Regional Analysis of Sheep Business in BanjarNEGara Regency

E. Gustia¹, S. Mulatsih²*, & A. Gunawan³

¹Graduate School of Regional Development Management, Faculty of Economic and Management, IPB University
²Department of Economics, Faculty of Economic and Management, IPB University
³Department of Animal Production and Technology, Faculty of Animal Science, IPB University

Jl. Agatis, Kampus IPB Darmaga Bogor 16680, Indonesia

*Corresponding author: mulatsupardi@gmail.com

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ABSTRACT

BanjarNEGara Regency is home to the local Batur sheep, known for their significant body weight. The community has been raising Batur sheep for generations, aiming to develop them into a regional economic driver. This study aims to analyze potential areas for sheep livestock development in BanjarNEGara Regency. The data used came from the farm statistics of the Directorate-General for Farm and Animal Health in 2021. The location quotient (LQ), localization index (LI), and specialization index (SI) method were used to perform regional analysis of sheep business. The results of the survey showed that the base area of sheep farming in BanjarNEGara district is distributed in the districts of Karangkobar, Pejawaran, Batur, and Wanayasa. The localization and specialization index showed that sheep farming is spread evenly throughout the district of BanjarNEGara, not concentrated in a particular region.

Keywords: BanjarNEGara district, base area, location quotient, sheep

ABSTRAK


Kata kunci : kabupaten BanjarNEGara, location quotient, ternak domba, wilayah basis
INTRODUCTION

Regional development is essentially the operationalization of national development within a specific region, tailored to the region’s physical, social, and economic capacities based on applicable laws and regulations (Tahir 2023). This process has gained importance with the issuance of Law No. 23/2014, which delegates significant responsibilities for managing and implementing development to regional governments. This decentralization is based on the assumption that regional governments possess the capability to plan and manage development independently, given their familiarity with their regions unique potentials and advantages. Sheep breeding is one of the most popular livestock businesses that developed in Banjarnegara due to the animal genetic resource of Batur sheep. Batur sheep has been one of the development sector priorities of Banjarnegara regency since 1974 and was designated as one of the Indonesian local sheep breeds through the Decree of the Ministry of Agriculture of the Republic of Indonesia No. 2916/Kpts/OT.140/6/2011.

In planning regional development, regional governments must consider the concept of comparative advantage, which refers to the superiority of a product compared to other products that could be produced, given the region’s specific resources (Jumiyanti 2018). These specific resources include land, climate, biological, and cultural assets, all of which are closely related to commodity production from natural resources such as agriculture, fisheries, forestry, mining, and other primary sectors.

Banjarnegara Regency in Central Java is one such region where development planning is crucial to improving its economic growth, which lags behind other regions in the province. The economic growth in Banjarnegara is relatively low, and the poverty rate is relatively high. Data from the Central Java Central Statistics Agency (BPS) in 2020 shows that the per capita income in Banjarnegara Regency is only Rp 3,773,323, significantly lower than the Central Java provincial average of Rp 6,706,874. Furthermore, the poverty rate in Banjarnegara Regency is 15.20%, higher than the national poverty rate of 9.57%. The majority of Banjarnegara Regency is rural, yet the contribution of sheep as a leading commodity in the region. The equation for location quotient (LQ) analysis was used to assess the contribution of sheep to the district’s Gross Regional Domestic Product (GRDP).

Furthermore, promoting Batur sheep farming could be an effective poverty reduction strategy that would subsequently boost the district’s GRDP.

The development of sheep farming in Banjarnegara Regency necessitates identifying which subdistricts have comparative advantages, highlighting potential development areas. Therefore, a regional study is needed to align the potential for Batur sheep farming with strategic planning in Banjarnegara Regency. Research on the comparative advantages of livestock commodities in Indonesia, particularly for sheep, is still limited. Surachman et al. (2022) utilized the location quotient (LQ) method to regionalize sheep farming in West Java Province, identifying several subdistricts as sheep farming bases, although sheep farming was not concentrated in one area. There remains a need for an analysis of the comparative advantages of sheep farming in Central Java, considering its potential as a sheep farming center alongside West Java and East Java.

This research focuses on Banjarnegara Regency, which has the largest potential Batur sheep population in Indonesia. The study aims to identify the subdistricts that serve as the base for sheep farming and analyze the characteristics of sheep farming distribution within Banjarnegara Regency.

