The 2nd International Conference On Indigenous Knowledge For Sustainable Agriculture 2023
ISBN : 978-623-161-062-1

THE DEVELOPMENT OF BEEF CATTLE IN TARAKAN CITY USING LQ AND SPATIAL ANALYSIS

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ABSTRACT

Livestock development in an area is influenced by natural resources and human resources as well as commodities grown and utilized as a source of animal feed, so a spatial analysis of potential is needed. This study aims to identify sub-districts that have the potential to become the basis for the development of beef cattle and identify potential areas for beef cattle development. This research was conducted in Tarakan City. This type of research is descriptive quantitative. Determination of the sample using a quota where the samples taken were 40 breeders divided from 4 sub-districts. The data used are primary data obtained from beef cattle breeders and secondary data obtained from BPS Tarakan City, Department of Agriculture, Food and Fisheries of Tarakan City. The method used for analysis is LQ analysis for sub-district base potential, area development potential analysis using livestock density analysis. The results of this study were that the LQ value for the North Tarakan sub-district was 1.44 and for the East Tarakan sub-district was 1.59 as the beef cattle base area. Based on the potential for regional development and spatial analysis, North Tarakan District is the first priority in the distribution and development area. East Tarakan District and Central Tarakan District are the second priority in the area of deployment, development and consolidation. West Tarakan District is the last priority as a stabilization area and deployment area.

Keywords:

Development, Beef Cattle, LQ Analysis, Spatial Analysis

INTRODUCTION

The potential for livestock development has good prospects in the future because the demand for products derived from livestock will continue to increase in line with the demand for population, income and public awareness to consume highly nutritious food as a result of the increasing level of education of the population [1]. Opportunities will increase the demand for this beef, must be seized as an opportunity for the development of this commodity. The development of the agricultural sector, especially the livestock sub-sector, includes the beef commodity. This commodity is one of the elements of government policy through the ministry of agriculture, namely national food self-sufficiency.

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Beef is one of the commodities as a variable for national economic growth. The average consumption of beef products by the Indonesian people per capita according to the PKH Directorate General [2] in 2017 to 2019 was relatively constant, namely 0.009 kg, while the beef cattle population, although there was an increase, was not significant. Regarding meeting the demand for beef, the government is currently optimizing its policy of efforts to develop beef cattle populations with the UPSUS SIWAB (Special Efforts for Obligatory Breeding Cows) program throughout Indonesia. So that it can meet the demand for meat consumption

North Kalimantan is one of the potential developments for beef cattle farming commodities and is supported by feed capacity covering an area of 30,891 ha which is divided into three development areas, namely Bulungan Regency, Nunukan Regency and Tarakan City. the development of the area can be integrated with agricultural crops, such as corn and rice [3]. The city of Tarakan, as the only city in North Kalimantan, is often used as a transit city and is known as the city of a million cafes. The need for beef to fulfill cafe menus is one of the opportunities for the development of beef cattle.

The population of beef cattle in Tarakan City is increasing every year, in 2018 the population of beef cattle has increased from 2,594 to 2,794 heads with beef production of 267.92 tons to 269.38 tons [4]. The maintenance of beef cattle in Tarakan City is still done traditionally so it is still classified as a side business. The sub-districts in Tarakan City have potential natural resources and human resources to support the development of cattle. Based on the problems and opportunities previously described, the purpose of this study was to look at the potential areas for beef cattle development by identifying potential beef cattle development areas in Tarakan City.

METHOD

This research was conducted in Tarakan City, North Kalimantan. Determining this location using purposive sampling method, namely the determination of the sample deliberately on the grounds that Tarakan City is one of the places used development of beef cattle business in North Kalimantan. The sampling technique used in this study was non probability sampling is a sampling technique that does not give equal opportunity for each member of the sample to be selected for the sample. Determination of the sample using the quota method, namely the method of determining the sample who have certain characteristics, namely as a beef cattle breeder, the minimum age is 17 years [5]. In this study the samples taken were 40 breeders which is divided into 4 districts in Tarakan City.

