

The Business Development of Beef Cattle through Regional Approach in Jember East Java

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ABSTRACT

This research analyzes the upstream part of the agribusiness system, including the potential availability of forage land, Human Resources, Natural Resources, and extension institutions, especially livestock, to develop and maintain beef cattle in the Jember District. This study yield Natural resources that the District of Jember is an inadequate location for beef cattle business on a narrow land. Land availability in the provision of feed (Ruminant Animal Population Increase Effective) has a positive value of 679,727. The means that the Jember District is one of the potential beef cattle populations. Several districts can still increase their population when seen from the effective Ruminant Animal Population Increase is positive. In general, breeders have the main job as herdsmen (55%), although their education is still low due to the average formal education is an elementary school (38.3%). However, the agricultural role extension agents are perceived as effective because farmers have applied Artificial Insemination (AI). Overall, the District of Jember can be a fattening business area and is ready for slaughter. Therefore, the presence of cows in the area is only temporary so that it does not interfere with the carrying capacity of the land in providing feed for beef cattle.

Keywords: *Business Development, Beef cattle, Jember.Agribusiness*

1. INTRODUCTION

Ruminants that have high economic value in Indonesia are beef cattle. However, the number of beef cattle available in the country is still far from meeting the demand for public meat. Department agriculture, Directorate General of Animal Husbandry and Animal Health (2010) shows that the availability of national beef is currently experiencing a shortage, so it a force to import, which reaches 35% of the total national demand for beef. The population of cattle in Jember was around 311,358 heads, while in the district of Jember, there are 17,767 cows (BPS Kabupaten Jember, 2013).

Jember also supports further development efforts, such as the availability of Natural Resources, especially the availability of feed and Human Resources. Optimization of beef cattle development is still not optimal due to the low availability of human resources. Calculation of the Ruminant Animal Population Capacity Analysis (KPPTR) and Location Quotient (LQ) includes aspects of the Profile of Natural Resources and Human Resources, although livestock counseling in Jember to maintenance and development

of beef cattle. Alternative strategies applied in the development of beef cattle in Jember.

The sustainability of the beef cattle business by the availability of forage land must be supported, which illustrates the ability of an area to provide feed in the form of forage and agricultural waste. Livestock capacity sees from the availability and adequacy of feed. The capacity of the livestock determines by the formula for calculating the capacity to increase the population. The land is carrying capacity by several factors determined including biophysical, social, economic, and cultural factors that influence each other. In addition to land, the success of a beef cattle fattening business, the availability of superior livestock breeds, management, and feed as determined.

2. METHODS

2.1 Study Design

The first stage was a purposive sampling of 4 villages from 18 villages in Jember. Highest beef cattle population: Umbulsari District with 5442 heads,

Jenggawah with 2615 heads, Sukowono 2452 heads, and Puger with 1856 heads (BPS, 2019). The sampling technique in this study was purposive sampling. Purposive sampling is a technique of determining the sample with specific considerations. Certain samples are willing to be interviewed and have more than five years of farming experience with a minimum number of livestock of 5 heads (Bojar et al., 2018);(Ismoyowati et al., 2020).

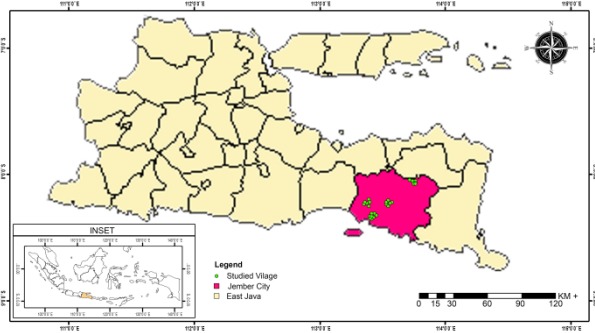


Figure. 1 The Map of Java Island

The Indonesian Territory Map above highlights the Jember area, East Java, a field research study conducted in 2019. The study area on maps with Purple is shown in Jember. Meanwhile, the sample study shows green dots, including Umbulsari, Jenggawah, Sukowono, Puger

