



Development Model of Beef Cattle in Gorontalo

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Abstract | The purposes of this study were to analyze the regional advantages in beef cattle development in Gorontalo and beef cattle development strategies in Gorontalo. This study is a quantitative study. Sources of data in this study were secondary data in the form of data from the Central Bureau of Statistic and primary data from distributing questionnaires to parties related to the development of beef cattle. The data analysis techniques used are Location Question (LQ) analysis, LQ Shift Share, Analytic Hierarchy Process (AHP) and SWOT (Strength, Weakness, Opportunities, Threat) analysis. The result of this study indicate that beef cattle are livestock that have regional advantages (base sector) and are a progressive sector in the development of beef cattle in Gorontalo because they can be a catalytic factor in regional economic development and meeting people's needs for meat and various sources of protein. Thus it is necessary to add a strategy to the previous strategy (strategy) in the development of beef cattle in Gorontalo. Based on the results of the AHP and SWOT above, it can be seen that the implementation of all process models for the beef cattle development policy strategy is the WO strategy. The level of the role of the actor element on the focus element found that the actor who has the biggest role in the development of beef cattle in increasing the income of livestock farmers is the livestock business actor himself with an interest weight of 0.399. In conclusion, taking into account aspects of supporting strategies, namely improving livestock technology and reporting systems, improving animal disease management and feed quality, facilitating business licensing, and strengthening legal regulations on livestock.

Keywords | Analytic hierarchy process, Location question, Livestock development, Beef cattle

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INTRODUCTION

The development of beef cattle in general in Indonesia has increased through various efforts and programs carried out by the Government to achieve food self-sufficiency. This effort is very important if it is related to the beef self-sufficiency program which aims to reduce dependence on imported breeds and beef. Gorontalo Province is also one of the places for sending beef cattle to other regions/provinces and beef suppliers in other areas. For this reason, the optimal use of the resources we have in various ways, such as improving the quality of seeds, technological inno-

vation, availability of animal feed and utilizing the potential of human resources for breeders. Yulianto and Saparinto (2010) said that livestock as a provider of protein, energy, vitamins and minerals is increasing along with increasing public awareness of nutritional needs to improve quality of life. One of the animal proteins consumed by many people is beef, beef is a very important food ingredient in meeting the nutritional needs of the community and is a strategic economic commodity.

Utilizing the existence of these resources, Gorontalo has made various breakthroughs to support the food self-suffi-

ciency program. Livestock-based economic activity is one of the activities that has good prospects. Until now, the productivity of Bali Cattle livestock is not optimal when compared to other sub-sectors in Gorontalo's agricultural sector. This is thought to be motivated by the management and maintenance system that still needs to be developed and the touch of technology which will eventually lead to the livestock industry. Low quality and quantity of feed, lack of bulls, not optimal reproductive performance, lack of understanding of breeders about reproduction, animal health management, and lack of infrastructure to support livestock production can lead to sub-optimal productivity. The potential of the beef cattle population in Gorontalo and the support of demand for beef cattle both from within and outside the region and the continued import of beef nationally means that Gorontalo has the potential to become a supplier of beef cattle. On the other hand, the development of the livestock industry faces global competition, which includes readiness for competitiveness and challenges in meeting domestic animal protein needs (Susilawati et al., 2017; Susilawati et al., 2020). The demand for beef cattle from other provinces as well as from outside the island of Sulawesi, for example Kalimantan, is quite significant from year to year. Many beef cattle entrepreneurs have to take beef cattle outside Gorontalo due to a lack of supply of beef cattle ready to be slaughtered and sent to other islands. This provides promising prospects in the business of raising beef cattle in increasing the income potential of farmers.

Referring to the expenditure data and demand for beef cattle from other regions, it is hoped that the beef cattle breeding community will be able to be competitive and compete in the competitiveness of goods and services. Regions that have a competitive advantage will encourage beef cattle business actors to further improve human resources so that they are able to be involved in it by having the ability to respond well to all challenges and opportunities that exist. The purposes of this study were to analyze the regional advantages in beef cattle development in Gorontalo and beef cattle development strategies in Gorontalo.

MATERIALS AND METHODS

The population in this study was 522 people using the slovin formula, a sample of 84 people was obtained. Then the sample was added by 12 people related to the beef cattle business. This study is a quantitative study using questionnaire. The data used in this study are secondary data and primary data. The farmer sampling method is based on data requirements to test the proposed hypothesis. To determine the number of samples in this study using calculations with the Slovin formula as follows:

$$n = \frac{N}{1 + Ne^2}$$

Where : n : Number of samples
N : Total population of beef cattle breeders
e : Fault tolerance limits/precision values

(10%)

With the following description :

Total Population: 522head of family

Tolerance limit : (10%)

$$n = \frac{522}{1 + 522(0,1)^2}$$

$$n = \frac{522}{1 + 522(0,01)}$$

$$n = \frac{522}{1 + 5,22}$$

$$n = \frac{522}{6,22}$$

$$n = 83,9$$

The total sample in this study amounted to 84 breeders.

