



# Analysis of Beef Cattle's Potential as a Leading Commodity in the Agropolitan Areas in Padang Pariaman Regency

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**Abstract** | This research aims to determine beef cattle potential as a leading commodity and the development strategy of agropolitan areas in Padang Pariaman Regency. The research was conducted using a descriptive qualitative method, namely research that is focused on problems based on facts and carried out by means of observation, interviews, and studying documents. The respondents were determined purposively with the provisions of farmers who specifically raise local beef cattle in 3 districts which are the agribusiness centers in agropolitan area, so that a total of 101 farmers, and in-depth interviews with 10 experts. Data analysis was conducted using analysis of existing conditions of resources and other supporting factors, Location Question (LQ) and shift share analysis (SSA) to determine beef cattle potential, and SWOT analysis was used to formulate agropolitan area development strategies. The results showed that the existing conditions of land availability, natural conditions, characteristics of farmers and beef cattle farming, farmer institutions and animal husbandry institutions, infrastructure and facilities are quite supportive although some of these aspects need improvement from the government. Beef cattle have potential as a leading commodity as evidenced by  $LQ > 1$ , which means that beef cattle are a commodity that has a comparative advantage that can fulfilling the needs of beef cattle at the district and regency area and even can be sold to other regions but beef cattle do not have a competitive advantage, this is indicated by the negative SSA value. This means that beef cattle production growth in this agropolitan area is still low compared to other regions in West Sumatra Province. The strategy for developing agropolitan areas can be carried out with an aggressive strategy. An aggressive strategy is carried out by optimizing the strengths and opportunities in agropolitan areas. Priority strategies in the development of agropolitan areas based on leading commodities (beef cattle), namely (1) policies to increase the population and body weight of beef cattle through improving the quality standards of animal feed and disease control, can be done with more intensive training and technical assistance, (2) policies to increase the availability of animal feed, by utilizing land and crop waste and forming more feed banks (3) policies to facilitate obtaining production facilities by reactivating livestock groups, the government facilitates access to capital and assistance with feed and medicine, (4) policies to improve marketing, by revitalizing livestock markets with management by local governments and Animal Husbandry Department so that they can attract cross-regional beef cattle trade and (5) the government needs to formulate an agropolitan master plan.

**Keywords** | Leading commodity, Beef cattle potential, Agropolitan, Development strategy

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The agropolitan model is a decentralization-based development model, wherein regions are granted the authority to manage their regions based on the existing potential. The development of agropolitan areas is predicted on agriculture, with the establishment of an area as a development center, supported by its resources, to encourage the agribusiness of surrounding villages (Rohma and Rahmawati, 2020; Nugraha *et al.*, 2021). This is due to the close relationship between agropolitan areas and agricultural production areas (Handayani *et al.*, 2021).

The concept of agropolitan was first explained by Friedman in 1975 (Karim *et al.*, 2023), the constituent elements of agropolitan include the existence of agricultural land, agropolitan centers, labour and accessibility that connects production areas and marketing areas. Additionally, the concept of an agropolitan area is supported by the following considerations: the leading agricultural commodities, adequate land area and population, supporting infrastructure, and institutional system that are necessary for the viability of agropolitan area (Simanjuntak and Sirojuzilam, 2013; Saleh *et al.*, 2017; Pantouw *et al.*, 2018; Oryzanti *et al.*, 2018; Abramson, 2020; Rohma and Rahmawati, 2020). The development of agropolitan areas needs to consider the potential local resources (Rahim and Adiatmojo, 2020). The objective of developing agropolitan areas is to foster the growth of agricultural agribusiness, thereby enhancing the economic growth of the surrounding community, enhances the competitiveness of the region and provides added value, thereby increasing the contribution of the agricultural sectors to the Gross Domestic Products of the region (Martadona *et al.*, 2014; Yuni, 2016; Surya *et al.*, 2021).

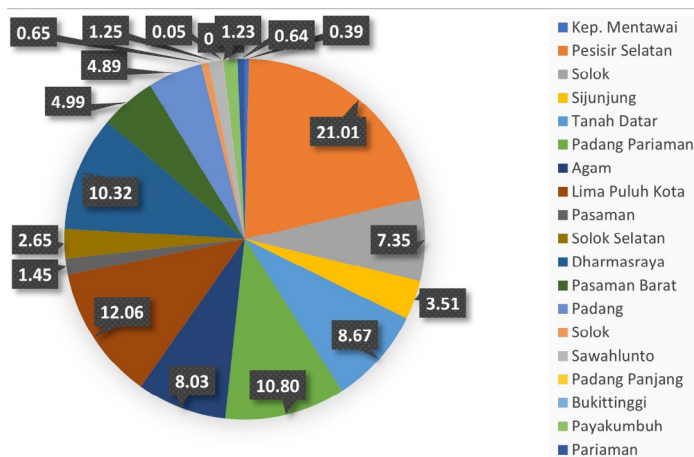


Figure 1: Percentage of beef cattle population by regency in West Sumatra Province.

The development of agropolitan areas in Indonesia began in 2002, becoming a regional economic development program, and outlined in the Regional Spatial Plan (RTRW), however, in general, the discourse on agropolitan develop-

ment has almost become inaudible at the moment. According to Iqbal and Anugrah (2016), the utilization of infrastructure in the agropolitan areas is suboptimal and does not continue after the agropolitan program is over, despite a significant investment having been made, which should be continued for the regional development. On the other side, the agropolitan program plan, which is contained in the Regional Spatial Plan, is merely a concept that has not been fully implemented in several regions.

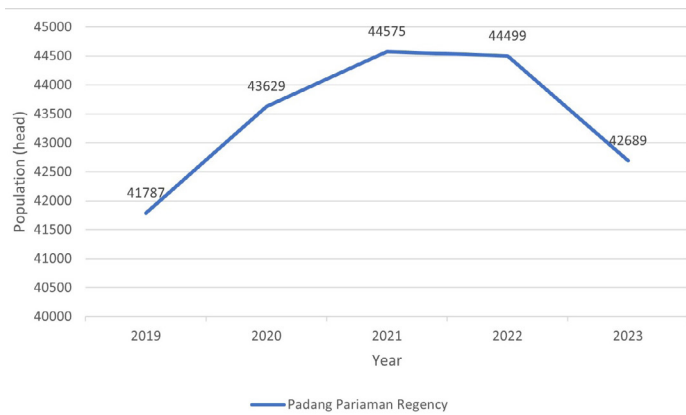
The West Sumatra Province has implemented a development agropolitan policy since 2002, as determined by the Ministry of Agriculture, where this policy designates a single region as an agropolitan area, namely Agam Regency (Departemen Pertanian, 2002). In 2006, six regencies were designated as agropolitan areas, one of which was Padang Pariaman Regency (Bappeda Provinsi Sumatera Barat, 2018).

In accordance with the The Regional Regulation of West Sumatra Province No. 13 of 2012 concerning the West Sumatra Regional Spatial Plan of 2012-2032, establishes development of integrated beef cattle and corn (Lubuk Alung District) in Padang Pariaman Regency and based on The Regional Regulation of Padang Pariaman Regency No. 5 of 2020 concerning the Regional Spatial Plan of Padang Pariaman Regency of 2020-2040, establishes strategic areas in terms of the importance of economic growth, specifically agropolitan areas in Sungai Geringging District (cocoa development and processing center) and VII Koto District (the center of beef cattle development).

The designation of 3 districts, namely VII Koto District, Lubuk Alung District and Sungai Garingging District as centers for agribusiness development in the agropolitan area in Padang Pariaman Regency, is expected to increase the productivity of farming, especially the beef cattle business as the core business in this agropolitan area, based on the consideration that Padang Pariaman Regency contributes 49.142 head or 10.80% (Figure 1) of the beef cattle population in West Sumatra Province (BPS-Statistics Sumatera Barat Province, 2024)

Based on the growth rate of beef cattle population in Padang Pariaman Regency over the last 5 years is quite worrying because it tends to decrease by 4.07% (Figure 2), while in line with the increase in population, the demand for beef is also increasing in West Sumatra Province. This certainly has an impact because it can make it more difficult for the local government to meet beef demand, especially since Padang Pariaman district is the third beef supply area in West Sumatra. Beef. Direktorat Jendral Peternakan dan Kesehatan Hewan (2021), Cattle production within West Sumatra Province has not been able to meet its beef demand. Beef production in West Sumatra is only able to supply no

more than 33% of beef demand in West Sumatra. Whereas, 77% of beef supply comes from additional beef and beef cattle from other provinces.



**Figure 2:** Graph of the development of beef cattle in Padang Pariaman Regency (2019-2023).

The existence of Padang Pariaman Regency as a center for beef cattle development that designed using the agropolitan concept, is a breakthrough by the government to increase the beef cattle population and beef production. Even to support agropolitan areas, According to [Bappeda Provinsi Sumatera Barat \(2018\)](#), agropolitan area development activities in Padang Pariaman Regency have been implemented in 2006 and has involved the implementation of various development initiatives, funded by the State Revenue and Expenditure Budget (APBD) through the Ministry of Public Works, Ministry of Agriculture Development Task, State Revenue and Expenditure Budget of West Sumatra Province, and State Revenue and Expenditure Budget of Padang Pariaman Regency. In fact, based on the availability of forage feed, which is the most important factor (70%) that determines the success of beef cattle production, according to data ([Badan Pusat Statistik Kabupaten Padang Pariaman, 2023](#)) there is land available for raising beef cattle in this area, in the form of rice fields (18,289 ha) and non-field agricultural land (83,217 ha) which can be used as grazing land sources of forage for livestock. In fact, according to [Devi et al. \(2023\)](#); [Fadillah et al. \(2023\)](#) the local government has also conducted an assistance program for beef cattle farming in the form of cattle breeding, concentrate feed and medicines to encourage the development of this farming.