Data collection using the observation method (observation), interviews (interviews), and questionnaires in the area described in Fig. 1 follow. The resulting data are primary, secondary, and supporting data. The Primary data are based on interviewed respondents. Furthermore, the Secondary data was based on the environment where the respondent lives and the related office. The collected data were analyzed using the Ruminant Livestock Population Capacity Analysis (KPPTR) method, an approach to demonstrate the capacity or capacity of an area to provide forage for livestock.

Stocking Rate

$$\frac{(15 \times \text{Land Area} \times \text{Conversion Equivalence of forage})}{(\text{Forage Land Area} \times \text{Forage of Agricultural Waste})}$$

The carrying capacity of the area uses the formula approach:

$$\text{KPPTR (ST/year)} = \text{KT} - \text{Real Population}$$

Where:

KPPTR (SL): Ruminant Animal Population Increase Capacity based on natural resources

KPPTR (KK): Ruminants Livestock Population Enhancement Capacity (AU) based on a farmer family

Popril: Real population (livestock population research location)

Based on the value of KPPTR (KK) and KPPTR (SL) obtained elective KPPTR values;

- Effective KPPTR: KPPTR (SL), if KPPTR (SL) < KPPTR (KK)
- Effective KPPTR: KPPTR (KK), if KPPTR (KK) < KPPTR (SL)

The following method used is the LQ method. Location quotient (LQ) compares the magnitude of a sector (the activity of an area) on the role of a higher borough of the region. This method Location quotation conducted to analyze the classification The following method used is the LQ method. Location quotient (LQ) compares the magnitude of a sector (the activity of an area) on the role of a higher borough of the region (Paly, M. B. 2019). The location quotation analyzes the classification into the base and nonbasic sectors Into the base and nonbasic.

$$LQ = \frac{v_i/v_t}{v_i/v_t}$$

Where:

v_i = Village Beef Cattle Population

v_t = Number of Village Family Heads

V_i = Population of Subdistrict Beef Cattle

V_t = Number of District Family Heads

Handayana (2001) explains that the results of LQ calculations produce the following three-point of criteria:

- $LQ > 1$ means that the commodity becomes the basis for growth sources. The results can meet the needs in the region concerned and can export outside the region
- $LQ = 1$ means that the commodity is non-base classified. It does not have a comparative advantage. The results only meet the needs of the region itself and cannot be exported outside the region
- $LQ < 1$ means that the commodity is non-base classified. The results can meet the region's needs, and it needs supplies or imports from outside.

3. DISCUSSION

3.1 Institutional (Animal Husbandry Extension)

Table 1. Beef cattle farmer group in Jember District

Farmer group name's	District
Karang Mulyo	Umbulsari
Lembu Selo Aji	Jenggawah
Sido Mulyo	Sukowono
Ngudi Rojokoyo	Puger
Margo Mulyo	Puger
Tani Asri	Jenggawah
Tani Makmur	Jenggawah
Margojujur	Sukowono
Abadi Jaya	Umbulsari
Tani Rahayu	Sukowono

Source: Secondary data processed (2020)

The government assists livestock groups in the form of cash and beef cattle and counseling in their activities. The job of the livestock instructor is to provide information related to the world of livestock to increase the production of beef cattle owned by the herdsman (Turnip, 2018);(Henrik et al., 2020). However, this is less effective because of the lack of enthusiasm for farmers in receiving information from farm extension workers because farmers are more comfortable using traditional methods of raising their livestock.

3.2 Beef Cattle Livestock Base Area in Jember District

Based on the table. 2. Sukowono Village had an LQ value of 1.91, the highest among other villages, while Sumberdanti Village had the lowest LQ value of 1.04. Other districts outside of the nine base areas have LQ <1 value as many as nine villages, including non-base areas.

