IOP Conference Series: Earth and Environmental Science

PAPER • **OPEN ACCESS**

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To cite this article: Muhammad Anshar *et al* 2019 *IOP Conf. Ser.: Earth Environ. Sci.* **247** 012076

View the article online for updates and enhancements.

This content was downloaded from IP address 139.219.8.96 on 09/10/2019 at 11:18

The potential for rural resources development, specifically livestock commodities based on Geographic Information System (GIS) in Patukku Village, Bontocani District, Bone Regency

Muhammad Anshar[1], Astati [2], and Nur Wahida[1]

[1]Departement Urban and Regional Planning Engineering, Faculty of Science and Technology, UIN Alauddin University, Jl. H.M. Yasin Limpo No. 36 Gowa, Indonesia

[2]Departement Animal Science, Faculty of Science and Technology, UIN Alauddin University, Jl. H.M. Yasin Limpo No. 36 Gowa, Indonesia

E-mail: ansharakhul@yahoo.co.id

Abstract. The Potential for rural resources development, specifically livestock commodities based on Geographic Information System (GIS) in PatukkuVillage, BontocaniDistrict, Bone Regency(Muhammad AnshardanNurWahidaas researchers). This study aims to analyze how the potential of Rural Resource Development, especially Livestock Commodities based on Geographic Information System (GIS) in Pattuku Village, Bontocani District, Bone Regency. The analytical method used is descriptive analysis and analysis of Geographic Information System (GIS) based mapping. The results showed that Pattuku Village has the potential resources in the form of basic physical conditions that are appropriate in supporting the development of rural areas based on agriculture, especially livestock sub-sector because it has topographic conditions located at an altitude of 120 meters above sea level (masl) with hydrological conditions including groundwater, springs and periodic inundation, namely rice fields and rivers as sources of water that can be used by residents, especially farmers in development of agricultural activities, especially livestock. For climatology conditions in Patukku Village, it has two seasons, rainy and dry seasons, with rainfall changing every month and this climate cycle occurring every year. These conditions encourage the optimization of agricultural land use, especially the development of rural areas based on superior livestock commodities.

1. Introduction

Regional development is an effort to empower stakeholders in a region in utilizing natural resources with technology to provide added value to what is owned by administrative areas or functional areas. rural development aims to advance rural areas and their communities, support food self-sufficiency, increase food production, provide basic infrastructure and facilities to the community, provide industrial raw materials, increase community participation in rural area development, and develop relations between rural areas and urban areas that support each other and benefit each other.

The concept of sustainability through leading commodities also needs to pay attention to the concept of regional development. Regional development concepts themselves are an effort to

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encourage socio-economic development, reduce regional disparities, and preserve the environment in a region, including rural areas [1].

Agricultural development aims to improve the lives of rural communities, including increasing income, output and productivity of farmers. [2] says that in several stages of agricultural development, sustainable steps have been carried out with the aim of increasing agricultural production and welfare and increasing food production. The targets of agricultural development are the development of systems and agribusiness enterprises and food security that are expected to provide benefits in the development and increase of economic income of the community [3].

Resources, especially humans in animal husbandry business, are important factors in innovating and developing agribusiness ideas. [4] states that human resource capital plays an important role in economic growth because human resources control the production, distribution and consumption chains. The potential of breeders is a measure of the ability of farmers based on basic potential, the potential for implementing production inputs, the potential for labor supply, and the potential for mastering technology.

Bone Regency is one of the districts in South Sulawesi Province which is 174 km from Makassar City. Bone Regency is the third largest district in South Sulawesi Province with a total of 27 sub-districts.

The area of Bone Regency is 4,559 km^2 with the widest area in Bontocani District and the smallest area in Tanete Riattang District. The population of Bone Regency is based on 2016 population projection of 746,973 people. Population density in Bone Regency in 2016 reached 164 people/km^2. Bone Regency is supported by the economy in the form of the agricultural sector, especially the livestock sub-sector which is spread in several sub-districts. Pattuku Village, Bontocani District is one of the potential villages in agriculture, this is supported by the livelihoods of the people of Pattuku Village, most of whom are farmers and farm laborers and the many rice fields that are the working area of the farming community, limited business productivity and increased production agriculture is often caused by inadequate agricultural facilities and infrastructure, this is also the basis for seeing the development of rural areas in Pattuku Village based on their potential.[5].