The allocation of the size of the sample in each selected village was carried out based on the proportional allocation formula, namely :

$$n_i = \frac{N_i}{N} \times n$$

Where :

n_i = Sample size in sub-population;
 N_i = The number of members in the sub-population;
N = Number of population = 522 people;
n = Number of samples = 84 people

STATISTICAL ANALYSIS

Descriptive Analysis: Descriptive identification of the factors that influence the development of beef cattle in Gorontalo. Descriptive analysis was performed on 84 respondents to identify internal factors, namely strengths and weaknesses, and external factors, namely opportunities and threats. Descriptive analysis was carried out by dividing between the actual score and the ideal score. Points whose value is greater than 80% will be categorized as good or included in the group of strengths (internal) and opportunities (external).

Regional Advantage Analysis: Commodity Comparative Advantage Location Question

Location Question (LQ) analysis is used to determine livestock sub-sector commodities that have a comparative advantage, with LQ criteria > 1. Operationally, the LQ formulation can be formulated as follows:

$$LQ = \frac{Q_{ir}/Q_r}{Q_{in}/Q_n}$$

Where :

= Total population of livestock commodity “ir” at district level

= Total livestock population for all commodities at district level

= Total population of “in” commodity livestock at the provincial level

= Total livestock population for all commodities at the provincial level

LQ_{share} and LQ_{shift} Analysis: LQ_{share} and LQ_{shift} analysis were developed from the LQ analysis model. This analysis is dynamic because it pays attention to sector developments at two points in time with the following formula:

$$LQ_{Share} = \left[\frac{(Q_{Rkn} + Q_{Rko})}{(Q_{Rn} + Q_{Ro})} \right] \left[\frac{(Q_{Nkn} + Q_{Nko})}{(Q_{Nn} + Q_{No})} \right]$$

Where :

QRko = Economic indicators sector “k” region early period
QRkn = Economic indicators sector “k” region end of period

QRo = Economic indicators for the total sectoral area at the beginning of the period

QRn = Economic indicators of total regional sectors at the end of the period

QNko = The “k” sector economic indicators are the starting point of the period

QNkn = Economic indicators sector “k” end of period reference area

QNo = Economic indicators total sector reference area at the beginning of the period

QNn = Economic indicators total sector end of period reference area

$\left[\frac{(Q_{Rkn} + Q_{Rko})}{(Q_{Rn} + Q_{Ro})} \right]$ = Component share sector “k” observation area

$\left[\frac{(Q_{Nkn} + Q_{Nko})}{(Q_{Nn} + Q_{No})} \right]$ = Component share sector “k” reference area

To get the formula for the development of regional competitiveness in two time points (periods), then:

$$LQ_{Shift} = \left[\frac{(Q_{Rkn} - Q_{Rko})}{(Q_{Rn} - Q_{Ro})} \right] \left[\frac{(Q_{Nkn} - Q_{Nko})}{(Q_{Nn} - Q_{No})} \right]$$

Where :

$\left[\frac{(Q_{Rkn} - Q_{Rko})}{(Q_{Rn} - Q_{Ro})} \right]$ = Component shift sector “k” observation area

$\left[\frac{(Q_{Nkn} - Q_{Nko})}{(Q_{Nn} - Q_{No})} \right]$ = Sector shift component “k” reference area

Analytic Hierarchy Process: The results of the comparison of each element will be a number from 1 to 9 which shows the comparison of the importance of an element. When an element in the matrix is compared to itself, the comparison results are given a value of 1. Scale 9 has been proven to be acceptable and can distinguish the intensity between elements. The results of the comparison are entered in the cells corresponding to the elements being compared. The pairwise comparison comparison scale and its meaning are introduced by Saaty can be seen in Table 1. The arrangement of the hierarchical structure of beef cattle development strategies in increasing the income of farmers in Gorontalo consists of 5 levels, namely focus, actors, factors, objectives, and strategies as shown in Figure 1.

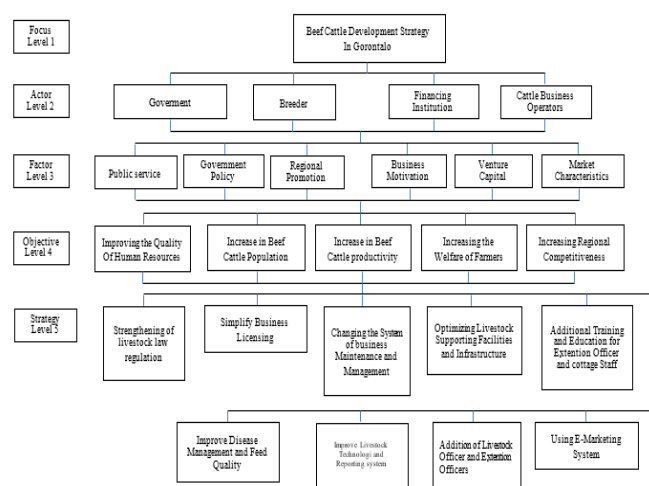


Figure 1: Hierarchical Structure Model

SWOT Analysis: Making a matrix of internal strategic factors arranged in an IFAS (Internal Strategy Factors Summary) and EFAS (External Strategy Factors Summary) table which formulates these internal strategic factors within the framework of Strengths (strengths) and Weaknesses (weaknesses) and external factors in framework of Opportunities (Opportunities) and Threats (Threats) for the development of beef cattle in Gorontalo, the stages are as set out in Table 2.