Data analysis was performed by calculating Location Quotients (LQ) values. According to Arsad (2017) the LQ method can be formulated as follows:

LQ = (es/ek) / (Es/Ek)

es = beef cattle population in Tarakan City

ek = number of heads of families in Tarakan City

Es = beef cattle population in the District

Ek = number of family heads in the District

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If LQ > 1 is obtained, then the village/kelurahan has the potential to can be developed as a beef cattle center area.

The second analysis is the Regional Development Potential Analysis, namely by calculating the population density. Population density classificationbased on [6] procedures for environmental planning for settlements in urban areas are presented in the following table. Calculation of population density using the following formula:

Rare Population Density = Total Population / Area

Table 1. Population Density Classification

No	Population Density	Classification
1.	>400 people/km^2	Very Dense
2.	201-400 people/km^2	Solid
3.	151-200 people/km^2	Moderate
4.	<150 people/km^2	Rare

The next analysis from the Regional Development Potential analysis is livestock density. Livestock density is divided into three types, namely economic density, farming density, and regional density. This analytical method is used by [7] with the following formula :

Table 2. Livestock Density Formula

No	Description	Formula	Criteria
1	Economic Density	∑Pop.Beef Cattle (ST)x 1000//∑ Population	-Very dense >300 -Dense (100-300) -Medium 50-100 -Rarely < 50
2	Farming Density	∑ Pop. Beef Cattle (ST)/ land area	-Very dense >2 -Solid 1-2 -Medium 0,25-1 -Rarely <0,25
3	Territory Density	∑Pop.Beef Cattle (ST)/Area (Km)^2	-Very dense>100 -Dense 50-100 -Medium 20-50 -rarely<20

Note: ST: Livestock Unit

The third analysis of the Regional Development Potential Analysis is to determine the potential for development areas for livestock commodities, namely selecting livestock parameter values according to the criteria key characterization as described in the following table:

Table 3. Criteria for livestock development areas

Livestock Economic Density (ST/1000 souls)	Population Density (people/km2)			
	Low/sparse	Moderatel y	dense	Very dense
Low/sparse	WPP	WPP	WP	WM
Moderately	WPP	WP	WM	WM
dense	WP	WP	WK	WK
Very dense	WP	WM	WK	WK

Note: WPP: area of deployment and development; WP: development area; WM: region stabilization; WK: consumer area

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The third analysis after the analysis of regional development potential is spatial analysis. Spatial data analysis was carried out to create the basic function of selectively retrieving spatial information in an area with computational, tabulating or mapping approaches of various statistical information intended [8]. Analysis of the spatial distribution center is a pair of spatial coordinates that describes the position of a point that is assumed to best represent the distribution the location of the phenomenon, the distribution center is determined by the spatial mean or approximation mean center and median center. The coordinate value of the mean center (x,y) is the average coordinate value of the phenomena measured on the x and y axes so that mean center coordinates are very sensitive to extreme values.

RESULT AND DISCUSSION

1.1. Characteristics of Respondents

Characteristics of Respondents were divided into three characters namely: the age of the respondent, the level of education of the respondent and experience raise cows. Age of respondents based on research results can be seen in the following table:

Table 4. Age of Respondents

Age (years)	Frequency (person)	Percentage (%)
< 20	1	2,5
21	1	2,5
31	9	22,5
41	16	40,0
>50	13	32,5
Amount	40	100

Source: primary data

Table 4 shows that almost all respondents are of productive age. This right shows that where the respondent's mindset is adequate to take consideration of developing his business and his mindset is still open, making it easier to transfer the technology and skills provided. This is based on the statement [9] that productive age of breeders between 15-64 years. Productive age is very influential in terms of skills and is the main capital in raising livestock. The education level of the respondents can be seen in table 5.

Table 5. Level of Education

Level of education	Frequency (person)	Percentage (%)
SD	13	32
SMP	6	15
SMA	17	42
SARJANA	4	10
Amount	40	10

Source: primary data

In table 5 it can be seen that the education of the respondents is mostly high school. Limited knowledge and the skills possessed by breeders can influence the management of their business, but this can be overcome through increased knowledge or education non-formally such as training and from various information media other. [9] states that education is an internal factor can provide motivation for technological innovations in particular in the livestock.

Experience determines success in managing livestock. The experience of raising the respondents can be seen in the table following.

