tons/year. Meanwhile, plantation waste reaches 109,005.1 tons/year [5]. It can be concluded that the amount of waste in Batu Bara Regency is considerable to be utilized.

f . Analysis of Agricultural and Plantation Waste Carrying Capacity

After knowing the amount of waste produced, it can be seen how many livestock the waste can accommodate. Based on the results of secondary data processing [4], agricultural waste can

accommodate a total of 91,676.29 ST of livestock. Comparatively, plantation waste can accommodate 47,809.25 ST of livestock based on dry matter. With this high livestock capacity, the sheep in Batu Bara has the potential to be developed. [10] stated about the carrying capacity of food plant waste, which understanding capacity is something in ensuring the availability of adequate feed in the form of waste agriculture/plantation, which could accommodate population needs cattle without conducted processing.

g . Analysis of Agricultural and Plantation Waste Carrying Capacity Index

Based on the results of the carrying capacity of the waste above, it can be concluded that the carrying capacity index of each sub-district in Batu Bara is high. Based on the results of secondary data processing from the [4], comparing feed with available livestock and their feed needs resulting in a high index, namely with an average index above 3, and the area was recommended to increase its livestock. [11] states the category high in waste carrying capacity means the area is recommended for adding value to cattle.

h . Ruminant Livestock Population Capacity Addition (KPPTR)

KPPTR aims to determine how much livestock can be added in Batu Bara Regency based on the available forage in the form of dry matter. Based on the results of secondary data processing by the [4], the capacity for additional livestock for goats reaches 168,040.04 ST per year. Then for sheep, a number of livestock can be added to reach 166,236.56 ST. Based on the results, there are no hostile areas in increasing livestock. It can be concluded that Batu Bara Regency has the potential to add some livestock and be developed in the future based on the available forage.

i . SWOT analysis

The final result of this study is to determine the strategy for developing goats and sheep in Batu Bara Regency. The strengths, weaknesses, opportunities, and threats are known from all parameters, and suitable strategies are to be developed from goats and sheep in Batu Bara Regency. This SWOT analysis is shown in "Table 1".

Based on the SWOT and the resulting SWOT quadrant, a suitable strategy to be developed is the SO strategy, which is a strategy that uses strengths and takes advantage of opportunities simultaneously or is called a *Growth Oriented Strategy*. Other strategies can also be used according to the required alternative, but the priority is the SO strategy.

Table 1. SWOT analysis

Internal factors	*Strengths* (S)	*Weaknesses* (W)
	The age of goat and sheep breeders is still productive	The farming business is relatively small and is only used as a side business
	Abundant water resources for raising livestock	Breeders are less interested in using the available capital bodies.
	The high demand for goats and sheep to export	Utilization of technology, waste and feeding according to needs is still lacking
	Easy maintenance of goats and sheep	The livestock rearing system is still traditional
External Factors	Capital in raising your own	Lack of experience and socialization of farmers
	Own livestock ownership status	The level of knowledge of raising livestock is still low

Opportunities (O)	SO Strategy	WO Strategy
There is a large livestock addition capacity	Making Batu Bara Regency a producer of goats and sheep	Improve, foster and develop all aspects of human livestock resources
High feed availability and carrying capacity.	Developing human resources for farmers who are still productive with training from the relevant agencies	Conducting socialization of capital institutions in utilizing capital agencies to develop livestock
Livestock density is still rare.	Utilize the availability and planting of forage with facilities from the relevant agencies	Assist both sapronak and seeds to farmers by the government
The existence of a loan agency, such as a bank for farmers	Adding variations in capital and business scale to meet the demand for goat and sheep meat by using a capital agency	Adopting innovative technology to increase commodity competitiveness and accelerate livestock development by entering farmer groups
There are farmer groups in each village	Forming and joining farmer groups so that it is easier to give direction and guidance as well as livestock assistance	Utilize and develop farmer service installations
There are policies and facilities from the relevant agencies		

Threats (T)	ST strategy	WT Strategy
Constraints and limitations of working capital.	Conducting socialization about livestock health and treatment as well as good cage sanitation	Adding infrastructure to support the development of goat and sheep farming
Disease outbreaks and livestock health problems occur regularly.	Educate farmers about the market to reduce the influence of agents in pricing	Conduct evaluations in the development of all livestock activities
Breeders tend to sell their business results to agents rather than directly.	Conduct online coaching both from social media and offline media with the guidance of the relevant agencies	Optimizing policies by existing agencies
Poor cage sanitation.	Facilitating farmers to be able to sell their livestock to the animal market	Cooperating with various government and private agencies in making policies during the pandemic

The failure of government programs or related agencies	Make a capital loan or do a partnership business either with the loan agency or the government	Conducting socialization and cooperation between breeders to increase experience and knowledge in raising livestock
Underdeveloped animal market		

4. Conclusion

Farmer resources in Batu Bara Regency, North Sumatra Province, can be utilized as much as possible based on human resources, natural resources, and maintenance management. Then the carrying capacity and the addition of livestock are also classified as very large based on the KPPTR analysis. At the same time, the development strategy that is suitable to be developed in Batu Bara Regency is the SO Strategy. Based on the results of this study, goats and sheep in Batu Bara Regency have the potential to be developed.

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