Table 1: Paired Appeal Scale

Interest Intensity	Definition	Explanation
1	Both elements are very important	Two elements have the same effect
3	One element is slightly more important	Experience and assessment provide values that do not differ much from one element to another
5	One element is very important	Experience and judgment give strong scores differently from one element to another
7	One element is clearly more important	One element is highly preferred over other elements
9	One element is absolutely more important	One element definitely ranks highest in the preference level
2,4,6,8	Values compromise on the values above	A numerical compromise rating is needed since there are no precise words to describe the level of preference
Vice versa	If for activity “i” gets one number compared to activity “j”, then “j” has the opposite value compare to “i”.	

Table 2: Matrix of Internal dan External Faktor

Internal Factor	
A. Strength	B. Weakness
1. Climate and Topography are favorable for livestock development	1. Local specific cattle genetics
2. Potential beef cattle germplasm	2. The education level of breeder is still low
3. Adequate feed resources are available	3. The scale of livestock ownership is small and traditional in nature
4. The majority of the population are farmers and ranche	4. Breeder institutions are not strong
5. High breeding experience and motivation	5. Limited human resources for livestock extension officers, veterinary medical officers and veterinary paramedics
6. The land for farage is very large	6. Facilities and infrastructure for animal health and production are not yet supportive
7. Land for breeding still available	7. It is difficult to access financing institutions
8. Easy to learn	8. High bank interest rates and the need for collateral
9. Many government programs aim to livestock sub-sector	9. Transportation facilities are not good
	10. Unsupported market
	11. Beef cattle marketing is still traditional
	12. Feed quality not good
	13. National development policies are not yet fully geared towards supporting agribusiness-base industries
External Factor	
A. Opprtunities	B. Threat
1 Government policy support for optimizing production and overcoming reproductive disorders in beef cattle	1 Globalization of trade and industry
2 Policy support for the UPSUS SIWAB Program (special efforts for mandatory pregnant cows)	2 Increase in population and consumption
3 Huge market potential	3 Livestock technology assistance is not on target
4 The development of science and technology using the E-Marketing system	3 The development of food safety and treasibility issues
5 Per capita income is increasis	4 There are many cases of zoonotic infectious animal diseases,
6 Livestock population is very potential to be develop	4 Supervision of livestock traffic that has not been maximized
7 The livestock and beef based food industry is growing	5 Lack of legal regulations on animal husbandry
8 Consumer preferences are starting to change to consume processed livestock products	
9 Regional promotion with technology-based packing	

ANALYSIS OF REGIONAL ADVANTAGES IN THE DEVELOPMENT OF BEEF CATTLE IN GORONTALO

Location Quotient (LQ) Analysis: The calculation results regarding the Location quotient are presented in Table 3. The Location Quotient (LQ) value of beef cattle is a superior commodity that can become a basis in the Gorontalo region, which means that the development of beef cattle is important as a catalyst factor in regional economic development and meeting people's needs for meat and various sources. proteins. In addition, it can also be found that for the poultry animals that are the focus of the research, there are 2 poultry that are the basis, namely native chickens and laying hens, where these two livestock commodities are a higher basis than beef cattle. The development of beef cattle farms is carried out jointly by the government, the community (small-scale breeders), and the private sector (Ardiansyah et al., 2022). The government sets the rules of the game, facilitates and oversees the flow and availability of products, both in quantity and quality, so that they meet halal requirements, are safe, nutritious and healthy. The private sector and the community play a role in realizing the adequacy of livestock products through production, import, processing, marketing and distribution of beef cattle products in Gorontalo

Analysis LQ_{Share} dan LQ_{Shift} : Overall the results of the analysis regarding LQ_{Share} and LQ_{Shift} are presented in Table 4. The LQ_{Share} value and LQ_{Shift} value can be explained that the LQ_{Share} value was 1.158. The LQ_{Shift} value is 1.243. If it refers to the criteria that have been set, then it is included in the good criteria or in other words the development of beef cattle development/competitiveness is higher than the reference area or data from Gorontalo Province. Because the value of $LQ_{Share} \geq 1$ and $LQ_{Shift} \geq 1$, the development of beef cattle is a progressive sector. This means that the level of specialization/ concentration of the sector has a relatively high rate of change, so that the sector has good prospects for playing a role in improving the regional economy.

This result shows that beef cattle in Gorontalo are capable of becoming a progressive commodity and can increase the income of these business actors, even though the calculation results are not greater than free-range chicken, but economically. it is clear that it will be higher because the price is relatively higher. as well as the absence of a standard for the sale and purchase of beef cattle so that sometimes two things are found, namely breeders who are losing money and there are also business actors who are experiencing business setbacks, moreover it can be seen that the development of beef cattle is still difficult due to constraints on capital.