2. Research method

2.1. Type of research

This type of research is qualitative descriptive with the location of this study conducted in Pattuku Village, Bontocani District, Bone Regency with the object of research namely Potential Rural Resource Development, Especially Livestock Commodities Based on Geographic Information System (GIS).

2.2. Types and data sources

The type of data used in this study is in the form of quantitative data and qualitative data which are considered to be relevant to research. Sources of data needed include primary data and secondary data. And primary is data obtained from individuals or individuals by conducting observations and interviews. Secondary data is data obtained from the offices of agencies or related institutions and data from the results of previous studies that are standard data, while the secondary data in the form of: basic physical aspects data, population data.

2.3. Data collection and data analysis techniques

Techniques for collecting data through field observations and literature review. To find out how the potential for developing livestock-based rural resources in Pattuku Village, Bontocani district, Bone Regency by looking at the potential of livestock owned and also referring to the basic physical aspects of the area using GIS-based mapping analysis followed by descriptive analysis with regional resource research variables (basic physical aspects) with topographic indicators, hydrology and climatology.

3. Discussion

3.1 Overview of reaearch site

Administratively, Bone Regency is divided into 27 sub-district administrative regions and 372 Village /urban administrative areas and 171 neighborhoods. The climate conditions in the Bone Regency region are generally characterized by rainy days and relatively high rainfall, ranging between 1750-2000 mm. The type of season that is known is the rainy season and the dry season. The rainy season in this region begins in November to May and after it enters the dry season, the highest rainfall occurs in February. The climate characteristics of the Bone Regency region are closely related to the activities of the people who live and depend on agricultural, plantation, livestock and fisheries activities.

The types of livestock business developed in Bone Regency are classified into two, namely large livestock and small livestock. Large livestock consists of cows, horses, buffaloes, goats, while poultry includes native chickens, broilers, and ducks.

For the area of each sub-district can be seen in the following table:

Table 1. Area of each district in Bone Regency

No.	District	Area (Km^2)	Percentage (%)
1.	East Bontocani	48,88	1,07
2.	Bontocani	23,79	0,52
3.	West Bontocani	53,68	1,17
4.	Cenrana	143,60	3,15
5.	Duaboccoe	144,90	3,17
6.	Ajanglale	139,00	3,04
7.	Amali	119,13	2,61
8.	Tellu Siattinge	159,30	3,49
9.	Awangpone	110,70	2,42
10	Palakka	115,32	2,52
11	Ulaweng	161,67	3,54
12	Bengo	164,00	3,59
13	Tellu Limpoe	318,10	6,97
14	Lamuru	208,00	4,56
15	Lappariaja	138,00	3,02
16	Ponre	293,00	6,43
17	Barebbo	114,20	2,50
18	Cina	147,50	3,24
19	Sibulue	155,80	3,42
20	Mare	263,50	5,77
21	Libureng	344,25	7,55
22	Patimpeng	130,47	2,86
23	Tonra	200,32	4,39
24	Salomekko	84,91	1,86
25	Kajuara	124,13	2,72
26	Kahu	189,50	4,16
27	Bontocani	463,35	10,16
Total		**4.559,00**	**100**

Source: Bone District in Figures, 2017.[6]

The following can be seen in the administrative map of Bone Regency as follows:

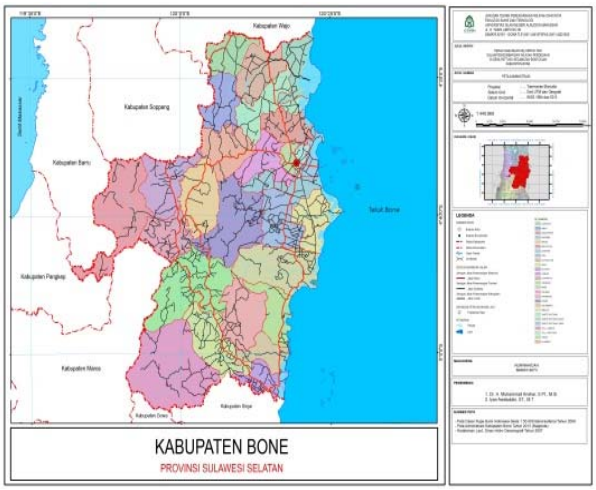

Figure 1. Administrative Map of Bone Regency [6]