MATERIAL AND METHODS

Material

The data utilized in this research comprises livestock statistics published by the Directorate General of Animal Husbandry and Animal Health from 2021 to 2023. This dataset included the number of ruminant livestock sheep, goats, and buffalo distributed across various subdistricts within Banjarnegara Regency.

Methods

Data from the 2022 Banjarnegara Agriculture and Fisheries Service Survey by the Central Java Province Central Statistics Agency (BPS) was used to describe the characteristics of farmers. Meanwhile, the total ruminant livestock population data, used to calculate the location quotient (LQ), localization index (LI), and specialization index (SI), was sourced from livestock statistics published by the Directorate General of Animal Husbandry and Animal Health (Ditjen PKH) and the Food Security and Animal Husbandry (DKPP) of Central Java Province.

Base Region Analysis

Location quotient (LQ) analysis was used to assess the contribution of sheep as a leading commodity in the region. The equation for location quotient (LQ) analysis was as follows:

\[ LQ = \left( \frac{X_{ij}}{X_j} \right) / \left( \frac{X_i}{X} \right) \]

LQ = Location Quotient
\( X_{ij} \) = Number of sheep in subdistrict j (animal unit/AU)
\( X_j \) = Number of ruminant in subdistrict j (AU)
If \( LQ < 1 \), it indicated that subdistrict \( i \) has a relatively smaller share of Sheep compared to ruminant livestock found in Banjarnegera Regency. On the other hand, if \( LQ > 1 \) shows the centralization of Sheep in the \( i \) subdistrict relative to the total region. \( LQ > 1 \) indicates that the role of Sheep is quite dominant in the \( i \) subdistrict and is often a sign that the \( i \) subdistrict has excess, and will send that commodity to another region. Therefore, \( LQ > 1 \) indirectly indicates that the subdistrict has a comparative advantage for the commodity in question. If \( LQ = 1 \), it means that the role of Sheep in the \( i \) subdistrict is relatively similar to the role of Sheep in the region of Banjarnegera Regency (Rustiadi et al. 2017).

### Analysis of Distribution Characteristics

The localization index (LI) and specialization index (SI) analyses assessed the concentration and specialization of sheep farming businesses in Banjarnegera Regency. The equations for these analyses were as follows:

\[
LI = \frac{1}{2} \sum_{j=1}^{22} \left[ \frac{X_{ij}}{X_{.j}} - \frac{X_{i.}}{X_{..}} \right]
\]

Information:
- \( LI \) = Localization Index
- \( X_{ij} \) = Number of Sheep in subdistrict \( j \) (AU)
- \( X_{.j} \) = Number of ruminant in subdistrict \( j \) (AU)
- \( X_{i.} \) = Number of Sheep in Banjarnegera Regency (AU)
- \( X_{..} \) = Number of ruminant in Banjarnegera Regency (AU)

If the localization index (LI) value is close to 0, it indicated that the distribution of sheep farm is relatively balanced throughout the district or city. Conversely, if the LI is close to 1, it means that the distribution of sheep farming businesses is relatively unbalanced and concentrated in one specific district or city (Muta’ali 2015). Specialization index (SI) equation:

\[
SI = \frac{1}{2} \sum_{j=1}^{22} \left[ \frac{X_{ij}}{X_{.j}} - \frac{X_{i.}}{X_{..}} \right]
\]

Information:
- \( SI \) = Specialization Index
- \( X_{ij} \) = Number of sheep in subdistrict \( j \) (AU)
- \( X_{.j} \) = Number of ruminant in subdistrict \( j \) (AU)
- \( X_{i.} \) = Number of Sheep in Banjarnegera Regency (AU)
- \( X_{..} \) = Number of ruminant in Banjarnegera Regency (AU)

If the specialization index (SI) value is close to 0, it indicated that the district or city area has a diversity of activities and is not specialized in sheep farming (Muta’ali 2015). Conversely, if the SI value is close to 1, it suggested that the district or city area tends to have unique activities predominantly focused on the sheep farming business.

### RESULTS AND DISCUSSION

#### Characteristics of Sheep Farmers in Banjarnegera Regency

The characteristics of farmers play an important role in the development of the livestock subsector. These characteristics describe the farmers conditions about their involvement in managing livestock businesses. Sheep farmers in Banjarnegera Regency show unique and varied traits, influenced by geographic factors, climate, and local livestock practices.