The obstacles faced by breeders are 1) limited capital, this causes a limited number of cows kept, 2) maintenance systems that are still traditional (extensive) and a few others use semi-intensive rearing systems so that beef cattle do not get good quality feed in increasing their body weight, 3) limited knowledge of farmers regarding cultivation management, maintenance and business management due to the limited number of Human Resources (HR) officers and livestock extension officers, 4) breeders have not yet utilized the cooperation system between breeders, financing institutions or business actors, 5) Farmers do not get sufficient information about prospects and business opportunities for raising beef cattle, causing a lack of motivation for farmers to make beef cattle a business, and 6) lack of management of animal health in disease management (Adli et al., 2023; Adli et al., 2022; Adli, 2021).

The Animal Husbandry Service has a role as an insulator and regulator in the development of beef cattle in its area, because of its contribution to sectoral policy development. The development of beef cattle farms can develop very quickly if it is carried out jointly by (private) business actors, financing institutions, breeders and also the government (Saputra et al., 2009). Sodiq and Yuwono, (2016) state that Bank Indonesia and banking institutions in an effort to support the people's economy, and implement the Food Security Commodity Development Program as an opportunity to develop productive, quality and competitive businesses that are carried out in a programmed manner

BEEF CATTLE DEVELOPMENT POLICY STRATEGY IN GORONTALO

Identification of AHP in the Development off beef cattle: The result of calculations using the AHP (Analytical Hierarchy Process) technique show that the priorities for cattle development in Gorontalo at each level are as shown in Figure 1. The role of the actor element to the focus element found that the actor who has the biggest role in the development of beef cattle in increasing the income of livestock farmers is the livestock business actor himself with an interest weight of 0.399. The second actor who plays a role in the development of beef cattle is a financing institution with an interest weight of 0.248. Financing institutions are important because one of the main weaknesses in business actors and breeders is in the aspect of capital so that with the help of financial institutions it will be able to increase the economic vibrancy of the community in the development of beef cattle business in Gorontalo.

The level of the role of the factor elements on the actor elements found that there are 6 factors that are interrelated with the actors in the development of beef cattle business. The level of the role of the objective elements on the factor elements found that the most dominant goal of these fac

Table 3: Location Quotient (LQ) Analysis Results

Types	Animal	LQ Value	Category
Livestock	Beef cattle	1.186	Base
	Horse	0.389	Non Base
	Goat	0.599	Non Base
	Pig	0.982	Non Base
Poultry	Local Chicken	2.515	Base
	Laying Chicken	1.128	Base
	Broiler	0.163	Non Base
	Duck	0.163	Non Base

Table 4: LQ_{Share} dan LQ_{Shift} Analysis Results

No	Types	Animal	LQ Share Values	LQ Shift Values	Information	Category
1	Livestock	Beef cattle	1.158	1.243	$LQ_{Share} \geq 1$ and $LQ_{Shift} \geq 1$	Progressive Sector
		Horse	0.424	5.576	$LQ_{Share} < 1$ and $LQ_{Shift} \geq 1$	Growing Sector
		Goat	0.663	0.040	$LQ_{Share} < 1$ and $LQ_{Shift} < 1$	Back Sector
		Pig	1.003	0.759	$LQ_{Share} \geq 1$ and $LQ_{Shift} < 1$	Slow Sector
2	Poultry	Local Chicken	2.506	11.815	$LQ_{Share} \geq 1$ and $LQ_{Shift} \geq 1$	Progressive Sector
		Laying Chicken	0.763	4.285	$LQ_{Share} < 1$ and $LQ_{Shift} \geq 1$	Growing Sector
		Broiler	0.176	0.544	$LQ_{Share} < 1$ dan $LQ_{Shift} < 1$	Back Sector
		Duck	0.286	2.609	$LQ_{Share} < 1$ dan $LQ_{Shift} \geq 1$	Growing Sector

tors was increasing the welfare of breeders with an average interest weight of 0.273 where the main factors in increasing the welfare of farmers could be pursued with high motivation in business, availability of capital and characteristics business related to the business climate, both demand and supply in the beef cattle business in Gorontalo. The level of the role of the objective strategy on the objective elements found that the urgent strategy carried out in the development of beef cattle in Gorontalo was the buying and selling system and marketing of beef cattle using the E-marketing system with an importance weight of 0.160

The results of the overall strategy in the development of beef cattle are shown in Figure 2. The level of the role of the actor element on the focus element found that the actor who has the biggest role in the development of beef cattle in increasing the income of livestock farmers is the livestock business actor himself with an interest weight of 0.399. The level of role of factor elements to actor elements found that there are 6 factors that are interrelated with actors in the development of beef cattle business. In the Gorontalo Animal Husbandry and Animal Health Service actors, the most dominant factors were business capital with a weight of 0.277 and government policies with an interest weight of 0.158.