The target of increasing beef production will be achieved quickly, one of which is by keeping imported cattle, and this is also the reason for farmers to tend to keep imported beef cattle rather than local cattle, on the pretext that imported beef cattle produce more meat and sell at a higher price. However, on the other hand, it is very important for the government to maintain the sustainability of local beef cattle as germplasm for West Sumatra and Indonesia. Local beef cattle such as south pesisir cattle, balinese cat-

tle, and ongole crossbred cattle, have their own advantages. [Adrial \(2010\)](#), including high adaptability to low-quality feed, traditional extensive rearing systems, and resistance to several diseases and parasites. Their relatively small body weight (150–250 kg) compared to imported cattle actually gives farmers and consumers an advantage because the price is relatively cheaper and sells quickly, so that the demand for beef can be met and the income level of farmers also increases. Therefore, this study is limited to local cattle farmers as research respondents, to provide an overview of the existing conditions of local beef cattle farmers in terms of social and economic aspects that have implications for strategy formulation, although the strategy formulation is not specific to local cattle development.

Based on the above phenomenon, for the success of the agropolitan development program based on leading commodities (beef cattle), of course, it also needs to be supported by empirical studies, so that it can be known how the potential of beef cattle, whether it is in accordance with local government policies that determine it's as a core business in the agropolitan area, and the strategy for developing agropolitan areas based on the beef cattle farming. Based on this premise, this research was conducted with two objectives: (1) to determine the potential of beef cattle farming as a leading commodity in Padang Pariaman Regency and (2) to develop a development strategy for agropolitan areas based on leading commodities in Padang Pariaman Regency.

## MATERIALS AND METHODS

### LOCATION AND TIME OF RESEARCH

This research was conducted descriptively qualitatively, which is research based on the philosophy of postpositivism used to research on natural object conditions where researchers contribute as key instruments, sampling, data sources are carried out purposively and snowball, collection techniques with triangulation (combined), data analysis is inductive / qualitative, and qualitative research results emphasize meaning rather than generalization ([Sugiyono, 2022](#)). Descriptive-qualitative research methods are focused on problems based on facts and are carried out by means of observation/observation, interviews, and studying documents. This research was conducted in 3 districts (VII Koto District, Lubuk Alung District and Sungai Garing-ging District), as agribusiness development centers, agropolitan areas in Padang Pariaman Regency, West Sumatra Province. The determination of the research location was carried out purposively with the consideration that this area was designated as one of the agropolitan areas with leading commodities of beef cattle farming since 2006 by the Regional Planning and Development Agency, West Sumatra Province. The research was conducted for six months from August 2022 to February 2023. ([Figure 3](#)).





Figure 3: Research location (Padang Pariaman Regency).

**DATA TYPES AND DATA COLLECTION METHODS**

The research data consisted of primary and secondary data. The primary data were employed to identify the specifics of beef cattle farming and the utilization of resources at the farmer level, including farmer characteristics (demographic aspects), beef cattle farming characteristics (type of local beef cattle raised, livestock rearing scale, livestock rearing system, livestock feeding, source of farm capital). Secondary data includes data on the natural potential of Padang Pariaman district, beef cattle population in 3 districts of agropolitan area centers (District VII Koto, Lubuk Alung District, Sungai Garingging District) and Padang Pariaman Regency level, land use data, supporting resource data (farmer institution and animal husbandry institutions, facilities and infrastructure), as well as regional planning documents and agropolitan areas.

The secondary data was obtained through the planning documents of The Regional Development Planning Agency (Bappeda), Regional Spatial Plan (RTRW) of Padang Pariaman Regency, Department of Agriculture and Food Security (DistankP), Department of Animal Husbandry and Veterinary Health (Dinakkeswan), publication reports from Central Statistics (BPS) of West Sumatra Province and Central Statistics (BPS) of Padang Pariaman Regency as well as the other related agencies. The data were collected through a combination of interviews and in-depth discussions with beef cattle farmers and relevant government agencies, in the form of identification of internal and external factors affecting beef cattle farming by providing weights and ratings for each factor, so that appropriate priority strategies for beef cattle development in agropolitan areas can be formulated.

**RESEARCH POPULATION AND SAMPLE**

The study population comprised local beef cattle farmers in 3 districts in the agropolitan area, Padang Pariaman Regency. The sample was selected through purposive sampling, with the stipulation that farmers who specialize in raising local cattle such as south pesisir cattle, balinese cattle, and ongole crossbred, 101 beef cattle farmers were obtained, with distribution in VII Koto district (28 people), Lubuk Alung district (53 people) and Sungai Garingging district (20 people). Furthermore, the data collection was also explored more deeply from 10 experts of stakeholders who are considered to possess knowledge and to be actively involved in the development of agropolitan areas, included The Regional Development Planning Agency (Bappeda), Department of Agriculture and Food Security (DistankP), Department of Animal Husbandry and Veterinary Health (Din7askkeswan), and field instructors (Table 1).

Table 1: Research respondents.

Local beef cattle farmers	Total Experts		Total
VII Koto District	28	The Regional Development Planning Agency	1
Lubuk Alung District	53	Department of Animal Husbandry and Veterinary Health	3
Sungai Garingging District	20	Department of Agriculture and Food Security	3
		Field Extension Officer (VII Koto, Lubuk Alung, Sungai Garingging District)	3
Total	101		10

**DATA ANALYSIS METHOD**

In order to know the potential leading commodity in Padang Pariaman Regency, subsequently, 3 distinct forms of data were conducted, (1) Analysis of existing conditions of natural resources, human resources, institutions, and infrastructure, farmer and local beef cattle farming, (2) Location Question (LQ) and (3) Shift Share Analysis (SSA), which thereafter, a strategy for the development of agropolitan areas based on leading commodities in Padang Pariaman Regency was devised through the implementation of Strengths, Weaknesses, Opportunities, and Threats (SWOT) analysis as outlined below:

**ANALYSIS OF BEEF CATTLE POTENTIAL AS A LEADING SEKTOR**

To determine the potential of beef cattle as a superior commodity in Padang Pariaman District, 3 analyses were conducted, as follows:

**ANALYSIS OF THE EXISTING CONDITIONS OF RESOURCES AND SUPPORTING FACTORS FOR THE DEVELOPMENT OF BEEF CATTLE IN PADANG PARIAMAN REGENCY:** The

potential of beef cattle to be developed as a commodity, in addition to being determined by the existence of the commodity itself, it will also be determined by various aspects that determine its development. The existing conditions can determine the extent to which the carrying capacity of natural resources, human resources/ farmers, institutions, and infrastructure facilities that are existing in the 3 districts of the center of the agropolitan area in particular and Padang Pariaman Regency in general. This analysis was carried out descriptively quantitative by using simple statistics such as averages, percentages, by identifying conditions and potential to support beef cattle farming.

**LOCATION QUESTION ANALYSIS (LQ):** LQ analysis is used to determine base commodities (leading commodities). This analysis can determine whether policies related to the determination of beef cattle as a leading commodity in Padang Pariaman Regency are appropriate or not, by also comparing with other ruminant farming. Formula, LQ (Ma'mun and Karyani, 2000):

$$LQ = \frac{(Si/Ni)}{(S/N)} \quad \text{or} \quad LQ = \frac{(Si/S)}{(Ni/N)}$$

Meaning,

LQ= Location Quotient of beef cattle

Si= The population of beef cattle in agropolitan area centers (VII Koto District, Lubuk Alung District, Sungai Garingging District)

S= The population of beef cattle in Padang Pariaman Regency

Ni= The population of ruminants in agropolitan area centers (VII Koto District, Lubuk Alung District, Sungai Garingging District)

N= The population of ruminants in Padang Pariaman Regency

LQ indicates;

LQ>1: Commodity is a basis commodity

LQ<1: Commodity is a no basis commodity

LQ=1: Commodity only could fulfill need owned area

LQ analysis was used to determine the comparative advantage of beef cattle farming in the 3 districts of agribusiness development centers in agropolitan areas, compared to the regency level. If the LQ value > 1, it indicates beef cattle as a basic commodity (leading commodity) and has a comparative advantage, which can fulfil the needs of beef cattle in the region and can even be sold outside the region. However, if the LQ value is < 1, then beef cattle is not a basic commodity (leading commodity) or does not have a comparative advantage, which means it cannot fulfil the needs of beef cattle in the region, and if LQ=1, it means that beef cattle production can only fulfil the needs within the region (district and regency).

**SHIFT SHARE ANALYSIS (SSA):** Shift Share Analysis (SSA) was employed to ascertain the expansion of a sector within a region. The following SSA method has been modified in accordance with the following considerations based on (Pratama, 2020):

$$St = Vjt - \left(\frac{Vt}{Va}\right) \times Vja$$

Meaning:

Vjt=The population of beef cattle in agropolitan area centers (VII Koto District, Lubuk Alung District, Sungai Garingging District) at the end of the year

Vt= The population of beef cattle in Padang Pariaman Regency at the end of the year

Va= The population of beef cattle in Padang Pariaman Regency at the initial year

Vja=The population of beef cattle in agropolitan area centers (VII Koto District, Lubuk Alung District, Sungai Garingging District) at the initial year

St indicates:

St > 0 or (+): the growth of a particular sector in the region is progressive

St < 0 or (-): the growth of a certain sector in the area is included in the slow group.