Overall, the farmers are in productive age, ranging from 15 to 64 years old. The dominant age group among farmers is 38-46 years, comprising 47.37% of the total. The detailed characteristics of sheep farmers in Banjarnegera Regency are presented in Table 1. Sheep farmers in Banjarnegera Regency have varied experiences. According to Parengkuan (2019) the age factor is usually closer to work productivity. If someone is still of productive age, their productivity level is high. This has an impact on physical condition and thinking ability. The younger the farmers the more likely they are to be physically strong and dynamic in managing their business. so they can work stronger than older farmers. There were no farmers aged <29 years based on farmers age characteristics (Table 1).

<table>
<thead>
<tr>
<th>Variable</th>
<th>Category</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age of Farmer</td>
<td>29-37</td>
<td>10.53</td>
</tr>
<tr>
<td></td>
<td>38-46</td>
<td>47.37</td>
</tr>
<tr>
<td></td>
<td>47-55</td>
<td>31.58</td>
</tr>
<tr>
<td></td>
<td>56-64</td>
<td>10.53</td>
</tr>
<tr>
<td>Education Level</td>
<td>Did not have formal education</td>
<td>10.53</td>
</tr>
<tr>
<td></td>
<td>Elementary school/equivalent</td>
<td>73.68</td>
</tr>
<tr>
<td></td>
<td>Secondary school/equivalent</td>
<td>5.26</td>
</tr>
<tr>
<td></td>
<td>High school</td>
<td>10.53</td>
</tr>
<tr>
<td>Experience (years)</td>
<td>&lt;9</td>
<td>36.84</td>
</tr>
<tr>
<td></td>
<td>Sep-21</td>
<td>31.58</td>
</tr>
<tr>
<td></td>
<td>22-34</td>
<td>15.79</td>
</tr>
<tr>
<td></td>
<td>35-45</td>
<td>15.79</td>
</tr>
</tbody>
</table>

Source: BPS Central Java 2021 Processed

Breeding experience can influence the farmer’s abilities and skills in raising sheep. The more experience a farmer has, the easier it will be to raise sheep. Generally, farmers learned the procedures for raising livestock from their parents and pay attention to other farmers independently. 36.84% of sheep farming experience in Banjarnegera Regency Province has less than 9 years. 31.58% has 9-21 years of experience. 15.79% has 22-34 years of experience and 15.79% has 35-45 years of experience. Most farmers do not keep sheep permanently or continuously due to side bussines reason. The main bussines activity of farmers was holticulture program. Most of the flocks of sheep cultivated
by farmers in Banjarnegara Regency are Batur sheep. Batur sheep are the result of a cross between merino sheep and thin-tailed sheep with an original geographical distribution in Batur subdistrict and its surroundings (Ministry of Agriculture Decree 2011). This sheep is a dual purpose type because it can produce both meat and wool. This typical sheep can weigh twice as much as local sheep, that is between 60 - 80 kg, with a maximum weight of 140 kg at the age of more than 12 months, and has thick and smooth hair (Ministry of Agriculture 2011).

On an animal unit (AU) scale, the number of sheep owned by farmers ranges from 0.07 AU to 10.262 AU with an average livestock ownership of 513 AU. Livestock ownership greatly influences the value of the production produced. The more sheep you have the greater the production value generated. The number of livestock has a very real influence on sheep production. especially the number of ewes owned by farmers (Cyrilla et al. 2010). The aim of raising goats and sheep on a small scale is to obtain additional income or savings which can become a source of emergency cash when the need is urgent (Rusdian and Praharai 2015).

**Sheep Farming Business Base Area in Banjarnegara Regency**

The results of the LQ analysis of sheep livestock in Banjarnegara Regency indicate that out of the 20 subdistricts designated for sheep population development. Four districts (22.22%) are identified as base area, while 20 subdistricts (88.88%) are not designated as non-base areas (Table 2). Economic base analysis or regional comparative analysis. conducted through LQ analysis. is essential for identifying base or non-base areas for livestock development (Jumianti 2018). LQ analysis is also frequently employed to estimate sectors or commodities, as well as specific activities that can contribute substantial monetary units to society by exporting goods and services (Fironika et al. 2024).

