THE ANALYSIS OF FORAGE PRODUCTION FOR RUMINANT LIVESTOCK IN SLEMAN REGENCY

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ABSTRACT

This research aimed to determine the analysis of forage production for ruminant in Sleman Regency. The research material used ruminant farmers with a minimum of 1 year of farming experience, as well as secondary data obtained from relevant government agencies, Agriculture and Livestock Department of Sleman Regency. The survey method was conducted in Berbah, Ngemplak, and Minggir District, Sleman Regency, Yogyakarta. The samples used were 98 farmers. The data analysis used descriptive analysis. The result of the research indicate that the average age of farmers was 52.46 years, with 92.86% of them in the productive age range and 7.14% in the non-productive age range. The educational level of farmers consists of 32.65% completing elementary school, 37.76% completing junior high school, and 29.59% completing high school. The main occupations of farmers include 30.61% as livestock farmers, 39.80% as farmers, 11.22% as laborers, 12.24% as entrepreneurs, and 6.12% as business owners. The average farming experience was 17.92 years. The total population of ruminant livestock was 28,656.37 AU, with a feed requirement of 95,139.15 tons/DM/year. Feed production from agricultural waste was 100,475.32 tons/DM/year, and feed production from forage from paddy fields, dry land, and forest land was 9,516 tons/DM/year. Thus, the total feed production was 109,991.32 tons/DM/year. It was concluded that Sleman Regency in one year could produce 109,991.32 tons (DM) of ruminant animal feed to meet the need for 33,129.92 AU of animal feed. The total population of ruminant livestock is 28,656.37 AU, so it has a potential livestock population increase capacity of 4,473.55 UT. The carrying capacity index value is 1.16 (critical).

Keywords: Forage Production, Ruminant Livestock, Sleman Regency

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INTRODUCTION

Agricultural development is carried out to increase farmers ' income, create jobs, alleviate poverty, improve food security, and encourage local economic growth. The agricultural sector plays an important role in the Indonesian economy, contributing significantly to the country's Gross Domestic Product (GDP) and being a self-sufficient food product (Pelengkahu et al., 2021).

The agricultural sector is an engine of growth, both in terms of the supply of raw materials, employment and food, as well as in terms of the purchasing power of products from other sectors (Elizabeth, 2019). Indonesia has a variety of agricultural subsectors including animal husbandry that offers many advantages in all aspects from input to production. The livestock subsector basically consists of a series of initiatives to encourage, support and facilitate the development of livestock trading businesses (Budhijana, 2023)

The impact of the speed of Population Development and income levels is a challenge to the availability of foodstuffs both carbohydrates and foodstuffs of animal origin. Meeting the food needs of carbohydrate sources has even become an important issue for countries with limited resources, while basic food needs continue to increase (Aldillah, 2017). On the other hand, for middle-and upper-income countries, where the demand for

food derived from carbohydrates has decreased and household food spending has been diverted to food products of animal origin and horticultural commodities, it has shown that there is competition for the development of these two commodities which will be largely determined by the level of efficiency in producing. However, observations made by various international research institutions concluded that in addition to improving the consumption of animal protein and nutrition of the community, traditional livestock business has also encouraged economic growth through the stability of the provision of cash in the form of collateral and livestock savings that are not easily hit by inflation (Soedjana, 2005)

Sleman regency has an area of up to 57,482 Ha or about 18% of the area of the Yogyakarta Special Region province (BPS Sleman, 2023). With this area, Sleman regency has polulation of ruminants (goats, sheep, beef cattle, dairy cows and buffaloes) reaching 74,366. 00 heads (BPS, 2023)

Production costs in the livestock sector, it will not be separated from the cost. Feed is one of the highest needs of the entire production cost. Then it becomes very important in the livestock sector to keep paying attention to the needs of quality feed and can be met in quantity. For ruminant farmers, the availability of feed in the form of forage fodder (Hijauan Makanan Ternak/HMT) also does not escape the needs that must always be met. So that elements that can affect the availability of feed such as the environment, both physical and biological, must be considered. The main is the availability of land because it has a very big influence in the provision of forage feed in the form of grass, legumes and other crops in the form of agricultural byproducts.