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Table 6. Livestock Experience

Livestock Experience	Frequency (person)	Percentage (%)
<5	25	62,5
6-10	8	20,0
>10	7	17,5
Amount	40	100,0

Source: primary data

Table 6. shows that most of the farmers have less than 5 years experiences. This shows effort Cattle farming is starting to develop, for respondents this cattle business is as additional income for family life. [10] added that the longer the farmer runs his business, the more There is also a lot of experience so that it can be used as a guide in dealing with it various problems in running a beef cattle business.

1.2. Locations Quotions (LQ) Analysis

LQ value indicates that the City of Tarakan has two districts which can be said to be the basis of cattle breeding cut, the districts are the East Tarakan District (1,59) and the District North Tarakan (1,44), which can be seen in the following table:

Table 7. LQ score

No	District	LQ Score	Information
1	East Tarakan	1,59	> 1 = Basis
2	Central Tarakan	0,57	< 1 = Non Basis
3	West Tarakan	0,86	<1 = Non Basis
4	North Tarakan	1,44	>1 = Basis

Source: Secondary data

This indicates that the population relatively more beef cattle than in other districts. Waprni (1984), Saputra et al. (2016) stated that if LQ > 1, it is called the basis sector, namely sector whose level of specialization is higher than the level of the reference area. So it is good for the development of beef cattle in the region. If LQ < 1, it is called a non-basic sector, namely a sector with a lower level of specialization than the reference area level. Thus it can be said that Tarakan City has two sub-districts which has the potential to be developed as a center for cattle production slaughter, when viewed in terms of the number of beef cattle.

1.3. Analysis of Regional Development Potential

In the Regional Development Potential Analysis, there are three things to be analyzed, namely population density, livestock density, and combined density. Based on the calculation data, it can be known the population density following:

Table 8. Population Density

District	An are (km^2)	Total population (people)	Population Density(people/km^2)	Criteria
East Tarakan	58,01	58,233	1.003,84	very solid
Central Tarakan	55,54	82,135	1.478,84	very solid
West Tarakan	27,89	91,792	3.291,21	very solid
North Tarakan	109,36	29,865	237,09	solid
Tarakan City	250,8	262,025	1.044,76	very solid

Source: Secondary data

Based on table 8 it can be seen that the population density in Tarakan City is included in the very solid category.

As for the density of livestock, based on the calculation data it can be seen the density of livestockbin table 9.

Table 9. Livestock Density

District	Economy	Criteria	farming	Criteria	Region	Criteria
East Tarakan	25,9	seldom	0,1	seldom	13,6	seldom
Central Tarakan	9,4	seldom	0,1	seldom	7,2	seldom
West Tarakan	13,9	seldom	0,2	seldom	24,1	solid

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North Tarakan	23,5	seldom	0,0	seldom	3,4	seldom
Tarakan City	72,8	moderate	0,5	moderate	48,3	solid

Source: Secondary data

Based on table 9 it is known that Economic density in Tarakan City is in the moderate category, density farming is classified as medium and the area density is solid. This matter shows that the economic density of cattle herds is being compared to the total population with a value of 72.77 souls. If you look at the density moderate farming with a value of 0.48 ST/ha, the area of arable land available possible to accommodate livestock to be developed. However, data and assessments for each sub-district will produce results different information on each density both economic, farming and regional.

The economic density in all districts includes the rare criteria, due to the ratio of the population to the number of beef cattle including rare. This happened because of the large demand for beef which is not accompanied by the number of beef cattle, the density of farming in all sub-districts are included in the rare criteria due to the area of land used breeders can still accommodate beef cattle, both of which caged or released into the wild and area density in all districts including the dense criteria and only the dense West Tarakan District, this shows that the aspect of natural resources in each sub-district still has deep potential development of cattle, but from the aspect of the number of human resources it is relatively solid. [11] stated that the development of beef cattle This can be done through increasing the potential of land, human resources, feed, and diet. [12] also states that 92.3% of the factors that influence the development of beef cattle are land area, availability of fodder, labor and capital.