St analysis was used to determine the competitive advantage of beef cattle farming, by looking at the growth of beef cattle production between the district level of the agropolitan area and the regency. If St > 0 or positive, it indicates that beef cattle have a competitive advantage, as evidenced by higher production growth at the district level compared to the regency level, while if St < 0 or negative, it indicates that beef cattle do not have a competitive advantage, in other words, the growth of beef cattle production or population in the district is slower than the regency or even provincial level.

## ANALYSIS OF AGROPOLITAN AREA DEVELOPMENT STRATEGIES

**SWOT ANALYSIS:** A Strengths, Weaknesses, Opportunities, and Threats (SWOT) analysis is used to determine agropolitan development strategies based on leading commodities in agropolitan areas. SWOT analysis consists of several stages of analysis, namely data collection, analysis and decision making Rangkuti (2001) as follows:

- Identifying various factors to be able to strategize. Internal analysis is conducted to identify strengths and weaknesses, and external analysis is conducted to identify opportunities and threats. As a result of in-depth discussions from researchers and 10 competent experts from local government and involved in the agropolitan program in Padang Pariaman Regency, the weight and

**Table 2:** The strategies used in the SWOT matrix.

Internal/ Eksternal	Strength (S) List of strengths	Weakness (W) List of weaknesses
Opportunities (OP) List of opportunities	The SO Strategy (The strategy of using strengths and leveraging opportunities)	The WO Strategy (The strategy of minimizing weaknesses and leveraging opportunities)
Threat (T) List of threats	The ST strategy (The strategy of using strengths and resolving threats)	The WT Strategy (The strategy of minimizing weaknesses eliminates threats)

**Source:** Rangkuti (2001).

- rating of each internal and external factor was determined, and the result of multiplying weight and rating and produced a score. The total score for all internal and external factors can indicate the condition of the beef cattle farming and all aspects that influence it in the agropolitan area, with the following criteria:
- 1,0 – 1,99: weak ; 2,00 – 2,99: moderate; 3,0 – 4,0: strong.
- Weighting and rating of internal and external factors, then sorting the scores from highest to lowest. Then calculate the internal factor score (the difference between the strength and weakness factor scores), and the external factor score (the difference between the opportunity and threat factor scores).
- Determining the quadrant of strategy, determined from the combination of the scores of internal factors (X) and the scores of external factors (Y), so that the appropriate strategy can be determined. Quadrant I is an aggressive strategy (a combination of opportunity and strength factors), quadrant II is a verified strategy (a combination of strength and threat factors), quadrant III is a defensive strategy (a combination of threat and weakness factors), quadrant IV is a change strategy (a combination of weakness and opportunity factors).
- Creating a SWOT matrix, namely the IFE (Internal Factor Evaluation) matrix and the EFE (External Factor Evaluation) matrix to obtain strategies by combining internal and external factors, so as to obtain S-O strategies, W-O strategies, S-T strategies and W-T strategies.
- Determining priority strategies, according to the results of the strategy quadrant and SWOT matrix, priority strategies are determined so that they can be used as a basis for providing recommendations [Table 2](#).

## RESULTS AND DISCUSSION

Analyzing the potential of beef cattle as a leading commodity.

### EXISTING CONDITIONS OF RESOURCES FOR BEEF CATTLE DEVELOPMENT IN THE AGROPOLITAN AREA OF PADANG PARIAMAN DISTRICT

**NATURAL AND LAND RESOURCES:** The Padang Pariaman Regency has an area of 1,343.09 km<sup>2</sup>, consisting of 17

Districts. VII Koto District, Lubuk Alung District and Sungai Garingging District are designated as agribusiness development centers for agropolitan areas in the regency, with the core business of beef cattle and supporting commodities of corn and cocoa. The area of each region is as follows: VII Koto District (64,14 Km<sup>2</sup>), Lubuk Alung District (124,76 Km<sup>2</sup>) and Sungai Garingging District (107,73 Km<sup>2</sup>), or 22.09% of the total area of the regency (BPS-Statistics of Padang Pariaman Regency, 2024).

This region has an average temperature of 27.18°C, with the average humidity of 83.55% (BPS-Statistics of Padang Pariaman Regency, 2024). This demonstrates that this region is suitable for the rearing of beef cattle, as proven by Abidin in [Adhitia et al. \(2022\)](#) that the optimal maintenance temperature for beef cattle falls within the range of 17-27°C with a humidity level of 60-80%.

Based on the topography, Padang Pariaman Regency is relatively flat and 40% of it is a lowland, this condition making it suitable for grazing land. According [BPS-Statistics Padang Pariaman Regency \(2023\)](#), the land area in Padang Pariaman Regency was recorded at 132,879 hectares, with the distribution of use in the form of rice fields at 18,289 hectares, non- agricultural land at 31,373 hectares and agricultural non-rice field land at 83,217 hectares. The non-field agricultural land consists of farmland (26,205 ha), field land (7,991 ha), plantation land (17,772 ha), community forest land (19,353 ha), pasture land (425 ha), state forest land (33 ha), land that is temporarily not cultivated (6,518 ha) and other land (4,882 ha) while the availability of land for beef cattle farming in the 3 districts of the agropolitan area centers, the majority (80.30%) is non-rice agricultural land, rice fields (14.46%) and non-agricultural land (5.24%) ([Table 3](#)). This statement indicates that there is still sufficient land available for the farming of beef cattle development in Padang Pariaman Regency and is also supported by waste from agricultural land that provides an additional source of feed for beef cattle.

**DEVELOPMENT OF BEEF CATTLE POPULATION:** The beef cattle reared by the local community in Padang Pariaman Regency was consisted from two categories, local and imported. The local cattle breeds are Pesisir cattle, Balinese In 2023, the beef cattle population in Padang Pariaman



**Table 5:** Development of beef cattle population in agropolitan centers in Padang Pariaman Regency (2019-2023).

Year	VII Koto District		Lubuk Alung District		Sungai Garingging District		Average development (%)
	Population (head)	Development (%)	Population (head)	Development (%)	Population (head)	Development (%)	
2019	4,492	-	3,318	-	2,974	-	-
2020	4,607	2.56	3,438	3.62	2,991	0.57	2.25
2021	4,839	5.04	3,019	-12.19	3,025	1.14	-2.00
2022	4,506	-6.88	3,171	5.03	2,824	-6.64	-2.83
2023	4,547	0.91	3,226	1.73	3,120	10.48	4.38

Source: processed secondary data.

cattle, and Ongole Crossbred cattle, while the imported cattle breeds consist of Brahman, Limousin, and Simental. For the local beef cattle, Pesisir cattle, the farmers were obtained through their home region of South Pesisir Regency, West Sumatra Province (BPS-Statistics of Padang Pariaman Regency, 2024).

**Table 3:** Land area by use in districts of leading commodity development centers in Padang Pariaman Regency (2023).

District	Land area by use (Ha)		
	Rice fields	Non-rice agricultural land	Non-agricultural land
VII Koto	1,226	7,719	148
Lubuk Lubuk Alung	2,521	8,446	196
Sungai Garingging	620	8,077	1,238
Total	4,367	24,242	1,582
Percentage (%)	14.46	80.30	5.24

Source: processed secondary data.

Regency was recorded at 42,689 heads. Based on Figure 4, it can be seen that over the last 5 years (2019-2023), the development of the beef cattle population has fluctuated, but in the last 3 years (2021-2023) it has decreased from 44,575 to 42,689 heads. The development of the beef cattle population in Padang Pariaman regency can be seen in the Table 4 below:

**Table 4:** Development of beef cattle population in Padang Pariaman Regency (2019-2023).

Year	Population (heads)	Increase (heads)	Development (%)
2019	41,787	-	-
2020	43,629	1,842	4.41
2021	44,575	946	2.17
2022	44,499	-76	- 0.17
2023	42,689	-1,810	- 4.07

Source: processed secondary data.

Meanwhile, the growth of beef cattle population in the 3 sub-districts of agropolitan centers in Padang Pariaman district can be seen in Table 5 below:

Table 5 shows that the largest beef cattle population is in VII Koto District as a beef cattle development area, but the development of the cattle population in the 3 districts of the center of the agropolitan area has fluctuated relatively over the last 5 years (2019-2023), if seen from the average development for the three districts, in 2020-2022 there was a decrease of up to 2.83%, but in the last condition 2022-2023, the beef cattle population has shown an increase in growth of up to 4.38%. The increase in the average growth of the beef cattle population was mostly contributed by Sungai Geringging district, VII Koto district, as the center of beef cattle, actually shows the lowest development compared to the other 2 districts in the agropolitan center area. For more details, please refer to the graph below Figure 5.

**FARMERS AND LOCAL BEEF CATTLE FARMING:** Farmer characteristics will greatly influence farmer behavior in making decisions in their farms. The following are the characteristics of local beef cattle farmers in the agropolitan area Table 6.