Forage feed is one of the main components in livestock production inputs. One determinant of the success of ruminant farming is determined by the availability of forage feed, so it is important for farmers to pay attention to the needs of forage both in quality and quantity in an area (Haza, 2016). In terms of providing fodder to increase the number of livestock, access to land suitable for the growth of fodder is a top priority. The government's plan will be difficult to implement if the issue of land supply is not properly considered. In addition to being used as animal feed, grass also has the potential as a land conservation tool.

Grass has a strong root system, so it can be used for conservation plants because it can prevent soil erosion. It will be very beneficial if it can be cultivated on soils with slope conditions, mainly used as staple food for ruminants.

In addition to HMT, farmers use agricultural waste that is used for animal feed. Agricultural waste is the remains of agricultural crops that are not used for human consumption and can be used as animal feed, so that the waste can be used as feed during the harvest season. agricultural waste that can be used as feed is dried in the sun to dry with the aim of extending the shelf life. Then during the dry season can be used as food reserves for ruminants (Eoh, 2022).

To support the productivity of ruminants and to pay attention to the projected development of ruminant farms in the region according to the availability of raw materials, an analysis of feeder potential and feed carrying capacity index is needed for the development of the appropriate livestock sub-sector. In addition, to overcome the shortage of forage feed (HPT) by looking at the availability of local feed tailored to the number of livestock, one of the potential feed analysis used is an inventory of land that can be used as livestock

development.indispensable. This is to determine the availability of forage feed and analyze the capacity of livestock that can be placed in the area (Kalangi et al., 2016). Based on the description of the background, a study was conducted aimed at knowing the carrying capacity index (Indeks Daya Dukung/IDD) and the availability of feed and the ability of an area to accommodate the addition of ruminant quota developed based on the availability of feed.

METHODS

time and place of research

The research was conducted on February 08-March 08, 2024. The study was conducted by survey on ruminant farmers in three districts in Sleman Regency, namely Minggir District, Ngemplak District and Berbah District.

Research Materials

Tools

The tools used in this research are stationery used to record data, cameras used in documentation, questionnaires containing the identity of farmers and questions**,**

Materials

The materials used in this research are data on livestock population and land area from the Department of Agriculture Livestock Sleman Regency and BPS Sleman, farmers with a minimum of one year of breeding experience with livestock ownership as much as 1UT, and feed, HMT (forage) and agricultural waste.

Research methods

Pre-research steps

The pre-research phase was conducted by applying for permission to the Department of Agriculture, Food Security and Fisheries of Sleman regency to conduct a survey of the location and condition of the area used as a sample.

Samples were taken from three sub-districts with the provisions of having the largest, medium and fewest livestock populations among them; Berbah Sub-district, Ngemplak Sub-district, and Minggir Sub-district. Three sub-district samples were taken with the consideration of having the same phenotypic characteristics. The formula used in determining the number of samples for respondents refers to the Slovin formula.

The Slovin formula is used to determine the minimum sample size required to describe and represent the population..

Use this formula to determine the minimum sample size needed to describe and represent a population. Hidayah & Fitriyah, (2023) revealed that the Slovin formula is used to calculate the minimum number of samples if the population behavior is uncertain. The size of the research sample using the Slovin formula is determined by the value of the error rate. The following applies when the higher the error rate used, the fewer samples are taken.

The following Slovin formula according Nalendra et al. (2021) :

$$n = \frac{N}{(1 + Ne^2)}$$

Description :

n = Number of samples selected,

N = Population size,

e = Tolerance of inaccuracy due to errors in population samples that can be tolerated is 10%.

Table 1. Sleman Regency Ruminant Breeder Population

No	Subdistrict	Peternak					
		Beef cattle	Dairy cows	Buffalo	Goat	Sheep	Total
1	Minggir	156		3	151	132	442
2	Moyudan	356		5	136	394	891
3	Godean	247		13	142	300	702
4	Gamping	292		3	94	235	624
5	Tempel	1.242	44	3	110	632	2.031
6	Sayegan	1.135		15	75	396	1.621
7	Mlati	973		2	59	281	1.315
8	Sleman	1.016		1	107	475	1.599
9	Ngaglik	1.338	26	1	118	404	1.887
10	Turi	451	27	7	963	260	1.708
11	Pakem	279	191	4	569	670	1.713
12	Cangkringan	468	1.346	1	311	198	2.324
13	Ngemplak	1.159		11	226	273	1.669
14	Depok	327		1	76	57	461
15	Berbah	1.325		4	782	863	2.974
16	Kalasan	1.375		1	612	691	2.679
17	Prambanan	1.322		2	949	386	2.659
	Total	13.461	1.634	77	5.480	6.647	27.299

Source: Department of Agriculture, Food Security and Fisheries, Sleman Regency (2022)

Then to determine the large number of samples taken, can use the following calculation:

n = N / (1 + Ne2)
n = 5.085 / (1 + (5.085 x 0,01))
n = 5.085 / (1 + 50,85)
n = 5.085 / 51,85
n = 98

A sample of 5,085 populations with a margin of error of 10% was 98 farmers. The Data will be used as a benchmark as a number for the sample used in the research.

