talenta PUBLISHER
Jurnal Peternakan Integratif

Analysis of Development Potential of Sheep inDeli Serdang Regency, North Sumatra Province

R. Ardiansyah, Edhy Mirwandhono*, Hasnudi

Animal Production Program Study, University of Sumatera Utara, Padang Bulan, Medan 20155, Indonesia

** Correspondent author: r.edhy@ usu.ac.id*

Abstract. Deli Serdang Regency is one of the largest sheep-producing areas in North Sumatra Province. Analysis of the potential for sheep development in the area needs to be done, to achieve various goals. This study aims to identify livestock resources, base or non-base areasand sheep capacity as well as to find the right strategy for the development of a sheep business in Deli Serdang Regency. The method used in this research is the stratified sampling method in all districts in Deli Serdang Regency and purposive sampling method inthree districts, namely, Percut Sei Tuan, Hamparan Perak, and Galang as a method of determining the area. Interviews with 10 breeders from each sub-district were conducted to gather information related to sheep farming in the area. Data analysis was performed with descriptive analysis, location quation (LQ), animal density, analysis of feed concentration index , and capacity analysis for Livestock Population Increase (LPIC).
The results showed that the livestock resources in Deli Serdang Regency have the potential to develop sheep farming businesses. There are 13 districts which are base areas with a capacity of livestock unit.

Keywords: breeders, deli serdang, LQ, potential, sheep development,

Received [10 October 2021] Revised [28 March 2022] Accepted [3 1 March 2022]

1. Introduction

North Sumatra Province is one of the important industrial areas in Indonesia. The development of various important industries in the region such as livestock, agriculture and plantations (especially oil palm and rubber) led to a marked increase in regional domestic income. The increase in the economy affects the consumption pattern of the local community, especially in relation to the increasing demand for foodstuffs of animal origin such as meat, eggs and milk. As a consequence, the supply of livestock products including lamb in North Sumatra is required to continue to increase.

The sheep farming business in Deli Serdang Regency is generally still dominated by smallholder farms related to other farming businesses. Raising sheep is done only as a sideline by most of the people besides farming. However, some communities also make animal husbandry their main business [1]. In connection with the development of the livestock sub-sector, especially sheep in Deli Serdang Regency, it plays an important role in the structure of the regional economy. Based on this, it is necessary to identify alternative patterns for developing

community farms that have an economic scale and are able to contribute to adequate family income. The livestock development strategy has good prospects in the future.

Deli Serdang Regency is one of the areas that has the largest population of sheep in North Sumatra reaching 134,267 heads with an area of 2,497.72 km2 and for sheep meat production in 2019 it reached 76,536 kg. Deli Serdang Regency has 22 sub- districts that have a good beef cattle sector, some of these sub-districts are Hamparan Perak District, Percut Sei Tuan District and Galang District. These sub-districts have largest distribution of livestock population in Deli Serdang Regency which has the potential to be developed. [2]

2. Materials and Methods

Population of This Research is the breeders in Kabupaten Deli Serdang. Sampling is done gradually,namely:

1. The first step is to stratify (stratified sampling) the sub-districts in Deli Serdang Regency, which is to divide the sub-districts into three groups with high sheep population, medium sheep population and low sheep population.
2. The second stage is taking purposive sampling of three sub-districts from the sub-districts with the highest population, namely Hamparan Perak Sub-district, Percut Sei Tuan District and Galang District which are centers of sheep development in Deli Serdang Regency.
3. The third stage is taking purposive sampling of 30 farmers from each selected sub-district. Selection of breeders based on skill level in raising sheep.
4. Design: This research was designed as a survey method, namely by direct observation to the field to find out that the resources owned by Deli Serdang Regency can be used as a sheep breeding area.

2.1. Data Collection Methods

The data obtained in this study consists of :

1. Primary data is obtained directly from the respondent's monitoring of sheep farming businessactivities through interviews and filling out a list of questionnaires.
2. Secondary data is obtained from various related agencies such as government agencies related toagriculture and animal husbandry.