**Figure 4:** The beef cattle population in Padang Pariaman Regency (2019-2023).

In 2023, the total population of Padang Pariaman Regency was 45,388 people and most of them (28.91%) worked in the agricultural sector (BPS Padang Pariaman Regency, 2024). Research results in the beef cattle development area in Padang Pariaman Regency found that local beef cattle breeders are dominated in the age range >40-65 years as much as 71.29%, according to Munica et al. (2017) old age

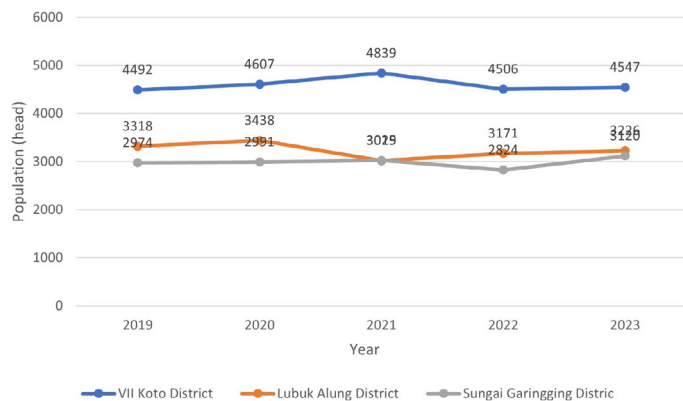
is usually slower to adopt innovations and tends to only carry out activities that are usually done.

**Table 7: Characteristics of Local Beef Cattle Farming.**

Description	Padang Pariaman (n=101)		
Type of cattle raised (AU):	Fre-	Unit of	Total
	quency	measurement	(%)
Pesisir cattle	71,45	Animal Unit	34.29
Balinese cattle	58,95	(AU)	28.30
Ongole Crossbred cattle	77,95		37.41
Scale of cattle rearing (heads):			
1-3	84	people	83.17
3-5	10		9.90
>5	7		6.93
Feeding:			
Forage feed	95	people	90.10
Forage feed + concentrate	5		9.90
Farming experience:			
1-10	63	year	62.38
>10-20	35		34.65
>20-30	2		1.98
>30	1		0.99
Husbandry system:			
Intensive	0	people	-
Semi-intensive	101		100.00
Extensive	0		-
Capital source:			
Government assistance	5	people	4.95
Own capital	96		95.05

Source: primary data (2023); 1 beef cattle: 1 AU; 1 young beef cattle: 0.6 AU; 1 calf: 0.25 AU.

There are 90.10% of farmers only provide forage feed while only 9.90% add concentrates to beef cattle feed. Feeding averaged 1.2 sacks/day or equivalent to 60 kg/day, with an average cattle ownership of 2.06 AU, the amount of forage feed given was 29.12 kg/AU/day. According Harinto and Aditya (2018), forage feed given to beef cattle is generally 10-12% of the cow's body weight, while concentrate feed given to beef cattle is generally 1-2% of the cow's body weight. Based on this, if the weight of 1 AU of local cattle is around 150-250 kg/AU/day, then the forage feed given by farmers is around 15-25 kg/AU/day and concentrate feed is around 1.5- 5 kg/AU/day. Forage feed needs seem to have been met quantitatively but not concentrate feed. In addition to quantity, feed quality must also be considered in terms of nutritional content. Farmers only utilize wild grass that grows around their environment, in Padang Pariaman Regency there is a lot of field grass growing such as nutgrass (*Cyperus rotundus L*) and bitter grass (*Axonopus compressus*). There are many types of nutgrass because it is in accordance with the natural conditions of this area, where according to Pranasari et al. (2012). it usually lives in lowlands and heights reaching 1,000 m above sea level. Nutgrass (*Cype-*



**Figure 5: Development of beef cattle population in agropolitan centers (2019-2023).**

The level of education is mostly low (43.57%), according to Rachmani et al. (2019) education provides knowledge of the spirit and motivation of a person to continue to develop, breeders are mostly men (72%), because of their role as head of the household (Table 7).

**Table 6: Characteristics of local beef cattle farmers.**

Description	Padang Pariaman (n=101)	
Age	Frekuensi	%
15-40	15	14.85
>40-65	72	71.29
>65-90	13	12.87
>90	1	0.99
Formal education:		
Elementary School	44	43.57
Junior High School	20	19.80
Senior High School	35	34.65
College	2	1.98
Gender:		
Male	73	72.00
Female	29	28.00

Source: primary data.

The most common type of local cattle kept is ongole crossbred cattle (37.41%), the scale of maintenance is still very small, most of them keep 1-3 local beef cattle (83.17%). In this agropolitan area, the main purpose of raising beef cattle is fattening, which produces meat. On average, farmers fatten cattle for 8 months by buying calves and selling them as adults. However, for female cattle, farmers usually tend not to sell them and use them as broodstock, because the cattle business is not a breeding business, they do not have males so they prefer to do artificial insemination to get calves, this is also used as savings, and sold when there is an urgent need.



*rus rotundus L*) grows a lot on agricultural land that is not too dry (not hilly), gardens, and also fields. Nutgrass grass (*Cyperus rotundus L*), is a weed and even a weed for certain plants, nutgrass contains crude fiber which is high enough for the nutritional needs of beef cattle, Agung *et al.* (2014) nutgrass (*Cyperus rotundus L*) contains crude fiber, namely cellulose 22.91%, hemicellulose 24.39%, and lignin 14.3%. The importance of attention to feeding management, because proper feeding will be able to increase optimal daily weight gain for beef cattle, Rusnan and Tulung (2015), livestock productivity is influenced by 70% environmental factors and 30% genetic factors. The environmental factor, feed aspect has an influence of about 60%. This shows that although the genetic potential of livestock is high, if the quality of feed is not considered, optimal productivity will not be achieved.

Breeding experience ranged from 1-10 years (62.38%), according to Haloho and Saragih (2022), the longer the breeding experience, the easier it will be for farmers to make decisions related to the livestock production process. For the livestock maintenance system, 100% of farmers manage livestock semi-intensively, where farmers release cows on grazing land from morning to noon and from noon to night, cows are kept in cages by providing forage feed. There are also some farmers who release the cattle to the pasture if they cannot cut grass for the cattle or the grass is not available due to hot weather.

The limited scale of livestock rearing and the ability of farmers to provide concentrate feed is inseparable from the availability of capital. Only 4.95% of the farmers had received assistance from the government in the form of seeds, concentrate feed and medicines at the beginning of the business, the rest (95.05%) cultivated beef cattle with their own limited capital.

### FARMER INSTITUTIONS AND ANIMAL HUSBANDRY INSTITUTIONS

The importance of institutions according to Hajirin (2017), is to support the successful development of beef cattle farming with the transfer of knowledge among group members (Table 8).

There are quite a number of farmer groups (Poktan), Women Farmer Groups (KWT) and joint farmer groups (Gapoktan) and Farmer Economic Institutions (KEP) in Padang Pariaman Regency, both engaged in livestock and crops. However, some farmer groups are less active and there are even members who have left for reasons of migrating or quitting the agricultural/livestock business. According to information from field extension workers in 3 districts in the center of the agropolitan area, group meetings are not held regularly and only if there is a specific need. The existence of farmer groups has not been able to

accommodate the needs of its members in production input problems or in marketing.

**Table 8:** Farmer institutions and animal husbandry Institutions in the agropolitan area of Padang Pariaman Regency.

No	Institutions / human resources	District (unit)		
		VII Koto	Lubuk Alung	Sungai Garingging
1	Farmer Groups	86	100	95
2	Farmer Group Associations	8	9	8
3	Women Farmer Groups	23	32	19
4	Farmer Economic Institutions	4	4	2
5	Extension Worker	4	5	2
6	Artificial Insemination Officer	4	3	2
7	Medics	2	-	-
8	Paramedics	2	2	1

Source: Decree of the Head of the Department of Animal Husbandry and Veterinary Health of Padang Pariaman Regency, (2023).

Field Extension Officers are the closest extension of the government and recognize livestock problems in the field. The existence of extension officers is in accordance with the Law of the Republic of Indonesia Number 18 of 2019 concerning Animal Husbandry and Animal Health, article 78 paragraph 4 that the government and local governments through educational institutions and the business world facilitate and develop education and training and counseling related to the provision of competent human resources in the field of animal husbandry and animal health. Judging from the number of extension workers in each district, they have a fairly wide range of work areas consisting of 2-3 villages, so officers tend to have difficulty managing the range of services.

Medical and para-medical personnel have a veterinary background, who have the duty and authority to carry out activities under the supervision of Veterinary Medics in the field of pest and animal disease control and animal product safety, medical personnel are only available in District VII Koto while medical personnel are available in 3 districts in the center of the agropolitan area, of course they cannot reach all areas in this agropolitan area.

### FACILITIES AND INFRASTRUCTURE

Facilities and infrastructure supporting agricultural activities in agropolitan areas, in the form of road access from production centers to livestock markets which are also used as livestock Agribusiness Sub Terminals in Padang Pariaman Regency, are already available. The length of the district road is 2,072.4 km. Road conditions in Padang Pariaman Regency are in very good condition, not only the main roads

**Table 10:** Location Quotient (LQ) Analysis of Ruminant Livestock Production in Padang Pariaman Regency (2019-2023).

Commodities	Agropolitan Centers Area	Padang Pariaman Regency	Location Quotient (LQ)		
	(2019-2023) (Heads)	(2019-2023) (Heads)	(c) = (a/tot)	(d)= (b/total)	(c)/(d)
	(a)	(b)			
Beef cattle	54,097	217,179	0.5303	0.4788	1.1076
Dairy cattle	-	124	0.0000	0.0003	0.0000
Bufallo	11,286	63,672	0.1106	0.1404	0.7881
Horse	223	247	0.0022	0.0005	4.0144
Goat	36,267	171,252	0.3555	0.3776	0.9417
Sheep	136	1,107	0.0013	0.0024	0.5463
Total	102,009	453,581			

Source: processed secondary data.

but also to remote villages. This facilitates access for farmers to bring production inputs to the livestock market (Table 9).