Sampling techniques

According to (Sumargo, 2020) sampling technique is a technique for taking samples. To determine the sample to be used in this study using the sampling technique is probability sampling. Probability sampling is a sampling technique that provides an equal opportunity for each element (member) of the population to be selected as a sample member (Sugiyono 2017). To determine the sample size in each village, proportional allocation is carried out with the following formula:

n = (Population x sample size) / total population.

Thus, to determine the number of samples in each sub-district selected as a sampling location, the following calculation can be carried out:

Berbah District
n = (2.974 x 98)/ 5.085
= 57 farmers
Kecamatan Ngemplak
n = (1.669 x 98)/ 5.085
= 32 farmers
Minggir District
n = (442 x 98)/ 5.085

= 8 farmers

Stages Of Research

In this research, data collection was conducted on respondents consisting of primary data and secondary data obtained through observation, asking questions directly, and data from the Department of Agriculture and Animal Husbandry of Sleman Regency and BPS Sleman.

Primary Data from this research is data obtained directly at the research site obtained through the process of observation and interviews with farmers using tools in the form of questions asked to respondents and direct observation of the region.

Primary data:

1. Farmer identity Data consists of the name of the farmer, the age of the farmer, the last education of the farmer, the experience of raising, the main job, the purpose of raising, and land ownership.
2. Livestock ownership Data include the number of livestock (UT), sex of livestock, livestock ownership status, age of livestock, and feed needs.
3. Variables observed include the type of feed (HMT and agricultural waste), feed source, feeding, feed production, carrying capacity/capacity of feed, and feed adequacy.

In calculating the variables can be done with:

1. Number of Ruminant Population in Sleman Regency. Uniformity of livestock follow the cow 1 UT, Buffalo 1 UT, sheep 0.14 UT, goat 0.14 UT (Mastur et al., 2022).
2. Forage potential, calculated using the Formula Tanuwiria et al., (2015) is: Wetland = (0.77591 x Land Area x 0.06 x 6.083) ton BK / year dry land = (1.062 x Land Area x 0.009785 x 6.083) ton BK/ year also assumed as plantation land forest land = (2.308 x Land Area x 0.05875 x 6.083) ton BK/ year
3. Agricultural waste production Obtained by calculating each crop area of agricultural waste with its conversion so that the production of agricultural waste in tons BK per year.

Table 2. Agricultural waste conversion value

Types Of Hay	conversion value
Rice straw	(2.5 × land area × 0.70) tons BK/year
Corn straw	(6.0 × land area × 0.75) tons BK/year
Soybean straw	(2.5 × land area × 0.60) tons BK/year
Peanut straw	(2.5 × land area × 0.60) tons BK/year
Sweet potato leaves	(1.5 × land area × 0.80) tons BK/year
Cassava leaves	(1.0 × land area × 0.30) tons BK/year

Sources : Tanuwiria et al. (2007).

4. Livestock capacity (UT), can be calculated using the following formula:

$$\text{Livestock capacity} = \frac{Total\ Feed\ potential\ available}{3{,}32}$$

The feed requirement for each ST is 9.1 kg of dry matter (BK)/day or 3.32 tons BK/year (Edi, 2020).

5. Capacity Increase In Livestock Population / Kapasitas Peningkatan Populasi Ternak (KPPTR), can be calculated using the following formula:
   KPPTR = Daya Tampung Ternak (UT) – Populasi Ternak (UT)
6. Carrying Capacity Index / Indeks Daya Dukung (IDD) Carrying Capacity Index (IDD) is a method to measure how well a region is able to support the number of livestock populations based on its capacity to provide feed. it can be calculated using the following formula :

$$\text{IDD region} = \frac{Livestock\ capacity(UT)}{Number\ of\ livestock\ population\ (UT)}$$

IDD criteria :