2.2. Descriptive Analysis

Descriptive analysis in this study is used to describe the state of sheep farming resources in the Deli Serdang area.

$$LQ = (vi/vt)/(Vi/Vt)$$

Description:

vi = District sheep population

vt = Number of sub-district heads

Vi = population of sheep in sub-district

Vt = Number of Heads of District Families

1. If the LQ of a sector is more than or equal to 1 (≥ 1), it means that the sub-district has the potential for developing sheep compared to the average population of sheep at the sub-district level.

2. If the LQ of a sector is less than 1 (< 1), it means that the sub-district has no potential for developing sheep compared to the average population of sheep at the sub-district level [3].

2.3. Animal/Sheep Density Analysis

The analytical method used to calculate livestock density is divided into three types:

1. Economic density can be calculated by dividing the total population of sheep by the total population and multiplying by a thousand with categories very dense > 300, dense 100 - 300, moderate50 -100, and rarely < 50.
2. Farming density can be calculated by dividing the total population of sheep by the area of farmland (ha) with categories very dense > 2, dense 1 - 2, moderate 0.25 - 1, and rarely < 0.25.
3. Regional density can be calculated by dividing the total population of sheep by the total area (km2) with categories very dense > 50, dense 20 - 50, moderate 10 - 20, and rarely < 10.

2.4. Feed Concentration Index/FCI

Based on the average value of Feed Concentration Index, it can be grouped by three categories index, namely:

1. The low carrying capacity category is less than the average FCI value (< 1).
2. The medium carrying capacity category is the FCI value that is in the range between the averagevalues of (1-2).
3. The category of high carrying capacity is more than the average value of FCI (≥3)

Feed Concentration Index (FCI) is the ratio between the production of available feed and the number of needs of a number of livestock populations in the region [4].

2.5. Livestock Population Increase Capacity (LPIC)

Livestock Population Increase Capacity (LPIC) method is an approach to demonstrate the ability or capacity of the region in the provision of livestock food. The method is a direct method that takes into account forage sources [5]. In this method the forage used is forage derived from permanent pastures, rice paddies,dry land/ moors, plantations and forests.

3. Results and Discussion

3.1. LQ Analysis (Location Quotient)

LQ analysis is used to analyze the condition of an area whether an area is a base sector or non-base sector of a potential commodity [6].

In this study is the population of sheep in Deli Serdang Regency.

Table 1. LQ Value in Deli Serdang Regency

No.	District	LQ
1	Gunung Meriah	0,38
2	STM Hulu	0,9
3	Sibolangit	4,92
4	Kutalimbaru	0,25
5	Pancur Batu	0,77
6	Namo Rambe	1,02
7	Biru-biru	0,6
8	STM Hilir	2,86
9	Bangun Purba	4,91
10	Galang	2,57
11	Tanjung Morawa	2,55
12	Patumbak	1,77
13	Deli Tua	0,26
14	Sunggal	0,37
15	Hamparan Perak	2,28
16	Labuhan Deli	1,15
17	Percut Sei Tuan	0,53
18	Batang Kuis	2
19	Pantai Labu	1,52
20	Beringin	1,49
21	Lubuk Pakam	0,04
22	Pagar Merbau	1,67

Research Data Processing Results (2021)

The Deli Serdang district has 22 sub-districts which have several areas of base activity for sheep farming, which means that Deli Serdang district has several sub-districts that have relatively large sheep population levels compared to other sub-districts. This is as shown by the results of the Location Quation (LQ) calculation, that these areas have an LQ value > 1 out of 22 sub-districts in Deli Serdang Regency namely Patumbak, Hamparan Perak, Labuhan Deli, Batang Quis, Pantai Labu and Pagar Merbau. Sibolangit District has a higher LQ value than other sub-districts, namely 4.56, so it can be said that Sibolangit District has a relatively large number of sheep population compared to other sub-districts and 12 sub-districts which are non-basic areas in Deli Serdang district. This is in accordance with the statement of [7] that LQ > 1 means that an area already has a comparative advantage, where the population exceeds the needs of the area

so that it can be sold or exported outside the region. In non- basic areas with an LQ value < 1, it means that livestock in an area cannot meet their own needs and need supplies from outside the region.