**Table 9:** Supporting facilities and infrastructure in the center of the agropolitan area of Padang Pariaman Regency.

No	Animal husbandry infrastructure	District (unit)		
		VII Koto	Lubuk Alung	Sungai Garingging
1	Animal Health Center	1	-	-
2	Artificial Insemination Post	1	1	1
3	Livestock Market	1	1	1
4	Feed Bank	-	1	1
5	Veterinary Clinic	-	1	-

Source: Decree of the Head of Padang Pariaman District Livestock and Animal Husbandry Services on the Designation of Livestock Development Areas (2023).

Padang Pariaman Regency currently has two Animal Health Center (Puskesmas) units, namely, Community Health Center (UPTD) of Sungai Sariak and the UPTD Puskesmas Sintuak Toboh Gadang (Sintoga). Puskesmas is under the auspices of the Animal Husbandry and Animal Health Service (Disnakeswan). The working area of the UPTD Puskesmas Sungai Sariak covers 9 (nine) districts, namely, VII Koto District, Patamuan District, 2x11 Kayu Tanam District, Padang Sago District, V Koto Timur District, V Koto Kampung Dalam District, Sei Geringging District, IV Koto Aur Malintang District and Batang Gasan District. The large working area, inadequate number of medical officers (veterinarians and veterinary paramedics), as well as inadequate supporting facilities and infrastructure, cause animal health services to the community to be often not optimal. This is because the service is done pro-actively by visiting farmers to their respective locations. In order to maximize services to the community, 1 (one) Puskesmas should have a working area of only two districts, and should also be supported by the number of veterinary medical and paramedical personnel, as well as adequate supporting facilities and infrastructure (Disnakeswan Kabupaten Padang Pariaman, 2024) while veterinary clinics are also not yet available in every district, only in Lubuk Alung District.

The existence of Artificial Insemination Services is the life-blood of increasing the population of large livestock (cattle and buffalo) in Padang Pariaman Regency, because in reality in the field as much as 80% of the birth of calves and buffalo is produced from the Biotechnology Artificial Insemination process. Throughout 2023 Artificial Insemination services amounted to 11,150 services, resulting in the birth of 9,050 calves (Disnakeswan Kabuapten Padang Pariaman, 2024). Many requests for artificial insemination needs have not been supported by the limited number of artificial insemination officers, which amount to 2-4 for each district (Table 8).

The availability of livestock markets is not sufficient for all districts in Padang Pariaman District, as there are only 3 districts that have livestock markets and operate once a week, namely VII Koto livestock market, Lubuk Alung livestock market and Sungai Garingging livestock market, while there are 14 other sub-districts that are quite far from the existing livestock market. This is a constraint for farmers because it increases the cost of transporting livestock, so farmers are more likely to sell their livestock to intermediary traders who buy from farmers' cages, so the selling price of livestock tends to be cheaper because the bargaining position of intermediary traders is stronger than that of farmers. It is different if farmers sell directly to the livestock market, where beef cattle can be sold by "marosok" (a typical West Sumatra way of selling livestock) with the same bargaining position between seller and buyer.

Feed banks are an effort to collect and store feed ingredients during abundant conditions (rainy season/harvest) to be utilized during the dry season or when feed is difficult to obtain. According to Pamungkas and Aryogi (2022) feed banks have benefits and advantages, namely providing a source of feed, time and labor efficiency, reducing feed costs and feed is always available. Feed banks are only available in 2 districts, and livestock groups need to be motivated to establish these feed banks, Akbar and Harianto (2023) Institutionally, feed banks can be managed jointly by farmers in the form of livestock groups or individually by farmers, especially those who have a lot of livestock.

**Table 11:** Shift Share Analysis (SSA) of Ruminant Livestock Production at Padang Pariaman Regency and West Sumatera Province Level.

Areas	Year	Commodities					
		Beef cattle	Dairy cattle	Bufallo	Horse	Goat	Sheep
Padang Pariaman Regency	2019	41,787	32	14,801	46	34,090	90
	2020	43,629	32	14,953	67	35,005	253
	2021	44,575	32	11,184	52	36,608	285
	2022	44,499	16	11,457	67	33,587	224
	2023	42,689	12	11,277	15	31,962	255
Agropolitan Centers Area	2019	10,784	-	2,879	43	7,408	-
	2020	11,036	-	2,964	63	7,494	-
	2021	10,883	-	1,734	50	7,844	-
	2022	10,501	-	1,763	58	7,514	35
	2023	10,893	-	1,946	9	6,007	101
Vjt		10,893	-	1,946	9	6,007	101
Vt/Va		1.02	0.38	0.76	0.33	0.94	2.83
Vja		10,784	-	2,879	43	7,408	-
(Vt/Va)*Vja		11,016.78	-	2,193.53	14.02	6,945.57	-
St		-123.78	-	-247.53	-5.02	-938.57	101.00

Source: processed secondary data.

### ANALYSIS OF LOCATION QOUTIENT (LQ)

Beef cattle, as a leading commodity designated by the local government, is certainly a priority for providing meat in this area. The following will demonstrate the potential of beef cattle compared to other ruminants in 3 District of agropolitan area in Padang Pariaman Regency (Table 10).

Based on Table 10, the beef cattle commodity was known to be a basic or leading commodity in 3 District of the center of agropolitan area in Padang Pariaman Regency with an  $LQ > 1$ . This aligns with the regulations of the The Regional Development Planning Agency of West Sumatera Province (Bappeda), which has designated this area as one of the key centers for beef cattle development in West Sumatera Province. Furthermore, the horse commodity also exhibit  $LQ > 1$ , indicating that these two commodities may also be prioritized for ruminant livestock development within this regency. However, the demand of horse meat certainly cannot substitute the public demand for beef. This indicates that the beef cattle commodity has a comparative advantage that can meet beef needs at the district and regency levels and even able to supply the needs of other regions in West Sumatera Province.

### SIHFT SHARE ANALYSIS (SSA)

The results of LQ analysis which can show comparative advantage (production ability to meet demand), need to be strengthened with the results of shift share analysis which can show growth in beef cattle production, because the demand for cattle that will be met is not just for immediate needs but for future sustainability and can assisting government pol-

icies in meeting demand for meat in West Sumatera Province. For more details, the shift share analysis is as follows:

According to Table 11, the SSA value for beef cattle commodities was known to be negative or  $< 0$ . It indicates that the growth of beef cattle farming in the 3 districts of the agropolitan area centers is slower than the growth at the Padang Pariaman Regency level. of the six ruminant commodities, only sheep exhibited positive SSA values or  $> 0$ . It indicates that sheep commodities are expanding a faster rate than the same commodities at the regency level.

Based on the LQ and SSA values generated from this study, it can be seen that the beef cattle commodity has been appropriately designated as a leading commodity and at the same time as a center for beef cattle development in District VII Koto of Padang Pariaman Regency, but the growth of beef cattle population at the agropolitan area level is still relatively low when compared to the district level, this condition can be shown in Table 12 below:

Based on the Table 12 above, it can be seen that the growth rate of beef cattle at the district level is 2.16% compared to 1.01% at the agropolitan center area, so it can be concluded that the growth rate of beef cattle at the of beef cattle at the district level is twice that of the agropolitan centers. The results of the LQ and SSA analysis above will be of important concern and used as a basis for identifying internal and external factors in the development of beef cattle in agropolitan areas, in formulating strategies.



**Table 13:** Evaluation Matrix of Internal Factors of Beef Cattle Development Strategy as the Leading Commodity of Padang Pariaman Regency.

	Internal Factors	Weight	Rating	Score
Strengths	The temperature and climate are suitable for beef cattle business	0.07	2.9	0.20
	Adequate availability of feed and water sources	0.10	3.8	0.37
	Adequate availability of land in the form of grasslands and pastures	0.10	3.8	0.37
	Beef cattle as a basic or leading commodity (LQ >1)	0.09	3.6	0.32
	The farmers have experience in running the livestock farming business	0.07	2.9	0.20
	Adequate availability of a livestock technology (Artificial Insemination)	0.08	3.0	0.23
	Equal bargaining position between livestock traders and buyers, with a unique marketing system (local wisdom) 'marosok'	0.06	2.7	0.16
	Sub Total	0.56		1.86
Weaknesses	The growth of the livestock population is still low (SSA <1)	0.09	3.2	0.29
	The low level of education	0.05	2.4	0.17
	The livestock farming is a secondary business	0.05	2.2	0.14
	Limited capital and access to financial institutions	0.09	3.5	0.31
	Limited human resources in the livestock sectors (medical personnel, field extension workers, and others)	0.07	3.3	0.24
	Limited infrastructure to support agropolitan areas (Agribusiness Sub Terminal, Slaughterhouse, Animal Health Center, and others)	0.09	3.3	0.29
	Sub Total	0.44		1.35
Total	1.00		3.21	

Source: primary data.

### THE STRATEGY OF AGROPOLITAN DEVELOPMENT BASED ON LEADING COMMODITY (BEEF CATTLE)

The results of in-depth discussions and interviews with 10 experts from relevant government agencies and involved with the agropolitan program, The Regional Development Planning Agency, Department of Animal Husbandry and Veterinary Health, Department of Agriculture and Food Security, Field Extension Officer in 3 districts of the center of the agropolitan area, the identification of internal factors and external factors that obtain the development of agropolitan areas based on leading commodities (beef cattle), with weighting and rating carried out by experts so that the resulting strategy formulation. For more details, it can be seen in the following results (Table 13, 14).