Table 2. Areas with LQ ≥ 1 Beef Catle

District	LQ Point
Mojogemi	1,4
Pocangan	1,4
Sumberwringin	1.2
Sumberdanti	1,0
Sukowono	1,9
Sumberwani	1,33
Arjasa	1,43
Sukosari	1,11
Sumberwaru	1,54

Source: Secondary data processed (2020)

Table 1. Non-base areas with LQ value <1 beef cattle

District	LQ Point
Gadingrejo	0,89
Gunungsari	0,75
Mundurejo	0,62
Paleran	0,19
Tegalwangi	0,79
Sugiharwas	0,87
Suciharjo	0,83
Parangbatu	0,73
Sembung	0,77

Source: Secondary data processed (2020)

3.3 Beef Cattle Farmer Income Analysis

The beef cattle business in Jember Regency is the same as any other business, and breeders always have the goal of obtaining the maximum profit with not too much capital. Table 4 shows the average year-end acceptance of livestock value owned by the respondent is 2026,09 USD on a scale of ownership of 3-6 head of beef cattle. The value was the livestock value at the end of the year when the research was carried out the research. Thus, the amount of income depends on the number of livestock populations owned at the end of the year.

Table 2. Beef Cattle Business Income in Jember District

Owners hip scale of Beef cattle	Beef Cattle Business Income			
	Year-end livestock value	The value of livestock sold	Faecal Income	Total
3-6	\$ 2026,09	\$. 892,49	\$ 19,05	\$ 2937,63

Source: Secondary data processed (2020)

It explained that the average income earned by farmers from selling beef cattle is 892,49 USD/year. The farmer sets the price for beef cattle based on a live weight of 2,50 USD/kg, and the average weight of livestock sold is around 310-350 kg. The total weight of livestock owned is directly proportional to the profit the farmer receives from livestock sales.

Add-on income from the sale of feces from the livestock owned obtainable, while the result was an average of 19,05 USD from the sale of feces. The feces sold consist of 2 forms, namely wet feces and dry feces. Dry feces are more upper price at 0,0036 Cent of USD/kg, while wet feces is 0,0018 Cent of USD/ kg.

The feces' size depends on the population of the beef cattle owned, where the more beef cattle have, the more feces produced. However, most herders do not sell all their feces but use them as fertilizer for their crops. The price of the cattle sold is the total value of the livestock at the end of the year plus the sale of livestock feces, resulting in a total beef cattle business income of 2937,62 USD.

3.3.1 Beef cattle production costs

Production costs in the beef cattle business are costs incurred by a herdsman in business activities for one year. The cost of beef cattle production determines farmers' income. In these cases, the production costs incurred are more than the profit's then that can be said that the business is not profitable or even loses money (Yulianti et al., 2020). Costs in the cultivation of beef cattle can divide into two parts: fixed costs and variable costs. Production costs in a beef cattle business include fixed cost and variable cost as in table 5 and 6.

Table 3. Beef cattle business costs

Ownership scale of Beef cattle	Beef Cattle Business Cost Components		
	Cage Depreciation Costs	Equipment depreciation costs	Total
3-6	\$ 11,66 /Years.	\$ 3,39/ Years	\$ 14,63 /Years

Source: Secondary data processed (2020)

Table 5 shows the cost of shed depreciation in a beef cattle business with a livestock ownership scale

Table 6. Variable Costs of the Beef Cattle Business in Jember

Ownership scale of Beef cattle	Business Component Cost					
	Early Years	Feed Cost	AI Cost	Electricity Cost	Labor Fee	Total
3-6	\$ 2047,11	\$ 275,70	\$ 4,93	\$ 10,03	\$ 389,02	\$ 2725,99

Source: Secondary data processed (2020)

Income is the difference between total revenue and total costs incurred when running a beef cattle business. The obtaining of beef cattle business income from beef cattle business income minus the total cost incurred during one year of maintenance (Qomar et al., 2017);

Table 4. The revenue of the beef for one year

Ownership scale of Beef cattle	Business revenue		
	Income	Production Cost	Total
3-6	\$ 2938,82	\$ 2751,62	\$ 187,20

of 3-6 heads has an average cage shrinkage cost of 11,66 USD. The size of the cost required is affected by the condition of the cage owned by the farmer. The herdsman in the research area generally makes cages from wood and bamboo, but they are very closed because the research areas are still prone to beef cattle theft.