- IDD ≤1 (very critical) means that the feed capacity is not sufficient to support the number of existing livestock.
- IDD >1 – 1.5 (critical) indicates that there is a shortage of feed to support the existing number of livestock.
- IDD >1.5-2 (prone) means that there is still enough feed to support livestock, but it needs more attention because it is approaching the shortage threshold.
- IDD >2 (safe) indicates that there is enough feed to support the existing number of livestock well (Saputra, 2016)

Data Analysis

The Data obtained from this study are primary data and secondary data which are then processed and tabulated using Microsoft Excell, then analyzed using descriptive analysis. Descriptive analysis is analyzing data by describing or describing the data that has been collected as it is without intending to make conclusions that apply to the general or generalization (Sugiyono, 2019).

RESULTS AND DISCUSSION

Description of research sites

Sleman regency is one of the regencies located in the province of Yogyakarta Special region (DIY) which is located at 110° 33' 00" and 110° 13' 00" east longitude, 7° 34' 51" and 7° 47' 30" South Latitude. Sleman regency has an area of 57,482 Ha or 574.82 Km2 or about 18% of the area of Yogyakarta Special Region province which is 3,185 . 80 Km2, with the farthest distance north-south 32 Km, while east-west 35 Km.

The topography of Sleman regency ranges from 100-1000 meters above sea level.The height of the land is divided into several groups, namely 1000 meters above sea level.Sleman regency has a strategic position because it is located midway between the city of Yogyakarta and Magelang regency, Central Java, so it is very easy to reach from various directions. Sleman regency is bordered by:

North Side: Boyolali regency, Central Java

Sebalah timur: Klaten regency, Central Java

South side: Yogyakarta city, Gunung Kidul Regency

West: Kulon Progo regency and Magelang regency, Central Java

Administratively, Sleman Regency consists of 17 sub-districts, which have 86 villages and 1212 hamlets with a population of 1,136,474 people. Its territory is bordered by all districts in the province of Yogyakarta Special Region and also the province of Central Java.

The economy of Sleman regency is supported by a fairly developed agricultural sector, including beef cattle farming. The development of beef cattle

farming in Sleman regency has begun since the 1980s, when the local government began to pay special attention to the livestock sector. The population of beef cattle currently reaches 20,640 heads, dairy cows 2,245 heads, Buffaloes 123 heads, goats 22,753 heads and sheep 35,939 heads. Sleman regency has an agricultural land area of 57,482 Ha, of course, the agricultural land has the potential to produce forage (HMT) which can be used as animal feed. This shows that Sleman regency has potential as a ruminant livestock development area.

Characteristics Of Respondents

Characteristics of respondents are inherent characteristics of farmers that affect the performance of cattle they manage. The characteristics of the respondents referred to in the results of this study are the characteristics of ruminant livestock farmers which include beef cattle farmers, dairy cows, buffaloes, goats and sheep. The results of ruminant breeder respondent characteristics can be seen in Table 3.

Table 3. Characteristics of ruminant breeders in Sleman Regency

No	Characteristics	Nilai
1	Age of breeder (years)	52,46
	Productive (15-64)	92,86%
	Non-Productive (>64)	7,14%
2	Breeder Education	
	Elementary school	32,65%
	Junior High School	37,76%
	Senior High school	29,59%
3	Principal Works	
	Breeders	30,61%
	Farmers	39,80%
	Labor	11,22%
	Self-employed	12,24%
	Entrepreneur	6,12%
4	Breeding Experience	17,92

Source: Processed Primary Data (2024)

Age of the breeder

The results showed that the average age of ruminant farmers in Sleman regency was 52.46 years. The majority of farmers are in the productive age range (aged 15-64 years), namely 92.86% and 7.14% are non-productive farmers (aged over 64 years). One of the factors that affect the success of livestock farming is age, because it is related to the physical ability and thinking of farmers to the livestock business carried out. From these results show that the majority of ruminant livestock business in Sleman is done by people who have productive age or working age, so they still have good physical ability to do business to develop beef cattle. According to Otampi et al. (2017) the age that is still productive greatly supports the ability of farmers to develop their livestock businesses, which is between 15 – 64 years. Generally, farmers who still have a productive age have a better physical ability to find feed and take care of their livestock. In addition, it is also more receptive to emerging new innovations such as feed manufacturing technology and others. The age factor is usually more identified with work productivity, and if a person is at a productive age, there is a tendency for high productivity (Rasminati et al., 2022).

