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

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Abstract. The Potential for rural resources development, specifically livestock commodities based on Geographic Information System (GIS) in Patukku Village, Bontocani District, Bone Regency (Muhammad Anshar dan Nur Wahida 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
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 km² with the widest area in Bontocani District and the smallest area in Tanete Rattang 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/km². 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 research 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:

| No. | District       | Area (Km²) | 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.  | Ajangtale      | 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. | Bongo          | 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. | Sibilue        | 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:
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.

| No. | Village       | Widht (Km²) | 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.  | Ereccinnong   | 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.
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 Ereccinnong 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

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**Figure 2. Administrative Map of Bontocani District [6]**

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**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:

| No | Area              | Width (Ha) |
|----|-------------------|------------|
| 1  | Settlement        | 469        |
| 2  | Plantation        | 205        |
| 3  | Agriculture       | 605        |
| 4  | Health            | 1.37       |
| 5  | Education         | 0.61       |
| 6  | Office Space      | 3.26       |
| 7  | Workshop          | 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:

| 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:

| 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. Hydrology. 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.
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.

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.

References
[1] Cipta C S W, Santun R P, Sitorus, and Djuara P. Lubis 2017 Pengembangan Komoditas Unggulan di Wilayah Pengembangan Tumpang Kabupaten Malang, (Bogor: Regional Planning Science Postgraduate Program, Bogor Agricultural University)
[2] Jenudin 2017 Peranan Kelompok Tani Sumber Harapan dalam Meningkatkan Kesejahteraan Anggota Kelompok Tani Sumber Harapan Desa Tenajar Kidul Kecamatan Kertasemaya Kabupaten Indramayu (Syekh Nurjati Cirebon IAIN Library 1)
[3] Rusastra I W, M Hendiarto, K Noekman, A Supriatna, K W Sejati and D Hidayat 2002 Kinerja dan Perspektif Pengembangan Model Agropolitan dalam Mendukung Pengembangan Ekonomi Wilayah Berbasis Agribisnis (Center Research and Development)
[4] Sugiarto M and Nur S 2013 Pengembangan Potensi Sumber Daya Peternak Sebagai Upaya Peningkatan Daya Saing Peternakan Kambing Skala Mikro Di Kabupaten Banyumas. Jenderal Soedirman University Faculty of Animal Husbandry, 2
[5] Wahida N, M Anshar 2018 Peran Gabungan Kelompok Tani dalam Pengembangan Wilayah Perdesaan di desa Pattuku Kecamatan Bontocani Kabupaten Bone. (Makassar : Faculty of Science & Technology UIN Alauddin)
[6] BPS Bone District 2017, Badan Pusat Statistik, Bone District in Figure 2017.
[7] BPS Bontocani District 2017, Bontocani District in Figure 2017.