The level of the role of the objective elements on the factor elements found that the most dominant goal of these factors was increasing the welfare of breeders with an average

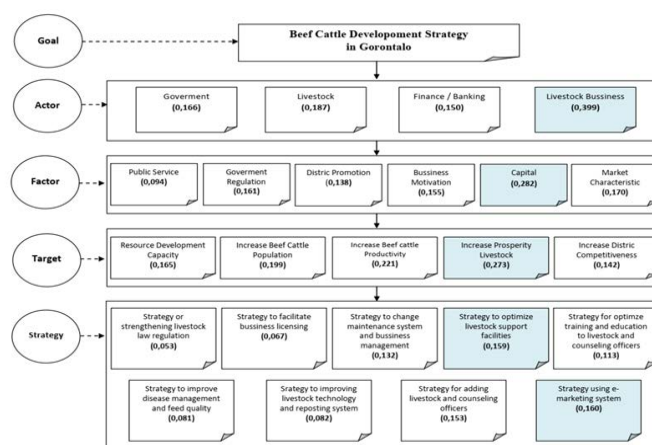


Figure 2: AHP Model and Value in Beef Cattle Development Strategy in Gorontalo

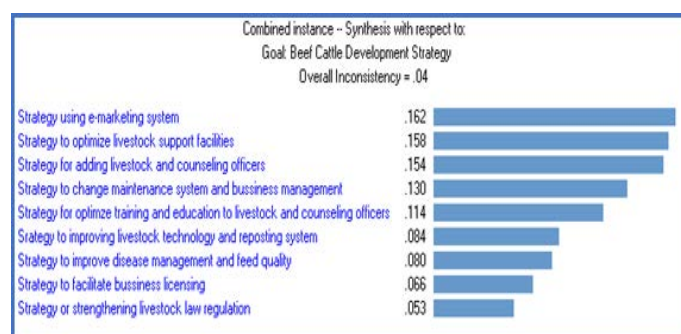


Figure 3: Combination of strategies in the development of beef cattle in Gorontalo

Table 5: SWOT Matrix Beef Cattle Development in Gorontalo

SWOT Matrix	Strengths	Weaknesses
INTERNAL	The climate and topography are favorable for livestock development	Local specific cattle genetics
	Potential beef cattle germplasm	The education level of breeder is still low
	Adequate feed resources are available	The scale of livestock ownership is small and traditional in nature
	The majority of the population as cattle breeders	Breeder institutions are not strong
	High breeding experience and motivation	Limited human resources for livestock extension officers, veterinary medical officers and veterinary paramedics
	The land for farage is very large	Facilities and infrastructure for animal health and production are not yet supportive
	Land for breeding still available	It is difficult to access financing institutions
EXTERNAL	Easy to learn	High bank interest rates and the need for collateral
	Many government programs aim to livestock sub-sector	Transportation facilities are not good
		Unsupported market
		Beef cattle marketing is still traditional
		Feed quality not good
		National development policies are not yet fully geared towards supporting agribusiness-base industries
Opportunities	SO	WO
Government policy support for optimizing production and overcoming reproductive disorders in beef cattle	Licensing is relatively easy for the goverment	Using the E-marketing system
Policy support for the UPSUS SIWAB Program (special efforts for mandatory pregnant cows)	Improve access and marketing system	Optimizing livestock support facilities and infrastucture
Huge market potential	Guaranty the availability of animal feed	Increasing the number of animal husbandry officers and extension
The development of science and technology using the E-Marketing system		Changing the business maintenance and manajemen system
Per capita income is increasis		Additional training and education for livestock extention workers and officers
Livestock population is very potential to be develop		
The livestock and beef based food industry is growing		
Consumer preferences are starting to change to consume processed livestock products		
Regional promotion with technology-based packing		
Threats	ST	WT

SWOT Matrix	Strengths	Weaknesses
Globalization of trade and industry	Increasing the motivation of breeders and business actor	Encouraging and facilitating credit for breeders and beef cattle business actors
Increase in population and consumption	Increasing program targets for the livestock sector	Doing a partnership pattern either with the nearest government or with the private sector
Livestock technology assistance is not on target		Diversify the business for the daily income of breeders, for example breeders who are also sellers of animal feed
The development of food safety and treasability issues		
There are many cases of zoonotic infectious animal diseases,		
Supervision of livestock traffic that has not been maximized		
Lack of legal regulations on animal husbandry		