Level of education

The results showed the level of education of farmers in Sleman Elementary School (32.65%), junior high school (37.76%) and high school (29.59%). Most breeders have a primary to secondary level of Education. The diverse level of education reflects the diversity of farmers ' educational backgrounds. Farmers with higher levels of education generally have better knowledge and skills in managing their livestock, resulting in higher productivity and greater profits. According to Indrayani and Andri (2018) the level of Education possessed by respondents can affect livestock

businesses both technically, management and management of livestock businesses in the absorption of technology. The development of training and education programs can help increase the knowledge and skills of farmers in managing farms efficiently.

Main Work

The results showed that the main occupation of ruminant breeders in Sleman regency are as breeders (30.61%), farmers (39.80%), laborers (11.22%), entrepreneurs (12.24%) and entrepreneurs (6.12%) (Appendix 2). This shows the diversity of the main work of farmers in Sleman Regency. The involvement of farmers in other occupations, such as farmers, laborers, self-employed, and entrepreneurs, indicates the existence of diverse sources of income. This can contribute to the economic resilience of the breeder family. From these results show that the majority of livestock raising is only used as a side job not used as the main job to meet economic needs every day. Usually raising livestock is used as savings or ivestation that at any time there is a sudden need for the livestock to be sold. According to Munier (2003) generally the main business of farmers is as a farmer but the sale of livestock is enough to contribute to family income, especially to send children to school and meet daily needs and partly for consumption.

Farming experience

The results showed that the average experience of farmers in Sleman regency is 17.92 years. The experience is quite long. Of course, farmers have enough knowledge, ability to handle problems and expertise in running the business.
The longer the farmer's experience in running his business, the easier it will be to face the problems faced and the more he has the ability to develop his business. According to Febrina et al. (2008) the experience of raising long enough to provide an indication that the knowledge and skills of farmers to livestock rearing management has a better ability, so that with many years of business experience is expected respondents can manage and develop their business better.

Number of livestock and fodder needs

The number of livestock and feed needs of ruminants in this study include various types of livestock classified as ruminants, namely beef cattle, dairy cows, horses, buffaloes, goats and sheep. The results can be seen in Table 4.

Table 4. The number of livestock population and the number of ruminant feed needs in Sleman Regency.

Types Of Livestock	Total[1] (UT)	Kebutuhan[2] (BK / ton/year / UT)	Total requirement BK / ton / year
Beef Cattle	20.640,20	3,32	68.525,46
Dairy Cows	2.254,00	3,32	7.483,28
Horse	136,50	3,32	453,18
Buffalo	132,00	3,32	438,24
Goat	2.977,94	3,32	9.886,76
Sheep	2.515,73	3,32	8.352,22
Total	28.656,37		95.139,15

Source: * 1 = Department of Agriculture, Food Security and Fisheries of Sleman Regency (2022)

[2] = Edi (2020).

The results showed that the total population of ruminants in Sleman regency was 28,656.37 UT. By using data on the number of livestock populations and feed needs per UT of livestock, the total feed needs for the entire population of ruminants in Sleman Regency can be calculated. Based on the calculation of the total feed requirements for all types of ruminants in Sleman regency is 95,139.15 BK/ton/year. The number of feed needs is the minimum amount of feed that must be met for ruminant feed in Sleman Regency. Ruminant feed needs are getting higher, causing farmers to be more innovative in feeding forage to farm animals. In order to anticipate the coming dry season and forage feed will be increasingly difficult to find, then farmers need a way to store fresh feed ingredients or feed ingredients store within a certain period of time. This can be done by wet pickling (silage) and dry pickling (hay). So that the difficulty of finding feed ingredients during the dry season is no longer an obstacle for farmers (Yulianto, 2016).

Feed Production

Feed is one of the main factors in livestock development efforts in the livestock business in addition to seed and governance factors. The availability of quality and sustainable animal feed will greatly support the increase in livestock production and reproduction (Rusdian et al., 2016). Feed production in this study is divided into the production of feed derived from agricultural waste and the production of forage potential of animal feed derived from various types of land that can potentially be overgrown forage.