Apart from pen shrinkage, there is also equipment depreciation of 3,39 USD from the beef cattle business. The equipment commonly used by a herdsman in running their livestock business includes buckets, shovels, brooms, slaps, hoses, sickles, and gloves. "The bigger business was you have, the more it will cost you to buy equipment." (Widodo et al., 2020) The total cost of depreciation of cages and the depreciation of equipment is 14,63 USD.

2. Variable Business Costs

There are several variable costs in the beef cattle business in Jember, including the value of livestock at the beginning of the year, feed costs, AI costs, electricity, and labor described in Table 6. The table below obtained an average value of livestock at the beginning of 2046,34 USD of the year, feed costs of 275,60 USD, AI fee of 4,93 USD, the electricity cost for 3-6 livestock is 9,99 USD, and labor costs 389,02 USD. The beef cattle business workers in the study areas are generally members of their own families. However, wages are calculated from the cost of food and daily weariness when handling cows.

(Anggraeni et al., 2019). The advantages and disadvantages of the sustainability of the beef cattle business can be seen from the income value as described in Table 7 below:

Source: Secondary data processed (2020)

The above table shows that seven the average income of the beef cattle business in the Jember district is 187,20 USD/year with a 3-6 head of livestock ownership for one year. When calculated revenue each month then the results obtained 15,60 USD/mo. The income is still relatively small when compared with the cost and effort that the breeder must issue. Thereupon, in raising beef cattle, expertise must meet the criteria for viable and profitable sales.

3.4 Population Increased capacity of Ruminant in Jember

Table 8. Population Increased capacity

District	Produksi HMT Total (Ton BK/Ha/Years)	KTTR Max.	POPRIIL (ST)	KPPTR Effective
Mojogemi	1156.04	502.6261	314.25	188.3761
Pocangan	336.77	146.4217	505.75	-359.328
Sumberwringin	1,895	823.913	857	-33.087
Sumberdanti	713.44	310.1913	219.25	90.9413
Gadingrejo	611.82	266.0087	386	-119.991
Gunungsari	943.39	410.1696	771.25	-361.08
Mundurejo	1115.52	485.0087	554.25	-69.2413
Paleran	775.68	337.2522	178.75	158.5022
Sidorejo	1634.18	710.513	650.5	60.01304
Sukoreno	1531.18	665.7304	559.5	106.2304
Kasiyan	1934.67	841.1609	781	60.16087
Mlokorejo	2391.31	1039.7	1061.5	-21.8
Puger wetan	2844.22	1236.617	1112.5	124.1174
Bagon	2410.16	1047.896	1603.85	-555.954
Wonojati	656.1	285.2609	879.5	-594.239
Kertonegoro	1289.76	560.7652	711.25	-150.485
Kemuningsari Kidul	3823.39	1662.343	907.75	754.5935
Sruni	3523.7	1532.043	1579	-46.9565
Total	23,929.87	12863.62	13632.85	679.727

Research data obtained, Kemuning Kidul Village, Jenggawah District has the most positive KPPTR value, namely 754.6 ST. The village described the potential to accommodate as many as 754.6 ST of livestock with a KTTR value of 1662.4. while the population there is only 907.75 ST. The potential forage for beef cattle feed is very large because Kemuning Kidul district has quite a distant location from the city center, forest areas, and agricultural land are supporting factors (Santoso et al., 2018). Other positive results of effective KPPTR are Mojogemi, Sumberdanti, Paleran, Sidorejo, Sukoreno, Kasiyan, Pugerwetan, Kemuningkidul district.