The four subdistricts were identified as base areas for sheep farming, with LQ values exceeding 1 were Karangkobar, Pejawaran, Batur, and Wanayasa. Among these, the Pejawaran subdistrict has the highest average LQ value (4.988), while the Pandanarum subdistrict shows the lowest average LQ value of 0.000. Pejawaran and Batur are the primary focus areas for the development of sheep farming in Banjarnegara Regency. This action plan includes establishing a breeding center for crossbreed sheep in Pejawaran and for Batur sheep in the Batur sub-district. Both Pejawaran and Batur subdistricts serve as the base areas for the production of seed and meat from local sheep in Banjarnegara. The significant LQ coefficient in the Pejawaran and Batur subdistrict indicates that the presence of a sheep population effectively balances the population of other ruminants. Conversely, the low LQ coefficient in Pandanarum subdistrict is due to the absence of a sheep population, leading to livestock development focusing on cattle and goats. Additionally, the Pandanarum area is relatively small and a new expansion area of the Kalibening subdistrict, further contributes to this observation.

Sheep farming serves as a primary source of income for communities in base areas, where farmers have a strong cultural inclination towards developing sheep farming. Conversely, in nonbase areas, sheep farming does not play a significant role in the economy as other livestock such as cattle and goats are more prevalent. The implementation of a business base area strategy for sheep farming in Banjarnegara Regency is a strategic approach to optimize the utilization of local resources and enhance the livelihoods of farmers in the region.
not significantly contribute to the subdistrict economic growth compared to the overall economy of Banjarnegara Regency. The LQ analysis underscores this point, depicting more nonbase areas for sheep compared to base areas in Banjarnegara Regency (Figure 1). This suggests that raising sheep in nonbase areas in Banjarnegara Regency is suboptimal in productivity, resulting in relatively small added value.

Characteristics of the Distribution of Sheep Farming Businesses in Banjarnegara Regency

The results of the localization analysis of sheep farming businesses show that the localization index for sheep farming businesses in subdistricts in the Banjarnegara area are Pejawaran and Batur (Table 3). This value means that from 2021 to 2023, the sheep farming business in Banjarnegara Regency will not be localized to a particular subdistrict area. Sheep farming businesses are spread throughout the subdistrict due to the characteristics of sheep farming, which can adapt to the natural conditions in the Banjarnegara Regency area. Sheep are relatively easy to maintain with diverse land topographic conditions, and sources of forages can always be available even if they come from agricultural waste (Najmuddin et al. 2019). Most of Banjarnegara Regency is located in the highlands or mountains with soil types Alluvial, Andosol, and Organosol (Tresia et al. 2021). Residents use the carrying capacity of dry land in Banjarnegara Regency to cultivate the horticultural sub-sector as their main livelihood. These plant commodities can produce relatively large biomass potential as a local feed source for livestock development in Banjarnegara Regency.

Sheep Farming Business Specialization in Banjarnegara Regency

The analysis of the specialization of sheep farming businesses reveals that the Specialization Index (SI) value of sheep farming businesses in subdistricts in Banjarnegara Regency is less than one. This indicates that each subdistrict in Banjarnegara Regency does not specialize in sheep farming businesses within its area. The government of Banjarnegara, in collaboration with the Ministry of Agriculture, has designated a special focus area...
for preserving Batur sheep through the UPLAND Project for 2022-2024. This project aims to conserve Batur sheep in the Batur region by establishing a breeding center. The purpose of this breeding center is to select superior Batur sheep and to continue crossbreeding efforts to produce superior and pure Batur sheep. Most individuals engaged in sheep farming do not prioritize it as their primary source of income. It's important to note that having an LI value more excellent than one does not necessarily imply specialization in that commodity in a particular area (Syahrial et al. 2019).

Generally, sheep farmers primarily engage in farming as their main livelihood, with sheep farming considered a supplementary activity or a means of saving. While some farmers may prioritize livestock as their primary source of income, sheep farming is typically not the sole focus, as farmers often raise other types of livestock, such as goats and beef cattle.

It is worth noting that research conducted in the West Java area by Firman et al. (2018) identified 10 districts as base areas for sheep livestock commodities, in contrast to the four districts identified in this study. This disparity can be attributed to differences in data sources and the timing of the research. In this study, the initial process of determining the primary commodity focused on sheep due to their significant population in Banjarnegara Regency.

The base areas for sheep farming in Banjarnegara Regency from 2021 to 2023 were Karangkobar, Pejawaran, Batur, and Wanayasa. However, sheep farming businesses in Banjarnegara Regency were not concentrated in a particular subdistrict area; instead, they were spatially dispersed. Additionally, no subdistricts in Banjarnegara Regency specialize in sheep farming.

It is worth noting that the results of this research can be utilized to formulate policies aimed at developing sheep farming areas to enhance the productivity of sheep farming in Banjarnegara Regency.

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