Based on the results of data analysis in the form of IFE matrix, the total score of all internal factors is 3.21, which suggests that Padang Pariaman Regency is internally capable of developing beef cattle. The EFE matrix indicates that the overall external factors reach 2.95, this condition indicates that externally, in Padang Pariaman Regency, the condition of beef cattle development tend to be strong (3.0-4.0), in other words, this region has not fully been able to overcome the existing threats in the beef cattle development (Table 15).

Based on the Table 15, it indicates that the most significant internal factors influencing the beef cattle development in

this area are the availability of adequate feed and water resources, as well as the availability of land in the form of pasture and grassland. The result of the analysis of external factors are most determined by government regulations (Regional Spatial Plan of Padang Pariaman Regency 2020-2040) in accordance with the development of agricultural strategic areas (agropolitan), which can be understood because this regulation can determine the direction and execution of future beef cattle development in this region.

**Table 12:** Growth of beef cattle in 3 sub-districts of agropolitan centers and Padang Regency Pariaman.

3 Districts Agropolitan Area Padang Pariaman Regency					
Population (heads)		Growth (%)	Population (heads)		Growth (%)
2019	2023	(%)	2019	2023	(%)
10,784	10,893	1.01	41,787	42,689	2.16

Source: processed secondary data.

The results of Table 15 indicate that the scoring of each strength factor (1.86) and weakness (1.35) were used to calculate the score for internal factors (X) which was found to be (0.51), while the the opportunity factors (1.71) and threats (1.24) were used to calculate the score for external factors (Y) which was found to be (0.47). This can be seen through the following SWOT analysis diagram Figure 6.

The diagram above illustrates the potential of beef cattle development in the agropolitan area of Padang Paria

**Table 14:** External Factor Evaluation Matrix of Beef Cattle Development Strategy as the Leading Commodity of Padang Pariaman Regency.

External Factors		Weight	Rating	Score
Opportunities	Government Regulations (Regional Spatial Plan of Padang Pariaman Regency 2020-2040) in accordance with the development of strategic agricultural areas (agropolitan)	0.19	3.7	0.68
	An appropriate accesibility of the road	0.17	3.4	0.57
	High demand for beef cattle from within and outside the district and regency	0.16	2.8	0.46
	Sub Total	0.52		1.71
Threats	The Conversion of agricultural land into resident and business place	0.15	2.9	0.45
	The competition of livestock products from outside the regency or province	0.11	2.3	0.25
	The limited post-harvest technology	0.10	2.4	0.24
	The weak institutionalization of farmers	0.12	2.5	0.30
	Sub Total	0.48		1.24
Total		1.00		2.95

Source: primary data.

**Table 15:** SWOT Analysis Scoring.

Strength (+)	Score	Weakness (-)	Score
Adequate availability of feed and water sources	0.37	Limited capital and access to financial institutions	0.32
Adequate availability of land in the form of grasslands and pastures	0.37	The growth of the livestock population is still low (SSA<1)	0.28
Beef cattle as a basic or leading commodity (LQ>1)	0.32	Limited infrastructure to support agropolitan areas (Agribusinessb Sub Terminal, Slaughterhouse, Animal Health Center, and others)	0.28
Adequate availability of a livestock technology (Artificial Insemination)	0.23	Limited human resources in the livestock sectors (medical personnel, field extension workers, and others)	0.22
The farmers have experience in running the livestock farming business	0.20	The low level of education	0.13
The temperature and climate are suitable for beef cattle business	0.20	The livestock farming is a secondary business	0.12
Equal bargaining position between livestock traders and buyers, with a unique marketing system (local wisdom) 'marosok'	0.16		
Total	1.86		1.35
		Difference between Strength Weakness	0.51
Opportunity	Score	Threats	Score
Government Regulations (Regional Spatial Plan of Padang Pariaman Regency 2020-2040) in accordance with the development of strategic agricultural areas (agropolitan)	0.68	The Conversion of agricultural land into resident and business place	0.45
An appropriate accesibility of the road	0.57	The weak institutionalization of farmers	0.30
High demand for beef cattle from within and outside the district and regency	0.46	The competition of livestock products from outside the regency or province	0.25
		The limited post-harvest technology	0.24
Total	1.71		1.24
		Difference between Opportunities and Threats	0.47

Source: primary data.

man Regency, which situated within Quadrant I. It implies that it is within the context of an aggressive strategy, which is the formulation of strategies by utilizing on existing strengths (internal factors) and opportunities (external factors), with the following alternative strategies.

The SWOT analysis diagram above illustrates the potential position in the development of beef cattle in the agropolitan area in Padang Pariaman Regency, which is in Quadrant I. It implies that it is within the context of a aggressive strategy, namely the preparation of strategies by utilizing existing

Table 16: SWOT Analysis Matrix.

	Strengths (S)	Weaknesses (W)
Internal / External	The availability of feed & sources (S1) The availability of and (grass-land and pasture) (S2) Beef cattle as a basic or leading commodity (LQ > 1) (S3) Adequate availability of a livestock technology (Artificial Insemination) (S4) Experienced farmers (S5) The temperature and climate are suitable for beef cattle business (S6) An Equal bargaining position (local wisdom, 'marosok') (S7)	Limited capital and access to financial institutions (W1) The growth of the livestock population is still low (SSA < (W2) Limited infrastructure to support agropolitan areas (W3) Limited human resources in the livestock sectors (W4) The low level of education (W5) The livestock farming is a secondary business (W6)
Opportunities (O)	S-O Strategy	W-O Strategy
Government Regulations (Regional Spatial Plan of Padang Pariaman Regency 2020-2040) in accordance with the development of strategic agricultural areas (agropolitan) (O1) An appropriate accessibility of the road (O2) High demand for beef cattle from within and outside the district and regency (O3)	Using government authority to optimize resources (S1, S3, S5, S6, O1) Optimizing the land function for business development livestock (S2, O3) Increasing the local livestock rearing scale (S3, S5, O1, O3) Utilizing a marketing system with local wisdom in order to attract consumers from outside the region (S7, O3)	Government facilitates livestock groups to gain the access to capitalization (W1, O1) The regulation of livestock promotion to engage investor in Padang Pariaman Regency (W1, W2, O1, O3) Optimizing the existence facilities (road access) and revitalizing the livestock market as part of the STA (W3, O1, O2, O3) Optimizing the role of livestock resources in serving livestock businesses (W4, O1, O3)
Threats (T)	S-T Strategy	W-T Strategy
The Conversion of agricultural land into resident and business place (T1) The weak institutionalization of farmers (T2) The competition of livestock products from outside the regency or province (T3) The limited post-harvest technology (T4)	Institutional assistance to re-activate the role of farmer groups in increasing livestock production and access to government program (T2, S4, S5) Technical ability training for farmer groups from cultivation to post-harvest (T3, T4, S3, S4, S5)	Farmer training and empowerment (T4, W5) Utilization of unproductive land for forage and livestock grazing (T1, W2, W6)

Source: primary data.

strengths (internal factors) and opportunities (external factors), in line with research by Ali and Muwakhid, (2017); Rusman *et al.* (2020) that the strategy in quadrant I (S-O strategy) can be applied to businesses that are run by supporting an aggressive growth strategy, and according Subkhie, (2012); Noor, (2014), a business in quadrant I is a business that has many opportunities to continue and develop, because in quadrant I, the weaknesses and threats possessed can be overcome by the strengths and opportunities that exist, with the following alternative strategies (Table 16).

For the preparation of recommended priority strategies, according to the results of the SWOT analysis obtained, namely the S-O strategy, it can be detailed as follows:

**USE GOVERNMENT AUTHORITY TO OPTIMIZE RESOURCES (S1, S3, S5, S6, O1):** Improve the quality and quantity of livestock resources such as medical personnel, Animal Health Centers, and field instructors in providing services

to beef cattle farming so that they can serve as a whole. This can avoid the risk of livestock deaths due to disease, as well as affect the development of beef cattle populations, Government policy is needed to evaluate the ratio between the availability of Animal Health Centers and the needs of farmers (ideally 1 Animal Health Center to serve 2 districts, the current condition serves 8-9 districts), the ratio of artificial insemination officers to the demand for artificial insemination services, the availability of livestock markets. The government needs to mobilize livestock groups to establish more feed banks so that they can meet the feed needs of beef cattle during forage shortages due to the dry season.

Re-empower the role and management of farmer institutions, so that they can be used as a forum for training and other government programs and can accommodate the needs of farmers ranging from ease of obtaining concentrate feed, medicines, agricultural production facilities to marketing at profitable prices.



**OPTIMIZE LAND FUNCTION FOR LIVESTOCK BUSINESS DEVELOPMENT (S2, O3):** Agricultural land as a source of forage and pasture especially since 100% of local beef cattle farmers still manage their farms semi-intensively. The government must design policies to develop unutilized land, in addition farmers can utilize agricultural waste from both food crops and plantation crops as alternative feed, which is produced from rice fields and non-field agricultural land. Purnomo (2017), land utilization in crop-livestock systems can be done in feed development.

of the Agribusiness Sub Terminal, and utilizing local wisdom marketing systems such as the system of determining the selling price of beef cattle by “marosok”, a price determination technique where the price bargaining process uses the fingers of the farmer and buyer which are closed under a cloth, so that the price agreement is only known by both parties, besides being unique, this marketing system can be a special way to attract more cattle trade flows from and outside Padang Pariaman Regency.

Revitalization of supporting infrastructure facilities in agropolitan areas such as livestock markets, management should be carried out by the livestock service office and can cooperate with livestock groups where so far it has only been managed by certain livestock groups. This is done so that the management, facilities and conditions of the livestock market are more conducive, on the other hand the government and other managers/livestock groups involved benefit from market levies.