Based on calculations to find out the density combination, the calculation results the density of livestock in the City of Tarakan that District of North Tarakan be the first priority in the deployment and development area (WPP) beef cattle. East Tarakan District and Central Tarakan District become the second priority in the area of deployment, development (WPP) and stabilization region (WM). West Tarakan District is the last priority into a stabilization area (WM) and a deployment area (WP). Recommendation given to each district will vary, according to culture, habits, skills and other social aspects. Priority areas different recommendations will be given.

Based on the results of the calculation of LQ and Density Combination, it can be seen that North Tarakan District is the basis for beef cattle farming and become the first priority area of development, namely the distribution area, development (WPP) and deployment areas (WP). This is due to density rare areas and livestock farming is still rare. Whereas East Tarakan District is also the base area with the highest score but became the second priority development area, Tarakan District Tengah and West Tarakan Districts are areas that are not based on beef cattle farming which are the second and last priority areas. Matter This shows that a sub-district which is a base does not necessarily become a region development. The calculation of density combinations can be seen in table 10.

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Table 10. Density Combinations

District	Combinations					
	E U	E W	U W	E P	U P	W P
East Tarakan	W PP	W PP	W PP	W M	W M	W M
Central Tarakan	W PP	W PP	W PP	W M	W M	W M
West Tarakan	W PP	W P	W K	W M	W M	W K
North Tarakan	W PP	W PP	W PP	W P	W P	W P

Source: Secondary data
Note: EU : economy vs farming, EW : economy vs area, UW : farming vs area, EP : economy vs population, UP : farming vs population, WP : area vs population.

1.4. Spatial Analysis

The results of the spatial distribution center analysis can be seen in the following figure:

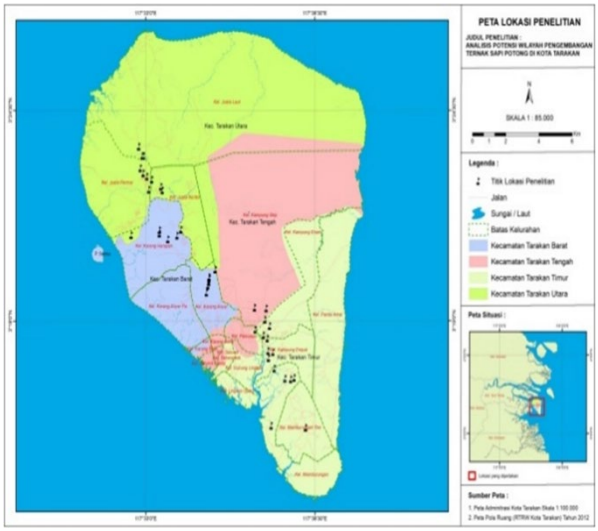

Figure 1. Beef Cattle location map

This image shows the distri- bution of locations where there are beef cattle in Tarakan City. The District of North Tarakan is a priority for the distribution and development of beef cattle, the Districts of East Tarakan and Central Tarakan are the priority for strengthening and spreading and for the District of West Tarakan it can be a priority for strengthening and spreading. This is because the area of North Tarakan District is not densely populated adequate population and feed resources for beef cattle besides the grass used as fodder. North Tarakan District is also the production site for corn, which can be used as additional feed for cattle cut. As for the West Tarakan District due to the wide area a very densely populated area cannot become a development area but becomes stabilization area where the area becomes a center of quality seeds and can supply livestock to other districts. For Tarakan District East and Central Tarakan will be development and deployment areas ownership of cattle due to the area that is not solid.

CONCLUSION

The location quotions (LQ) value shows that the districts that are the basis are North Tarakan District of 1.44 and East Tarakan District of 1.59, the LQ values of the two districts are > 1. Based on the potential for regional development and spatial analysis, North Tarakan District is the first priority in the distribution and development area. East Tarakan District and Central Tarakan District are the second priority in the area of deployment, development and consolidation. West Tarakan District is the last priority as a stabilization area and deployment area.

ACKNOWLEDGMENTS

On this occasion, the author would like to thank the Faculty of Agriculture, University of Borneo Tarakan, as the organizer of the ICIKSA conference and for helping with funding.

ISBN : 978-623-161-062-1
Managed By: Faculty Of Agriculture, University Of Borneo Tarakan

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