Bontocani District has an area of 463.35 Km2 with a population of 23,613 people. Bontocani sub-district which is the widest sub-district of the 27 sub-districts in Bone Regency has 11 sub-districts / villages. The largest village area is Bana Village with an area of 69.16 Km² followed by Langi Village with an area of 59.20 Km², while the village with the smallest area is Lamoncong Village which is about 29.42 Km².

Administratively, Bontocani District is directly adjacent to:

- The North is bordered by Libureng District.
- The South is bordered by Sinjai Regency and Gowa Regency
- East side borders with Kahu District
- The West is bordered by Gowa Regency and Maros Regency

for the area of each kelurahan in Bontocani District can be seen in the following table.

Table 2. Area of Each Village in Bontocani District in 2016 [7]

No.	Village	Widht (Km^2)	Percentage (%)
1.	Watang Cani	50,53	10,91
2.	Pattuku	30,24	6,53
3.	Bonto Jai	51,25	11,06
4.	Bulu Sirua	42,19	9,11
5.	Bana	69,16	14,93
6.	Pammusureng	32,30	6,97
7.	Kahu	34,26	7,39
8.	Langi	59,20	12,78
9.	Erecinnong	35,04	7,56
10.	Lamoncong	29,42	6,35
11	Mattiro Walie	29,76	6,42
Total		**463,35**	**100,00**

The map of Bontocani District can be seen as follows.

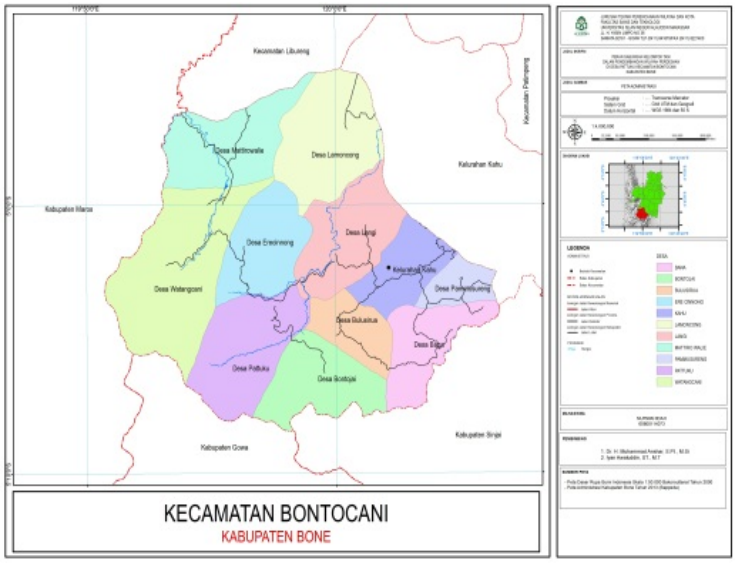

Figure 2. Administrative Map of Bontocani District [6]

Pattuku Village is one of 11 villages / kelurahan in Bontocani District, Bone Regency. Pattuku Village has an area of 30.24 Km2. Which includes 3 hamlets namely Pattuku Hamlet, Samaenre Hamlet and Lemo Hamlet, the distance from the District capital to Pattuku Village is 8 Km. In Administrative Pattuku Village has the following regional boundaries:

- The North is bordered by Erecinnong Village and Langi Village
- East side borders Bonto Jai and Bulusirua Villages
- The South is bordered by Gowa Regency
- The west is bordered by Watangcani Village.