3.2.Sheep population density analysis

Sheep population density can be determined in several ways, such as economic density, agricultural density, and regional density. Sheep population density is very influential on the livelihoods of the surrounding community. Effective livestock management will accelerate the process of development and growth of livestock. With the basic knowledge of the community about the use of food plant waste, it will have an impact on the use of feed ingredients derived from agricultural waste to meet the needs of sheep. Besides that, there is a need for optimal utilization of agricultural waste so that theneeds of sheep are met.

According to [8] areas with dense categories provide an indication of the possibility of competition between livestock and residents in terms of providing food. While according to [9] that districts which included in the rare category, it is still possible to increase the population of ruminant livestock, the support for the area is still large and gives an indication that in this area the potential for pasture or grazing land for livestock raising is still available. In the opinion of [10] that the balance between the livestock population and land in a sub-district is one of the considerations/indicators for determining livestock development.

3.3. Feed Concentration Index

The feed concentration index is the availability of feed in an area in the use of agricultural waste as a source of feed based on the production of dry matter waste. If the feed concentration index is more than 1, it can be said that the area has considerable potential in the utilization of agricultural waste. To find out the comparison of agricultural waste production between sub-districts in Deli Serdang Regency, it is necessary to calculate the feed concentration index from each sub-district in Deli Serdang Regency. The categories used are 3 types, namely the high category IKP> 1, the medium category IKP = 0.5-1 and the low category IKP <0.5. Feed concentration index = Dry Matter Production / Average Dry Matter. Utilization of agricultural waste as an alternative feed is one solution to overcome the shortage of ruminant feed. According to[11], the higher the waste production per unit area of land, the higher its ability to accommodate a number of livestock at a certain time.

Table 2. Feed Production (Dry Matter)

No.	District	Dry MaterialProduction (Tons)	IKP	Category
1	Gunung Meriah	758,33	0,23	Low
2	STM Hulu	2.796,33	0,84	Moderate
3	Sibolangit	1.423,12	0,43	Low
4	Kutalimbaru	8.567,16	2,59	High
5	Pancur Batu	3.141,98	0,95	Moderate
6	Namo Rambe	1.537,65	0,46	Low
7	Biru-biru	2.419,99	0,73	Moderate
8	STM Hilir	4.677,26	1,41	High
9	Bangun Purba	1.010,70	0,31	Low
10	Galang	1.390,16	0,42	Low
11	Tanjung Morawa	3.900,14	1,18	High
12	Patumbak	1.750,24	0,53	Moderate
13	Deli Tua	36,59	0,01	Low
14	Sunggal	3.853,11	1,16	High
15	Hamparan Perak	7.087,60	2,14	High
16	Labuhan Deli	4.731,15	1,43	High
17	Percut Sei Tuan	11.899,86	3,59	High
18	Batang Kuis	1.987,34	0,60	Moderate
19	Pantai Labu	3.853,46	1,16	High
20	Beringin	2.430,07	0,73	Moderate
21	Lubuk Pakam	1.373,59	0,41	Low
22	Pagar Merbau	2.270,02	0,69	Moderate
Amount		72.895,85		
Average		3.313,45		

Source: Research Data Processing Results 2021

IKP > 1 categorized as High
IKP = 0.5 - 1 categorized as Medium
IKP <0.5 is categorized as Low.