Source: Processed data, 2022

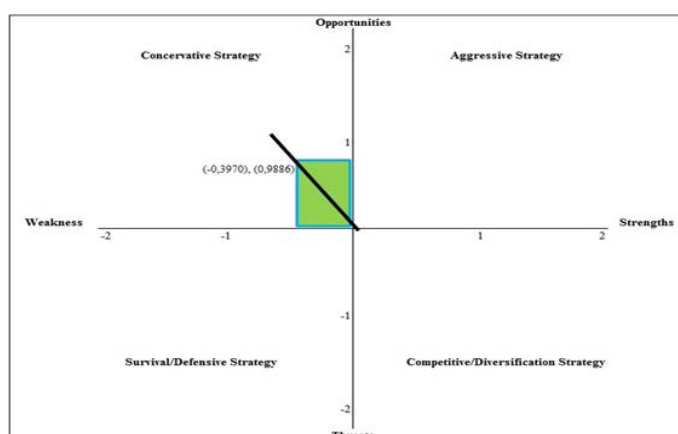


Figure 4: SWOT Analysis Diagram of beef cattle development strategy in Gorontalo

interest weight of 0.273 where the main factors in increasing the welfare of farmers could be pursued with high motivation in business, availability of capital and characteristics business related to the business climate, both demand and supply in the beef cattle business in Gorontalo. The level of the role of the objective strategy on the objective elements found that the urgent strategy carried out in the development of beef cattle in Gorontalo was the buying and selling system and marketing of beef cattle using the E-marketing system with an importance weight of 0.160. The second strategy is to optimize livestock supporting facilities and infrastructure with an importance weight of 0.159.

Beef Cattle Development Strategy in Gorontalo: Based on the results of IFAS (Internal Strategy Factors Summary) and EFAS, (External Strategy Factors Summary) coordinate points can be arranged from the SWOT diagram, which can be seen in Figure 3. The results show that the beef cattle development strategy in Gorontalo is in quadrant 4 which supports a stable strategy or WO strategy (a combination of optimizing opportunities to overcome weaknesses in beef cattle development). The SWOT matrix can be seen in Figure 4 the attachment regarding the

swot matrix. Based on the swot matrix table, the alternative strategy that can be carried out by the Government is the WO strategy in Table 5.

Based on the results of the AHP and SWOT above, it can be seen that the implementation of all process models for the beef cattle development policy strategy is the WO strategy (suppressing weaknesses by taking advantage of opportunities). The strategies are as follows: (1) Using the E-marketing system, (2) Optimizing Sapras supporting livestock, (3) Adding livestock officers and extension officers, (4) Changing the maintenance and business management system, (5) Adding training and education for livestock officers and extension workers, (6) Improving livestock technology and reporting systems, (7) improving animal disease management and feed quality, (8) facilitating business permits and ease of financing and (9) Strengthening legal regulations regarding animal husbandry. The results of the study found that a good strategy is to apply the WO strategy. This is very good for all parties because parties who have weaknesses can easily be covered up because of the role of other actors. The advantages of this WO strategy are as stated by Priyanto (2011) that the WO (Weakness-Opportunity) strategy or the weakness-opportunity strategy is a strategy to be able to minimize existing weaknesses in order to be able to take advantage of an external opportunity.

DISCUSSION

USING AN E-MARKETING SYSTEM

In this study, it is expected that marketing through E-marketing technology will be a promotional tool to facilitate buying and selling transactions in the livestock business. Promotion itself is part of the marketing mix which is a set of marketing tools used by the company to continuously achieve its marketing objectives in the target market. While the purpose of this beef cattle business is to make a profit. So far, the sale of poyong cattle in the study area is sold to local traders, traders between regions, and

sometimes directly to butchers. From the results of interviews and surveys, information was obtained that the sale of cattle by breeders was carried out at the breeder's residence or stables and only a small portion was carried out in the market or directly to the butchers. This is what causes farmers to have no other choice even though the supply of cattle is low. The price of cattle is low because it depends on the traders and/or blantik in the supply. Through technology-based marketing (e-marketing) it is hoped that we can not only sell cattle directly to butchers but also market processed cow manure or organic fertilizers.

E-marketing is done to prevent long marketing channels which can result in smaller profits. The cattle distribution pattern in the Eco-Friendly Farmers Group is generally long and involves many market players, resulting in higher marketing costs which are a burden to consumers (Pabobo, 2016). The longer the marketing chain, the greater the costs incurred and the smaller the profits obtained by the beef cattle marketing business actors. The second channel is the most effective channel in the beef cattle marketing business because the second channel has great advantages (Alamsyah, 2015).

OPTIMIZING LIVESTOCK SUPPORTING FACILITIES AND INFRASTRUCTURE

Provision of infrastructure in the form of livestock industry infrastructure is one of the strategic steps in beef cattle development policy (Yusdja and Ilham, 2004). It can be explained one way, for example through the provision of land and irrigation to produce forage for livestock. Provision of Animal Health Centers (PAHC) and Artificial Insemination Service Units (AISU). PAHC and AISU are needed in order to support and ensure cattle are healthy and have a good reproductive system. As a guarantee of animal health which is a determining factor in the productivity of beef cattle. Provision of medicines, hormones, frozen semen and medical equipment etc. To support animal health services and optimize reproduction. According to the government program of *Upaya Khusus Sapi Indukan Wajib Bunting* (UPSUS SIWAB) and Reproductive Disorder Management. The number of PAHC in each District in Gorontalo Province is on average 3 units.