This can also be seen on the following administration map

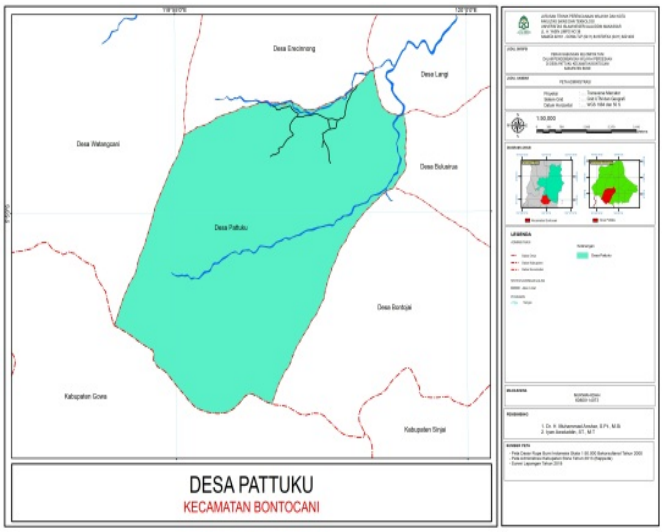

Figure 3. Administrative Map of Pattuku Village

Land use in Pattuku Village consists of residential areas, plantations, agriculture, offices, cemeteries and other public facilities. The widest area is the agricultural area with an area of 469 ha and the smallest area, namely public infrastructure with an area of 2.5 ha. For more details, see the following table:

Table 3. Areas of Area in Pattuku Village [7]

No	**Area**	**Width (Ha)**
1	Settlement	469
2	Plantation	205
3	Agriculture	605
4	Health	1,37
5	Education	0,61
6	Offive Space	3,26
7	Workship	12,83
8	Trade and Services	33,41
9	Funeral	0,13

3.2 Potential of rural areas resources

3.2.1 Agricultural land

3.2.1.1. *Food Crop Agriculture Sub Sector.* The area of Pattuku Village is a potential area for food crops. Besides rice as a food crop commodity, other food crops produced are peanuts. The main commodity is rice. To be more clearly seen in the following table:

Table 4. Production of rice plants / inner crops (Ton)[7]

No	Commodity	Production in 2016
1	Rice	9,6
2	Corn	2,5
3	Peanuts	4,8
Total		16,9

3.2.1.2. *Plantation agriculture sub sector.* The types of plantation crops in the Pattuku Village area are coffee and candlenut. In addition there are also other plantation crops such as cocoa and cloves. For more details, see the following table:

Table 5. Production of inner plantations (Tons)[7]

No	**Commodity**	**Production in 2016**
1	Cocoa	1,05
2	Coffee	4,7
3	Clove	1,1
4	Candlenut	4,6
Total		**11,45**

3.2.1.3. *Agriculture Livestock Sub Sector.* Business in the field of animal husbandry both for large livestock and for small livestock. For more details, see the following table:

Table 6. Livestock / Poultry Population in 2016 [7]

No	Commodity	Production in 2016
1	Cow	600
2	Horse	20
3	Chicken	800
4	Duck	100
Total		**1520**

3.3. Potential basic physical aspects of rural areas

3.3.1. Topography. Based on a review of the topographic conditions in Pattuku Village, Bontocani District, Bone Regency is located in an area that is located at an altitude of about 120 meters above sea level (masl). This can be seen on the following topographic map.

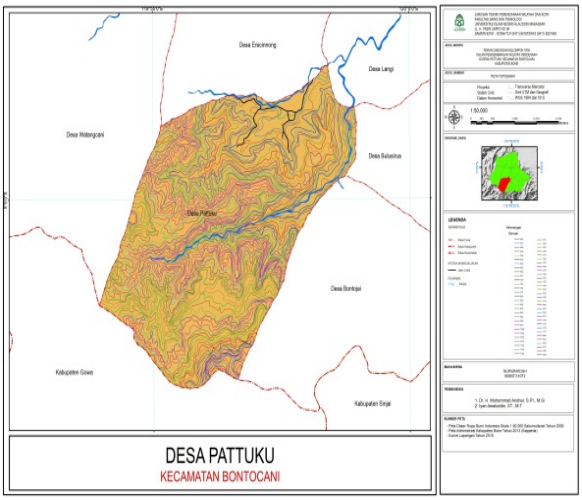

Figure 4. Pattuku Village topography map (Source: Field Survey in 2018)

3.3.2. *Hidrology.* Source of water is one of the most strategic and essential needs in people's lives and agricultural activities and so on. Hydrological conditions in Pattuku Village include groundwater and periodic inundation, a source of water that can be utilized by residents in Pattuku Village, namely springs. Hydrological conditions in Pattuku Village are divided into periodic puddles, namely rice fields and permanent inundation, namely rivers. This condition is suitable as a development area for livestock sub-sectors, especially livestock commodities. This can be seen in the following hydrological map.