Agricultural Waste Production

Agricultural waste was identified as a potential source for producing animal feed. Efforts to utilize agricultural waste generated during the agricultural process as an alternative feed source to improve livestock production efficiency. The production of agricultural waste in this study came from commodity waste crops of paddy, field rice, corn, soybeans, peanuts, cassava and sweet potatoes. The results of research on agricultural waste production that can be used as animal feed in Sleman Regency can be seen in Table

Table 5. Production of agricultural waste in Sleman Regency

Commodities	Harvest Area (Ha)*	Conversion value (tons/BK/year)
Rice Straw	41.908,20	73.339,39
Farm Rice Straw	445,00	778,75
Corn Straw	4.738,35	21.322,58
Soybean Straw	47,40	71,10
Peanut Straw	3.160,60	4.740,90
Cassava Leaves	435,98	130,79
Sweet Potato Leaves	76,51	91,81
Total	50.812,04	100.475,32

Source: * = Department of Agriculture, Food Security and Fisheries of Sleman Regency (2022).

Based on the results showed that the production of research waste in Sleman regency is 100.475, 32 tons/BK/year (Appendix 5). The most agricultural waste production potential in Sleman regency is derived from paddy straw which annually can produce 73,339.39 tons/BK/year. The use of agricultural waste as animal feed has great potential to provide economic and environmental benefits. Agricultural waste can be converted into animal feed through various means, such as drying, fermentation, or other processing. Using agricultural waste as animal feed can help farmers save on feed

costs, as some of these wastes can often be obtained at low cost or even for free (Anas et al., 2017).

Production Of Forage Fodder

Forage production is obtained from the production of various types of forage crops derived from paddy fields, dry land or plantation land and forest land. The results of forage production in Sleman Regency can be seen in Table 6.

Table 6. Forage production in Sleman Regency

Types Of Land	Land Area (Ha)*	Conversion value (tons/BK/year)
Rice Fields	17.889,94	4.956,52
Dry Land	15.863,97	1.002,80
Forest Land	4.330,73	3.556,68
Total	38.084,64	9.516,00

Source: * = Department of Agriculture, Food Security and Fisheries of Sleman Regency (2022)..

Based on the results showed that the production of forage from rice fields, dry land, and forest land that can be used as ruminant feed in Sleman regency is 9,516 tons/BK/year. The availability of seasonal forage in the dry season is a serious problem for farmers because its existence is strongly influenced by the season. In the rainy season the availability of forage fodder is very abundant, and vice versa in the dry season the availability of hijaun is very limited. In the rainy and dry seasons there is an imbalance of forage production so that the provision of forage is very difficult (Sawen et al., 2003). In addition, the availability of forage is also influenced by the limited land as a feed crop caused by land conversion that competes with food crops. Thus, more effective strategies are needed to address changes in the availability of forage and ensure the sustainability of animal feed production.

Total Animal Feed Production

The Total production of animal feed is the total of the potential production of agricultural waste and forage production. By knowing the total potential of animal feed production so that later it can be used as a reference to determine the capacity of livestock and Carrying Capacity Index in an area. The results of total livestock production can be seen in Table 7.

Table 7. Total production of agricultural waste and ruminant forage in Sleman Regency

Types Of Feed Sources	Production (ton/kg / year)
Rice Fields	4.956,52
Dry Land	1.002,80
Forest Land	3.556,68
Agricultural Waste	100.475,32
Total	109.991,32

Source: processed Primary Data (2024).

The results showed that the total production of animal feed in Sleman yogyakarta is 109,991.32 tons/BK/year (Table 7). These results can be a foundation for animal feed Policy Planning and livestock sector development in Sleman Regency. According to Rasminati and Utomo (2010) the availability of feed continuously, cheap and easily available is the key to the success of a livestock business, so it is necessary to consider aspects of sustainability and management of natural resources so that feed production can be maintained in the long term. Factors such as seasonal changes and land conversion can affect the availability of forage.

Livestock Capacity

Capacity of livestock in suatau region is the ability of an area to accommodate a particular livestock on pertimbanagan potential availability of existing feed. The capacity of livestock is calculated by looking at the population in an area compared to the potential feed produced in that area within a certain period of time (Tubangsa, 2018). Livestock capacity in Sleman Regency can be seen in Table 8.

Table 8. Capacity of ruminants in Sleman Regency

Total Feed Production (ton/kg / year)	Feed requirement (ton/BK/year / UT)	Power tap (UT)
109.991,32	3,32	33.129,92

Source: primary data processed 2024

The results showed that Sleman regency has a capacity of 33,129.92 UT of ruminants. This capacity is calculated based on the total ruminant feed production of 109,991.32 tons/BK/year divided by the need for feed for 1 UT of ruminant livestock of 3.32 tons/BK/year. So it can be interpreted that Sleman regency has the capacity to maintain about 33,129.92 UT of ruminant livestock by ensuring the availability of sufficient feed.