Source: Secondary data processed (2020)

Where:

- HMT = Forage forage,
- BK = Dry Material,
- KTTR Max = Maximum Ruminant Capacity,
- POPRIIL = Real Population,Effective
- KPPTR = Capacity to Increase Ruminant Population

The calculation of KPPTR in Wonojati Village obtained a result of -594.24 ST. The maximum KTTR

was 285.7 ST, while the fact population in the area was 879.5 ST. There is an overpopulation due to the production of forage in the village of Wonojati. It makes it, though, to meet the need for animal feed so that most of the farmers in the Wonojati district buy weft from outside the region. Other results of effective KPPTR with negative values are Pocangan, Sumberwringin, Gadingrejo, Gunungsari, Mundurejo, Mlokorejo, Bagon, Wonojati, Kertonegoro and Sruni villages. The KPPTR value defines the number of ruminant livestock population, in this case, cows. These can not anymore because there is an overpopulation of the KPPTR value

upgraded. However, it can still accommodate beef cattle in some villages due to abundant forage production and agricultural waste.

Matters affecting the differences between villages KPPTTR result is the number of ruminant livestock population, the number of farmers, and the land is different forages. The potential land for the development of ruminant livestock is arable land crops

3.5 Group Area Beef Cattle Development

Table 9. Group Area Beef Cattle Development

No	Group	Criteria	Village
1	I	KPPTTR (E) Positif, LQ > 1	- Mojogemi
			- Sumberdanti
			- Paleran
			- Sidorejo
2	II	KPPTTR (E) Positif, LQ < 1	- Sukoreno
			- Kasiyan
			- Pugerwetan
			- Kemuningsari Kidul
			- Sumberwringin
			- Gadingrejo
3	III	KPPTTR(E) negatif, LQ > 1	- Gunungsari
			- Mundurejo
			- Mlokorejo
			- Bagon
4	IV	KPPTTR(E) negatif, LQ < 1	- Wonojati
			- Kertonegoro
			- Sruni

Source: Secondary data processed (2020)

3.5.1 Region Group I

The Regional groups with positive KPPTTR (E) criteria and LQ> 1 are included in the region far from the city center. Livestock activities in this area still have the potential to be developed. The availability of forage is quite a lot. Besides, in the Mojogemi area, there are inseminators and animal health officers to control the condition of the livestock at any time. This region has agricultural land as a forage production provider. Able to accommodate the increase in ruminant livestock population. Paleran Village, in this case, can increase the beef cattle population by 188.4 ST. Sumberdanti Village can increase the population by 754.6 ST. These five villages can as the concentration use of the local government for the development of beef cattle in the Jember district.

The government's strategy in the region I group is to utilize existing resources by increasing the beef cattle population for each family head. subsidies for fodder to other villages so that feed shortages in other villages can resolve. (Wibowo, 2017); (Setiarso, et al., 2017).

3.5.2 Region Group II

Region II is a group of positive KPPTTR (E) criteria and LQ <1. The villages included in this group are:

(paddy fields, dry land, and fields) (De et al., 2015); (Suwarta., 2018); (Kusumastuti et al., 2019). KPPTTR calculation results overall in Wonojati amounted to -879 ST, which means that in District Wonojati occur due to overpopulation of forage and forage production. Waste as livestock feed crops can not meet the needs of the livestock population in the region. However, some villages still can pile up cattle, beef cattle for forage production, and abundant agricultural waste.