The government must provide technical guidance in the form of a master plan to determine the direction and guidance in the development of agropolitan areas as outlined in the 2020-2040 RTRW of Padang Pariaman Regency.

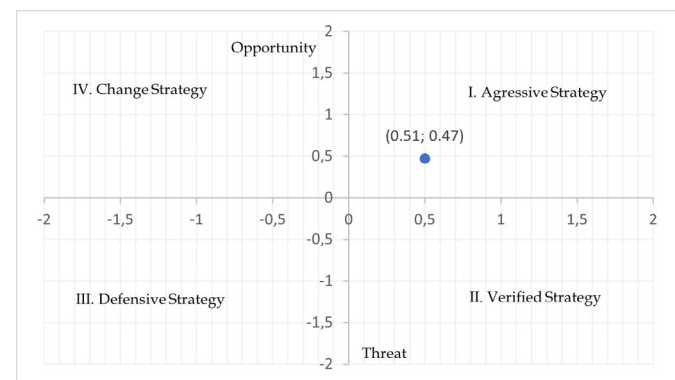


Figure 6: SWOT analysis diagram.

**INCREASE THE SCALE OF LOCAL LIVESTOCK REARING (S3, S5, O1, O3):** Increase the scale of local livestock rearing by increasing knowledge and technology of cultivation to post-harvest, through mentoring, training and empowerment of livestock groups from the local government. One of the most important assistance provided to farmers is knowledge of the standard amount and quality of animal feed, both in the form of forage and concentrate feed, where so far farmers (90.10%) tend to rely only on forage feed, so that the daily weight gain of livestock is very low as seen from the appearance of relatively thin cows. Karim (2019) training for workers is needed to increase knowledge for business owners or workers who have an average primary school education.

Facilitation of access to capital by the government, which can bridge between livestock businesses and financial institutions or the business world (investors), is a way that the government can increase farmers’ business capital, where 95.05% of farmers finance their farms from their own capital, so as to increase the scale of livestock rearing, such as opening cooperation with local banks (regional owned enterprises) in the form of low-interest and collateral-free business loans (or livestock as collateral), so as not to burden farmers but motivate farmers to be more productive. Utilize the Marketing System with Local Wisdom to Attract Many Consumers from Outside the Region (S7, O3): Optimizing the role of livestock infrastructure facilities in agropolitan areas and revitalizing livestock markets as part

## CONCLUSIONS AND RECOMMENDATION

Based on the research objectives, the results of the study can be concluded as follows:

### THE POTENTIAL OF BEEF CATTLE AS A LEADING COMMODITY CAN BE DETERMINED FROM

Carrying Capacity Seen from the Existing Conditions of Natural Resources, Human Resources, Institutions, and Infrastructure:

- Natural resources (land available for feed sources and grazing land, flat topography suitable for semi-intensive rearing system, temperature and humidity support for optimal production).
- Beef cattle as a leading commodity (beef cattle population at the district level and 3 districts of agropolitan area centers is relatively fluctuating, and tends to decrease in the last 2-3 years)
- Farmers and local beef cattle farming (the majority of farmers are still in the productive age range, the majority have low education, the majority are male, the majority raise ongole crossbred cattle, the majority scale of maintenance is 1-3 AU, the majority feed only forage, quite experienced in farming and all farmers maintain semi-intensive)
- Farmer institutions (there are quite a number of farmer groups, farmer group associations, women farmer

groups, farmer economic), although they still need training and mentoring to be more productive and the government needs to evaluate the ratio between the availability and demand for farmer services to livestock institutions (extension workers, artificial insemination officer, medical and paramedics).

- Facilities and infrastructure (very good road facilities are available, there are health centers, artificial insemination post, livestock markets, feed banks, veterinary clinics spread across the 3 districts of the agropolitan area centers) although the ratio of availability to community demand needs to be re-evaluated, as well as the role of livestock medical personnel so as to meet and overcome the problems of beef cattle farming.

#### BEEF CATTLE POTENTIAL FROM COMPARATIVE ADVANTAGE AND COMPETITIVE ADVANTAGE:

- $LQ > 1$ , beef cattle farming has a comparative advantage (base commodity), which indicates beef cattle production in the 3 sub-districts of agropolitan area centers can meet local needs (sub-district, district level) and can even be sold outside the region).
- SSA value  $< 0$ , but beef cattle do not yet have a competitive advantage of SSA value  $< 0$ , which means the growth of beef cattle population is still low compared to other districts in the province. This is the basis for the preparation of local government policies to increase population growth.

#### DEVELOPMENT STRATEGY OF AGROPOLITAN AREA

Identification of internal and external factors from the results of the analysis of the carrying capacity of various aspects of objective 1, and results of LQ and SSA analysis, formulated with in-depth discussions and analysis from experts from 4 government agencies relevant to beef cattle farming with a total of 10 expert respondents, a SWOT matrix was compiled and an S-O strategy was produced as a priority strategy (a combination of opportunities and strengths of agropolitan area conditions), so that several strategic programs were formulated under the coordination of The Regional Development Planning, Department of Animal Husbandry and Veterinary Health, Department of Agriculture And Food Security, Field Extension Officer, Animal Health Center, Artificial Insemination Post and others, with the authority of the local government, can optimize all existing resources (land, farmer institutions and animal husbandry institutions, facilities and infrastructure), make policies and be more pro-active in providing training and assistance, especially technical aspects related to feed quality standards, disease control with the aim of achieving an increase in beef cattle population and daily weight gain of livestock more optimally, as well as revitalizing livestock markets so that they are more conducive and can attract cross-regional beef cattle trade.

#### RESEARCH LIMITATIONS

Specific respondents were selected from local cattle farmers, rather than beef cattle development strategies specific to local beef cattle farming, in line with the more general title of the study. The determination of local cattle farmers as research respondents is to provide limitations in respondent collection as well as to show attention to the socio-economic conditions of local beef cattle farmers which are specifically different from imported cattle, for example in terms of feeding and maintenance management. In the analysis, the potential of local beef cattle in Padang Pariaman District has not been explicitly presented due to unavailability of secondary data, namely specific data related to the local beef cattle population at the district level, especially for the calculation of LQ and SSA. Therefore, future research with a broader scale of research supported by sufficient funding is recommended to focus more on local beef cattle development strategies in this district.

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#### NOVELTY STATEMENT

The novelty of this research lies in its focus on agropolitan development in 3 districts of agropolitan area centers based on the potential of beef cattle as leading commodity, in contrast to previous studies that discuss technical, social and behavioral aspects of beef cattle farmers in Padang Pariaman Regency. Furthermore, this research was conducted specifically in districts that have become the center of beef cattle development in Padang Pariaman Regency.

#### AUTHOR'S CONTRIBUTIONS

Fitri: Contributed to designing, drafting, collecting data, analyzing and wrote the article.

Masyhuri: Contributed to reviewing and analyzing the article.

Dwidjono Hadi Darwanto: Contributed to reviewing and analyzing the article.

Tri Anggraeni Kusumastuti: Contributed to reviewing and analyzing.

All authors accepted for the final manuscript.

#### CONFLICT OF INTEREST

No conflict of interest.