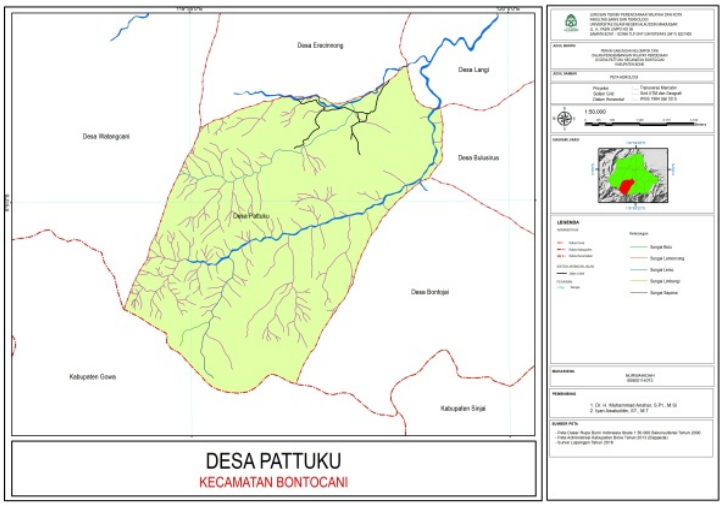

Figure 5. Pattuku Village hydrological map (Source: Field Survey in 2018)

3.3.3. Climatology. Climatological conditions affect three aspects that have a large influence on space in a region, namely season, air temperature and rainfall. The area in Pattuku Village has two seasons or climate, rainy and dry season. The rainfall in Pattuku Village is almost evenly distributed every year. This condition is suitable in the development of livestock sub-sectors, especially cattle farms. The following is Pattuku Village climatology map.

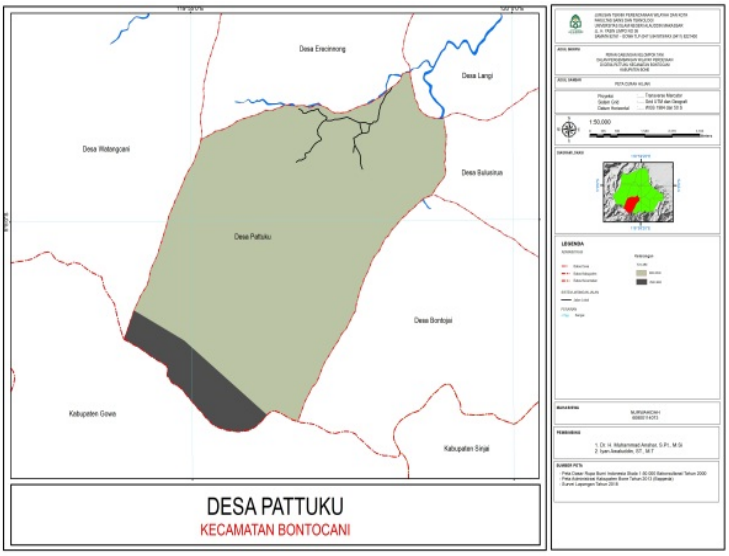

Figure 6. Pattuku Village climatology map (Source: Field Survey in 2018)

4. Conclusion and suggestion

4.1 Conclusion

The conclusion that can be obtained from this study is that Pattuku Village, Bontocani District, Bone Regency has agricultural potential, especially the livestock sub-sector, both large livestock and small livestock and especially physical resources potential, be it topography, hydrology and climatology.

4.2. Suggestion

The Bone Regency Government should pay more attention to and develop rural areas based on existing resource potential in an effort to improve community welfare and regional economic development.

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