Paleran, Sidorejo, Sukoreno, Kasiyan, Pugerwetan, Kemuningkidul. The village can still provide land to accommodate beef cattle. However, the level of ownership of beef cattle in this sub-district is not as good as the overall level of ownership in Kabupaten Jember. The prominent cause people in the seven villages in group II raise more ruminants besides beef cattle, namely goats and buffalo. If in the area want to add beef cattle, it is still possible. This area can become a base area if each family head increases the number of livestock owners or there is a new head of a family who wants to raise livestock as a side job.

The government's strategy for Group II is to motivate herders to increase the number of their livestock population. Livestock can do this by providing counseling to herders to get the motivation to increase the number of animals they have, given the potential forage that is still there is enough available to accommodate ruminants, especially beef cattle (Liubenko, 2020).

3.5.3 Region Group III

Region III comprises areas with negative KPPTTR (E) criteria and LQ> 1. The villages included in this group are Sumberwringin, Gadingrejo, Gunungsari,

Mundurejo, Mlokorejo, Bagon. This village has negative land tamping capacity, meaning that it is impossible to increase livestock in these villages. However, these villages have beef cattle which in the base area include. To get forage for their livestock, herders have to find or buy grass to the nearest area (Nasirudin et al., 2020)

The government's strategy to overcome this is by increasing the availability of forage, planting grass in the yard or empty land in the area, or taking grass from other villages to meet the forage needs of livestock. Another solution is to make this area a good business area for beef cattle or fattening (Aqel., 2020). The choice of solution as a fattening area or cattle business is ready for slaughter because cattle in the area are only temporary, so it does not interfere with the land's carrying capacity in providing feed for ruminants, especially beef cattle. The livestock population that exceeds the carrying capacity of land resources that continues without prevention will result in land degradation and reduced forage availability for livestock. So, actions are needed to increase the land's carrying capacity. Like land-use efficiency, they planted legumes (a type of legume), agroforestry development, and reforestation.

3.5.4 Region Group IV

Group IV is a group of negative KPPTTR (E) criteria and $LQ < 1$. The villages included in this group are Wonojati, Kertonegoro, Sruni. The means that the availability of forage in this area is deficient. The level of beef cattle ownership is not as good as the overall level of ownership in the Parengan District. Based on the land capacity of these two villages, it is no longer possible to add livestock. The two villages in the vicinity of the sub-district center, whose activities are more directed towards government, trade, and service activities, are located because these areas are not based areas.

In terms of zoning (arable land) as a provider of forage for animal feed, this group of areas cannot increase the population of ruminant livestock anymore. The three villages are areas close to the district center, which are full of agricultural land. (Haloho, 2020); (Riszqina et al., 2019); (Zaw, et al., 2018); (Lalhmunmawia et al., 2018).

However, the availability of agricultural land that provides animal feed has not met the needs of livestock because the population of ruminants is more than the KPPTTR value of the region. The high population of ruminants in this sub-district is related to most of the population's livelihoods, namely farmers. Farming communities integrate livestock businesses with the agricultural land they own. If the livestock business is on a small scale oriented towards family business, then the development program is based on an integrated agricultural system. Strategies that the government can carry out in overcoming this problem are 1) bringing in

forage from other villages, 2) intensification, for example, fattening, utilizing unconventional food sources such as forest land and plantations.

4. CONCLUSION

1. Overall, Jember District can develop a beef cattle business, and some areas have limited availability of animal feed and a lack of interest from a herdsman in increasing the population.
2. Human resources are potential enough to develop the beef cattle business.
3. The government must carry out a strategy to overcome the problems that exist in each village, according to the grouping based on the Ruminant Livestock Population Capacity (KPPTTR) and LQ values:
 - a. Positive KPPTTR and $LQ > 1$ increase the population or send forage to villages with excess forage
 - b. Positive KPPTTR and $LQ < 1$ receive forage from other villages for villages that are short of forage
 - c. Negative KPPTTR and $LQ > 1$ increase the availability of forage
 - d. Negative KPPTTR and $LQ < 1$ make the village a temporary business of fattening beef cattle not to disturb the availability of forage in the village.

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