The capacity of livestock in an area is influenced by several main factors, including the availability of forage feed as the main source of livestock food, soil fertility to produce more feed, and the availability of sufficient water for livestock drinking needs. The ideal climate, the type of livestock raised, and an efficient livestock management system also contribute to the capacity. Overall, these factors are interrelated and need to be considered holistically to optimize the region's capacity in supporting sustainable livestock farming (Kleden et al., 2015).

Capacity Increase In Livestock Population

Livestock population increase capacity (KPPTR) is a concept that refers to the ability of a region or farm to accommodate and manage an increase in livestock population (Hayati, 2021). The capacity of Ruminant Population increase in Sleman Regency can be seen in Table 9.

Tabel 9. Kapasitas peningkatan populasi ternak ruminansia di Kabupaten Sleman

Livestock capacity (UT)	Total livestock population (UT)	KPPTR (UT)
33.129,92	28.656,37	4.473,55

Source: primary data processed 2024

The results showed that the capacity of ruminants in Sleman regency was 33,129.92 UT, while the total population of ruminants in Sleman regency was only 28,656. 37 UT. So there is still potential to increase the number of livestock as much as 4,473.55 UT. This kpptr value can be used as an indicator of the potential growth of livestock populations in Sleman Regency. In this case, relevant parties can consider strategies to optimize the utilization of livestock capacity that is still available. In addition, it should be noted that factors such as the availability of feed, land, water, and environmental conditions can also affect the realization of KPPTR. Therefore, increasing the capacity of the region to support livestock growth must be accompanied by sustainability and wise planning in order to maintain ecosystem balance and livestock welfare (Muhammad, 2021).

The Forage Carrying Capacity Index (Indeks Daya Dukung / IDD)

The Forage Carrying Capacity Index (Indeks Daya Dukung / IDD) is the ability of a region to assess regional development (Edi, 2020). IDD figures are also used to determine the level of animal feed safety in an area to support the lives of livestock in the region (Triyanto et al., 2018). The results of the carrying capacity index (IDD) of Sleman Regency can be seen in Table 10.

Tabel 10. Indeks daya dukung wilayah di Kabupaten Sleman

Daya Tampung Ternak (UT)	Total Populasi Ternak (UT)	IDD
33.129,92	28.656,37	1,16

Sumber: Data Primer terolah 2024

The results showed that Sleman regency has a Carrying Capacity Index (IDD) of 1.16. This Carrying Capacity Index is used to describe the status of feed availability conditions in Sleman Regency, and in this case, the condition is interpreted as "critical status". This means that the region is experiencing a situation where the number of livestock populations is relatively high, while the carrying capacity of the available feed is relatively low. According to Saputra (2016), IDD values between 1-1.5 are classified as critical criteria. With the IDD value of Sleman regency of 1.16, this indicates that the area is in the critical category, but has not yet reached the level of very critical or emergency.

This "vulnerable status" condition in terms of feed carrying capacity can pose a number of challenges, such as the risk of feed shortages, decreased livestock health, or even a negative impact on farm productivity. Therefore, there is a need for strategic actions to address this imbalance, such as improvements in feed management, increased availability of forage and more efficient Land Management. The importance of continuous monitoring and management of The Carrying Capacity Index is crucial to prevent greater losses in the livestock sector (Dotulong et al., 2021). Through an understanding of the value of IDD, appropriate policies and strategies can be designed to ensure the sustainability of livestock farming in Sleman Regency.

Conclusion

Conclusion

It was concluded that Sleman Regency could produce 109,991.32 tons (BK) of ruminant feed in one year to meet the needs of 33,129. 92 UT. The total population of ruminants is 28,656.37 UT, so it has a potential capacity for increasing livestock population (KPPTR) of 4,473. 55 UT. Carrying capacity index value (IDD) 1.16 (critical).

Advice

Sleman regency needs strategies to increase the availability of animal feed such as land utilization of unproductive land for planting various types of animal feed, utilizing all agricultural waste that can be used as a source of animal feed and implementing animal feed preservation for the dry season. This strategy is expected to help Sleman overcome the shortage of animal feed and maintain the sustainability of livestock production.

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