ADDITION OF LIVESTOCK OFFICERS AND EXTENSION OFFICERS

The importance of the animal health center as a means of guaranteeing animal health, it is necessary to add officers or in this case veterinary medics, veterinary paramedics, inseminators, assistant livestock reproduction (ALR) and also pregnancy examiner (PE) to provide optimal service to the community. Sometimes because we lack manpower or human resources, we can not immediately respond to reports from the breeder community and this has a huge

impact on the livestock and the breeders themselves. For example, when a farmer reports that the cow is in heat and needs to be carried out immediately by Artificial Insemination (AI) but there are no officers in the area, this is detrimental to the breeder because they have to wait one more cycle for the cow to come into heat again. While the impact on livestock if it has been in heat several times and is not mated, reproductive disorders can occur. This will reduce livestock productivity so that it will indirectly reduce income. Livestock extension workers are very important in providing outreach and knowledge to the farming community about good husbandry procedures, recognizing cattle in heat, changing maintenance management patterns and disseminating information about new livestock technology.

CHANGING MAINTENANCE AND BUSINESS MANAGEMENT SYSTEM

In general, breeders in Gorontalo use a rearing system that is still traditional (extensive) and a few others use a semi-intensive rearing system so that beef cattle do not get good quality feed to increase their body weight. This is what we need to change by providing farmers with knowledge about good management of beef cattle cultivation, how to maintain and manage beef cattle business. We can do this if we have a sufficient number of Human Resources (HR) officers and livestock extension workers. Farmers must obtain sufficient information about the prospects and opportunities for beef cattle farming to motivate breeders to make beef cattle a business by raising livestock. intensive beef cattle. Livestock business is a process of combining production factors in the form of land, livestock, labor and capital to produce livestock products. The success of a cattle business depends on three elements, namely breeding, feed, and management. In traditional cattle farming, the method of raising livestock extensively does not pay attention to these three elements, so it is necessary to change the maintenance system from extensive to intensive rearing systems.

The intensive rearing system is the maintenance of cattle in pens with biotic and abiotic environmental factors that are fully controlled by humans. The biotic environmental factors are feed, bacteria, viruses and workers. While the abiotic environmental factors are cages, waste, cage equipment, places to feed, places to drink etc. The intensive maintenance system is a modern maintenance system invented in the 19th century along with technological and scientific developments, especially vaccines and vitamins for livestock. With full control of environmental factors, it is hoped that high-quality meat products that are free from disease can be produced in a relatively short time compared to other rearing systems.

ADDITIONAL TRAINING AND EDUCATION FOR LIVESTOCK OFFICERS AND EXTENSION WORKERS

Increasing the knowledge of human resources for livestock officers and livestock extension workers through additional education and training, indirectly agricultural officers and extension workers can transfer new knowledge gained from education or technical knowledge updates to increase breeder knowledge. For example, embryo transfer technology, this requires reliable and skilled livestock workers/veterinarians so that they require training in stages starting from training in artificial insemination, pregnancy checks, livestock reproduction assistants and then only being able to carry out embryo transfers.

Anwas (2013) said that to improve competency, many efforts can be made, including through increasing formal education, training, meetings or discussions between extension agents, providing land/places for testing livestock innovations, providing extension facilities and infrastructure, and other activities. Based on this identification, the formal education followed after becoming a livestock extensionist, training, and meeting activities between extension agents are assumed to have a significant effect on increasing the competence of extension agents. Therefore, it is necessary to do research on these variables. Training is an effort to improve oneself, both in terms of knowledge, attitudes and skills. If the frequency of training is often carried out, then the extension worker will get the knowledge, attitudes, and skills needed in extension activities. On the other hand, participating in training activities not only gain knowledge, but it is also possible for instructors to get other aspects that are useful for improving their abilities. These other aspects include: interacting with training resource persons (instructors), sharing experiences with fellow instructors, obtaining new energy (motivation) for learning, as well as other latest information needed in counseling. Therefore, it is suspected that the more intensity of training activities attended by extension workers, the competence will also increase. Thus, the intensity of the training attended by extension agents has an effect on increasing their competence.

IMPROVE LIVESTOCK TECHNOLOGY AND REPORTING SYSTEM

As an effort to disseminate the technology of the results of the engineering of livestock cultivation to the livestock community as users of livestock technology, it is hoped that it will have an impact on increasing the capacity and improving the economy of breeders. Livestock development requires adequate and sustainable technology. New technology will be very beneficial if it can be reached and implemented by breeders or users who need it. In general, there are many technologies that have not been able to be directly adopted or applied in Gorontalo. Several technol-

ogies that have been applied so far in Gorontalo, namely 1) Artificial Insemination technology, 2) Management of feed from agricultural waste (silage), 3) use of biogas from sewage, 4) management of solid and liquid waste for inorganic fertilizers, and 5) embryo transfer.