#### REFERENCES

Abramson DB (2020). Ancient and current resilience in

- the Chengdu Plain: Agropolitan development re-'revisited'. *Urban Studies*, 57(7): 1372–1397. <https://doi.org/10.1177/0042098019843020>
- Adhithia F, Qisthon A, Husni A, Hartono M (2022). Respons fisiologis dan daya tahan sapi peranakan ongole dan sapi brahman cross terhadap cekaman panas di KPT Maju Sejahtera Tanjung Sari Lampung Selatan. *J. Riset. dan Inovasi. Peternakan.*, 6(3): 300–304. <https://doi.org/10.23960/jrip.2022.6.3.300-304>
- Adrial (2010). Potensi sapi pesisir dan upaya pengembangannya di Sumatera Barat. *J. Penelitian dan Pengembangan Pertanian*, 29(2): 66–72. <chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/https://media.neliti.com/media/publications/124314-ID-potensi-sapi-pesisir-dan-upaya-pengembangan.pdf>
- Agung C, Halim A, Utami K, Mujaroh KA, Ainun ADM (2014). Peningkatan konsentrasi selulosa rumput teki (*Cyperus rotundus*) berbasis teknologi microwave sulphate acid pretreatment. *Keteknikian Pertanian: Universitas Brawijaya*.
- Ali U, Muwakhid B (2017). Upaya pengembangan sapi potong menggunakan pakan basal jerami padi di desa Wonokerto Dukun Gresik. *J. Dedikasi*, 14: 65–72.
- Badan Pusat Statistik Kabupaten Padang Pariaman (2023). Luas lahan menurut penggunaan Kabupaten Padang Pariaman 2022.
- Bappeda Provinsi Sumatera Barat (2018). Kawasan agropolitan di Sumatera Barat. <https://bappeda.sumbarprov.go.id/home/news/4-kawasan-agropolitan-di-provinsi-sumatera-barat.html>
- BPS-Statistics of Padang Pariaman Regency (2024). Kabupaten Padang Pariaman dalam angka 2024.
- BPS-Statistics Padang Pariaman Regency (2023). Luas lahan menurut penggunaan di Padang Pariaman 2022.
- BPS-Statistics Sumatera Barat Province (2024). Provinsi Sumatera Barat dalam angka.Vol.54.<https://sumbar.bps.go.id/publication/2020/04/27/0bde2141fda787c1f0e923bf/provinsi-sumatera-barat-dalam-angka-2020.html>
- Decree of the Head of the Department of Animal Husbandry and Veterinary Health of Padang Pariaman Regency (2023). Determination of livestock development areas.
- Departemen Pertanian RI (2002). Pedoman umum pengembangan kawasan agropolitan dan pedoman program rintisan pengembangan kawasan agropolitan. Badan Pengembangan Sumberdaya Manusia Pertanian. <https://repository.pertanian.go.id/handle/123456789/14313>
- Devi Y, Agustar A, Khairati R (2023). Efektifitas program bantuan ternak sapi potong sebagai salah satu strategi penanggulangan kemiskinan di Kabupaten Padang Pariaman. *J. Niara*, 16(1): 113–120. <https://doi.org/10.31849/niara.v16i1.13951>
- Direktorat Jendral Peternakan dan Kesehatan Hewan (2021). Statistik peternakan dan kesehatan hewan.
- Disnakkeswan Kabupaten Padang Pariaman (2024). Eksistensi pelayanan inseminasi buatan. <https://disnakkeswan.padangpariamankab.go.id/home/posting/Eksistensi-Pelayanan-Inseminasi-Buatan>
- Disnakkeswan Kabupaten Padang Pariaman (2024). Puskesmas ujung tombak pelayanan kesehatan hewan. <https://disnakkeswan.padangpariamankab.go.id/home/posting/Puskesmas-Ujung-Tombak-Pelayanan-Kesehatan-Hewan>
- Fadillah T, Syarfi IW, Agustar A (2023). Keberlanjutan usaha peternakan sapi potong program bantuan pemerintah di Kabupaten Padang Pariaman. *J. Niara*, 16(1): 188–197. <https://doi.org/10.31849/niara.v16i1.14098>
- Hajirin (2017). Strategi pengembangan sapi potong di wilayah pengembangan sapi balli kabupaten baru. IPB.
- Haloho RD, Saragih CL (2021). Analisis kelayakan usaha peternakan sapi potong rakyat di Kabupaten Langkat. *J. Agrimor* 6 (1): 9–14. <https://doi.org/10.32938/ag.v6i1.1189>
- Handayani A, Jamal R, Komalawati, Kristanto BA (2021). The evaluation of agropolitan program in Central Java, Indonesia. *J. Bina Praja*, 13(1): 05–123. <https://doi.org/10.21787/jbp.13.2021.105-123>
- Harinto P, Aditya (2018). Manajemen pakan sapi potong. <https://ternak-sehat.fkh.ugm.ac.id/2018/10/08/manajemen-pakan-sapi-potong/>
- Iqbal M, Anugrah IS (2016). Rancang bangun sinergi kebijakan agropolitan dan pengembangan ekonomi lokal menunjang percepatan pembangunan wilayah. *Analisis Kebijakan Pertanian*, 7(2): 169–188. <https://epublikasi.pertanian.go.id/berkala/akp/article/view/727>
- Karim (2019). Optimalisasi pengembangan produk care competence pada usaha wajak lokal mandar sebagai alternatif pendapatan. *J. Bisnis Manajemen dan Informatika*, 16(1).
- Karim A, Ruslan M, Burhanuddin A, Taibe P, Sobirin S (2023). Contribution of village funds to regional economic recovery in South Sulawesi Province. *SEIKO: J. Management and Business*, 6(1): 573–589. <https://doi.org/10.37531/sejaman.v6i1.4412>
- Akhbar H (2021). Manajemen pakan dan analisis profitabilitas usaha peternakan sapi potong rakyat di masa pandemi Covid 19 di Kabupaten Langkat. *Agrimor*, 6(4): 180–185. <https://doi.org/10.32938/ag.v6i4.1396>
- Ma'mun D, Karyani T (2000). Pemahaman potensi, analisis dan perencanaan wilayah. *Balitbang Departemen Pertanian danngan Fakultas Pertanian Universitas Padjadjaran Bandung*, Maret: 1–18.
- Martadona I, Purnamadewi YL, Najib M (2014). Strategi pengembangan kawasan agropolitan berbasis tanaman pangan di Kota Padang (agropolitan development strategy based on food crops in Padang City). *Tataloka*, 16(4): 234–244. <https://doi.org/10.14710/tataloka.16.4.234-244>
- Munica RD, Ulya M, Fakhry M (2017). Analisis strategi pengembangan industri jamu tradisional di Kabupaten Bangkalan Madura. *Agroinfotek*, 11(2): 84–91. <https://doi.org/10.21107/agrointek.v11i2.3057>
- Noor M (2014). Analisis kelembagaan Program Nasional Pemberdayaan Masyarakat Perkotaan (PNPM-MP) untuk penanggulangan kemiskinan. *J. Ilmiah Untaq Semarang*, 3(2): 113–124.
- Nugraha AT, Prayitno G, Khoiriyah LA (2021). Land suitability and economic performance in the Pasuruan region for coffee development. *International Journal of Sustainable Development and Planning*, 16(2): 229–236. <https://doi.org/10.18280/IJSDP.160203>
- Oryzanti P, Rustiadi E, Eriyatno, Rochman NT (2018). Policy priorities for the economic development in agropolitan area of Karacak based on mangosteen agroindustry. *American Journal of Applied Sciences*, 15(11):489–496. <https://doi.org/10.3844/ajassp.2018.489.496>
- Pamungkas D, Aryogi AL (2022). Introduction superior bulls and feed bank enhancing sustainability of wanaternak programs in Indonesia. *The International Journal of Science & Technoledge*, 10(1): 9–17. <https://doi.org/10.24940/thejst/2022/>
- Pantouw CE, Poluan RJ, Rogi OH (2018). Analisis pengembangan kawasan agropolitan rurukan di Tomohon. *Spasial*, 5(3):



- 406–416. <https://doi.org/10.35793/sp.v5i3.22005>
- Pranasari RA, Nurhidayati T, Purwani KI (2012). Persaingan tanaman jagung (*Zea mays*) dan rumput teki (*Cyperus rotundus*) pada pengaruh cekaman garam (NaCl). *J. Sains Dan Seni*, 1(1): 54–57.
- Pratama MP (2020). Analisis dan kontribusi sektor basis non-basis: penentu potensi produk unggulan Kabupaten Kebumen. *J. Ilmiah Akuntansi dan Keuangan*, 9(1): 75–82. <https://doi.org/https://doi.org/10.32639/jiak.v9i1.313>
- Purnomo (2017). Strategi pengembangan peternakan sapi potong rakyat di Kecamatan Wiryontoro Kabupaten Wonogiri. *Bulletin Peternakan*, 4(4): 484–494.
- Rachmani NN, Daryanto A, Jahroh S (2019). Pengembangan strategi bisnis produk olahan susu xyz dengan pendekatan business model canvas. *J. Aplikasi Bisnis dan Manajemen*, 5(3): 490–500. <https://doi.org/10.17358/jabm.5.3.490>
- Rahim DA, Adiatmojo GD (2020). Development of industrial estates in the context of supporting border economic development (Case study at Entikong National Strategic Areas). *J. of Physics, Conf. Series* 1469 (2020) 012136. <https://doi.org/10.1088/1742-6596/1469/1/012136>
- Rangkuti F (2001). Analisis SWOT teknik membedah kasus bisnis. PT. Gramedia Pustaka Utama.
- Rohma A, Rahmawati F (2020). Pengembangan kawasan agropolitan berbasis komoditas unggulan tanaman hortikultura di Kecamatan Poncokusumo Kabupaten Malang. *J. Kajian Ekonomi dan Kebijakan Publik*, 5(2): 237–246. <https://jurnal.pancabudi.ac.id/index.php/jepa/article/view/911>
- Rusman RFY, Hamdana A, Sanusi A (2020). Strategi pengembangan usaha ternak sapi potong di Kecamatan Lau Kabupaten Maros. *17(2): 120–129*. <https://doi.org/10.26487/jbmi.v17i2.11464>
- Rusnan HK, Tulung Y (2015). Analisis potensi dan strategi pengembangan sapi potong dengan pola integrasi kelapaspapi di Kabupaten Hamahera Selatan Provinsi Maluku Utara. *J. Zooteek*, 35(2): 187–200.
- Saleh H, Surya B, Musa CI, Azis H M (2017). Development of agropolitan area based on local economic potential (A case study: Belajen Agropolitan Area, Enrekang District. *Asian Journal of Applied Sciences*, 5(1): 73–88.
- Simanjuntak D, Sirojuzilam (2013). Potensi wilayah dalam pengembangan kawasan agropolitan di Kabupaten Toba Samosir. *J. Ekonomi dan Keuangan*, 1(3): 134–150.
- Subkhie (2012). Feasibility analysis of chicken ranch business by plasma patnership system in Ciampea Bogor. *Manajemen IKM*, 7(10): 54–63.
- Sugiyono (2022). Metode penelitian kuantitatif, kualitatif dan R and D. Alfabeta. Bandung.
- Surya B, Saleh H, Hamsina H, Idris M, Ahmad DNA (2021). Rural agribusiness-based agropolitan area development and environmental management sustainability: regional economic growth perspectives. *International Journal of Energy Economics and Policy*, 11(1): 142–157. <https://doi.org/https://doi.org/10.32479/ijeep.10184>
- Yuni SW (2016). Implementasi kebijakan pengembangan kawasan agropolitan di Desa Ringinrejo Kecamatan Kalitidu Kabupaten Bojonegoro. <https://ejournal.unesa.ac.id/index.php/publika/article/view/15061/13634>