3.4. Livestock Population Increase Capacity (LPIC)

Table 3. LPIC Value in Deli Serdang Regency

No	District	LPIC Value (Livestock Unit/LU)
1	Kutalimbaru	12.994,52
2	Labuhan Deli	12.008,60
3	Sinembah Tanjung Muda Hulu	11.966,76
4	Pantai Labu	11.523,03
5	Percut Sei Tuan	11.292,03
6	Biru-biru	6.944,85
7	Sinembah Tanjung Muda Hilir	6.321,56
8	Beringin	6.095,21
9	Lubuk Pakam	5.286,91
10	Gunung Meriah	4.773,56
11	Sunggal	3.704,14
12	Pagar Merbau	3.138,79
13	Sibolangit	2.812,41
14	Namo Rambe	1.796,11
15	Tanjung Morawa	1.046,25
16	Hamparan Perak	838,17
17	Deli Tua	-993,11
18	Pancur Batu	-1.137,80
19	Batang Kuis	-3.687,46
20	Bangun Purba	-4.298,51
21	Galang	-7.055,24
22	Patumbak	-9.030,69
Amount		**223.099,21 (**LU)

Source: Research Data Processing Results 2021

The value of the effective LPIC in Deli Serdang Regency is 223.099,21LU(LU in LPIC is sheep). This shows that Deli Serdang Regency still has great potential for the addition of ruminants as much as the RLPIC value. However, in its implementation in the field, it is necessary to pay attention to several factors such as technical, socio-cultural and farmer skills in managing the management pattern of raising sheep. The distribution of RLPIC values in each sub-district is very varied, the highest RLPIC value is in Kutalimbaru District, which is 12.994.52 ST. According to [12], thepositive value of the capacity to increase the population of ruminants means that the availability of feed plant waste as a source of ruminant feed is very sufficient and it is possible to add a number of ruminant populations.

Districts that have a positive RLPIC value have the potential to increase the sheep population. Thevalue of each sub-district and can be used as a center for sheep production. For areas that have a negative RLPIC value, although the population cannot be increased due to overpopulation of that value, the area still has the potential for sheep.

4. Conclusion

Animal husbandry resources in Deli Serdang Regency have the potential to develop sheep farming business in terms of superior livestock genetic resources, natural resources and agricultural and plantation waste that can be used as animal feed, human resources, capital and technology utilization. The area which is the basis for the sheep population according to the results of the LQ (Location Quation) calculation in Deli Serdang Regency, there are 13 sub-districts. Analysis of the capacity of increasing the population of sheep in Deli Serdang Regency shows a total RLPIC of 223.099,21 ST.

REFERENCES

[1] BPS Agriculture Deli Serdang Regency. 2019. Deli Serdang Regency In Figures 2019.

[2] BPS Agriculture Deli Serdang Regency. 2020. Deli Serdang Regency In Figures 2020.

[3] Syamsu, J. Food Crop Waste as a Source of Feed Ruminant Potential Supporting Capacity in Makassar. Emulsion Foundation and Livestock Service Office, South Sulawesi. 2006.

[4] Animal Husbandry and Health Act. Farm Law and Animal Health. 2009.

[5] Hendayana, R. Location Quotien Method (LQ) Application InDetermination of National Leading Commodities. Agricultural Informatics.Volume 12 : 658-675. 2003.

[6] Ashari S. Horticultural Aspects of Cultivation.Buku. Publisher University ofIndonesia.Jakarta. pp 141--146. 1995.

[7] Tanuwiria, U.H., Mushawwir, A and Yulianti, A. Feed PotentialFiber And Its Carrying Capacity To Livestock PopulationRuminants In Garut Regency. Journal of Livestock Sciences.Vol. 7 No. 2, 117 – 127. 2007.

[8] Haryanto et al, 2002. Crude Fiber Protein Content. Jakarta: Self-Help Spreader Animal Husbandry and Animal Health Law 2009. Animal husbandry law and animal health

[9] Tanuwiria et al 2007. Nutrient content of feed ingredients from agricultural by-products Tangendjaja 2009. Feed technology in supporting the livestock industry in Indonesia Agricultural Innovation Development

[10] Shamsu, J.A. 2011. Repositioning the Paradigm of Livestock Development Thoughts,Ideas and public enlightenment. Absolut Media, Yogyakarta

[11] Suparini. 2000. An assessment of the potential of the Bogor Regency area as an area sheep breeding. Essay. Faculty of Animal Husbandry Bogor Agricultural University,Bogor

[12] Sedia Oetama 2000. Nutrition Science, Dian Rakyat Publisher: Jakarta 2000