The community reporting system to officials, officer reports to the District and Center can already be through National Animal Health Information System (NAHIS). In practice, breeders can report heat-ridden cattle or sick cattle to the NAHIS center number or through the NAHIS application, which the system will then forward this report to officers according to their respective areas. Then if it has been handled by the officer, the officer can again send a report via NAHIS. Thus we will be able to quickly find out the disease situation in an area, the number of animal diseases both communicable and non-communicable, the number of cattle in AI, the number of pregnant cows, the number of births, the number of reproductive disorders in cattle, the number of recoveries, the number of male population and female for each village/district, livestock identity and breeder identity, vaccination activities, and service programs

IMPROVE ANIMAL DISEASE MANAGEMENT AND FEED QUALITY

A good breeder must be able to recognize his livestock when they are healthy or if there is a change in behavior in a bad direction due to a decrease in the animal's immune system (Kusumawati et al., 2019). If farmers can easily recognize their sick animals, farmers will easily and immediately report their sick animals to livestock officers in the area. Delay in reporting sick livestock which results in the death of their livestock because usually farmers are unable to see the functional changes in their livestock. And breeders must provide deworming drugs regularly, which is once every 3 months for maximum livestock growth. Good quality and quality of feed will accelerate weight gain every day, which is around 500–600 gr/head/day (Mastika, 2003). The farmer will quickly be able to sell his cattle if the cattle are fattened. Likewise, if the seeds are taken, quality cow seeds will be produced because during pregnancy the mother gets quality and quality feed intake. Sasandi et al., (2018); Hernawan et al. (2018) and Ardiansyah et al. (2019) said that feed management procedures include feed prediction, procurement of feed ingredients, mixing of concentrates (mixing), distribution and feeding. When this whole process is carried out optimally and in accordance with the SOP in optimizing feed, it will have an impact on increasing the weight of beef cattle for better farmer benefits.

FACILITATING BUSINESS LICENSING AND EASE OF FINANCING

The legal aspect studies the form of business entity that will be used (related to legal force and consequences), and studies the guarantees that can be provided when using sources of funds in the form of loans, various deeds, certificates and permits. The purpose of the feasibility assessment based on the legal aspect is to examine the legitimacy, completeness and authenticity of the documents held. Local and central governments must be serious about supporting the increase in livestock capital and opening up opportunities for investors to invest in beef cattle business by facilitating business licensing. Ease in legalizing beef cattle business and promoting investment in beef cattle business.

Sodiq and Yuwono (2016) state that Bank Indonesia and banking institutions in an effort to support the people's economy, and implement the Food Security Commodity Development Program as an opportunity to develop productive, quality and competitive businesses that are carried out in a programmed manner. The Food Security Commodity Development Program is implemented, among others, through the development of Beef Cattle Farming SMEs in rural areas. Funding through the role of the government is directed at increasing the scale of agribusiness-oriented businesses. The business applied is beef cattle fattening. The pattern of development along with the productivity performance of beef cattle in participating breeders needs to be studied in order to increase business results.

STRENGTHENING LEGAL REGULATIONS ON ANIMAL HUSBANDRY

The absence of regional regulations regarding livestock price standards and livestock export/import regulations (livestock traffic) is one of the reasons for weak government legal regulations. Weak government regulations lead to low bargaining power of farmers in the buying and selling process of their livestock products. The success of developing a beef cattle business is determined by strategic policy support that includes three main agribusiness matters, namely input market policies, cultivation, and marketing and trade involving the government, the private sector, and the farming community (Mayulu et al., 2010). From the three main matters, marketing (trade) policy plays a key role. The success of market policies will have a direct impact on prices and income received by agribusiness actors. This condition will further encourage the adoption of technology (eg e-marketing), increase productivity and sustainability in investment because financing institutions will have more trust and confidence in beef cattle business opportunity.

CONCLUSIONS

Beef cattle are livestock that have regional advantages (sector basis) and are a progressive sector in the development of beef cattle in Gorontalo because they can be a catalytic factor in regional economic development and meeting people's needs for meat and various sources of protein. Thus it is necessary to add a strategy to the previous strategy (strategy) in the development of beef cattle in Gorontalo. As well as taking into account the aspects of supporting strategies, namely improving livestock technology and reporting systems, improving animal disease management and feed quality, facilitating business licensing and strengthening legal regulations regarding livestock.

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CONFLICT OF INTEREST

No potential conflict of interest relevant to this article was reported.

NOVELTY STATEMENT

The novelty in the research process lies in the hierarchy that was built, namely in the use of AHP (Analytical Hierarchy Process) using 5 levels of hierarchy, then AHP analysis is supported by SWOT results and mapping of beef cattle potential based on beef cattle population in Gorontalo. Meanwhile, Novelty's research results, namely efforts to develop beef cattle in Gorontalo, are in dire need of a touch of technology (e-marketing) so that the capacity building of farmers-breeders in Gorontalo is a necessity to continue to be upgraded, but taking into account the capital factor for economic optimization in Gorontalo through the livestock sector, especially beef cattle.

AUTHOR'S CONTRIBUTION

This study is expected to contribute to the decision making of the Government in Gorontalo in the development of beef cattle, bearing in mind that this study was designed by researchers with a scientific background in animal husbandry and agribusiness. The main researcher contributes to designing research to produce journals that can be used as policy papers, the second researcher is in charge of coordinating with local governments and key informants and the third researcher is in charge of data analysis and macro-economics of the livestock agriculture sector in Gorontalo.

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