



Optimization Strategy for the Beef Cattle Commodity Market Chain in Gorontalo Province to Meet the Logistical Needs of the Nusantara Capital City (IKN), Indonesia

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Abstract | Strategies are required to overcome the challenges of distribution and market competition for beef cattle, enhancing the supply chain efficiency and competitiveness of Gorontalo's beef cattle in the Nusantara Capital City (IKN) market. This study aims to formulate strategies for optimizing the beef cattle commodity market chain in Gorontalo Province to meet the logistical needs of the IKN in East Kalimantan. It employed a descriptive quantitative approach. The study locations include Gorontalo Province, as well as Balikpapan City and Penajam Paser Utara Regency in East Kalimantan. A total of 26 respondents were selected as the observational sample, consisting of key players in the beef cattle supply chain from production to distribution, namely cattle farmers, cattle traders, meat retailers, and local policy-makers. Respondent selection based on levels of interest, knowledge, understanding, and experience related to beef cattle cultivation and market chains.. Data collection methods included questionnaires, observation, and in-depth interviews with stakeholders on the Strengths, Weaknesses, Opportunities, and Threats in the development of Gorontalo's beef cattle sector. Data analysis was performed using SWOT (Strengths, Weaknesses, Opportunities, Threats) analysis to identify strategies for optimizing the beef market chain. The results indicated that the main problem for beef distribution from Gorontalo to East Kalimantan was the lack of supporting infrastructure, such as livestock health testing laboratories and transportation for cattle. The difference between beef production and consumption in Gorontalo is 1,054.4 tons. This difference can be used as a local consumption reserve and some can be sent to the IKN (New Capital City). The most effective and sustainable strategy for optimizing the beef supply chain in Gorontalo was a turnaround strategy, which included financing and investment programs for the market chain, infrastructure development, technology extension and training for farmers to improve livestock productivity, and partnerships with feed and seed suppliers. Practical contributions to the market chain optimization strategy include the provision of laboratory facilities to expedite the identification of zoonotic diseases, the addition of sea vessels for transporting cattle to the IKN, and the improvement of beef cattle productivity in Gorontalo.

Keywords | Beef cattle, Strategy, Market chain, Logistics

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The relocation of Indonesia's capital city from the Special Capital Region (DKI) of Jakarta to East Kalimantan, named "*Ibu Kota Nusantara (IKN)*," was officially established through the Indonesian Capital City Law on January 18, 2022. The land area of the IKN is 256,14 hectares (ha), and the sea area is 68,18 hectares (ha). The land area of the IKN is divided into the core area of the IKN with an area of approximately 56,18 hectares and a development area of roughly 199,96 hectares (Kalalinggi *et al.*, 2023). Several countries have also carried out the relocation of a capital city (Perwira *et al.*, 2024), such as the United States from New York to Philadelphia and to Washington DC (1800), Brazil from Rio de Janeiro to Brasilia 1960, Australia from Melbourne to Canberra 1927, Kazakhstan from Almaty to Astana 1997 and Malaysia from Kuala Lumpur to Putrajaya 1999.

The relocation of Indonesia's capital city to IKN aims to reduce the population concentration in DKI Jakarta, which bears the burden as the center of government, trade, services, economic activities, social affairs, education, culture, and even defense and security. Moving the capital to IKN will also assist East Kalimantan province in diversifying its economy from one that is intensive in natural resources to one that is more service-oriented and low-carbon (Yusuf *et al.*, 2023). The current area of DKI Jakarta in 2023 is 664.01 km², which is only 0.003 percent of Indonesia's total land area of 1,919,440 km². Jakarta's population stands at 10,672,100 people, or 3.9 percent of Indonesia's total population of 278,696,200 people (Central Agency of Statistics, 2024). The impacts of Jakarta's heavy burden include increasing population density, traffic congestion, rising air pollution, floods, and escalating crime rates. The relocation of the capital to IKN also aims to promote more equitable development, which has so far been concentrated on Java Island, by shifting it to Kalimantan Island, which is centrally located in Indonesia (Kalalinggi *et al.*, 2023).

The increase in population in the IKN area and its surrounding regions due to the relocation of the capital will be accompanied by a rise in demand for both animal and plant-based food. The increasing demand for food in the IKN area is an opportunity. This opportunity is especially beneficial for food-producing areas in Sulawesi, such as North Sulawesi, Gorontalo, Central Sulawesi, West Sulawesi, and South Sulawesi, whose coastal regions are located on the sea coast. This growing demand for food in the IKN area presents an opportunity for nearby coastal food-producing regions, such as North Sulawesi, Gorontalo, Central Sulawesi, West Sulawesi, and South Sulawesi. One of the food commodities from Gorontalo that has the potential to meet the logistical needs of IKN is beef cattle. Gorontalo has the potential to develop a beef cattle indus-

try, supported by the region's extensive land area, suitable climate, and a long history of cattle farming. Data from the Central Agency Statistics of Gorontalo in 2022 reveals that the total land area of Gorontalo Province is 12,215.44 km². This land area comprises 72.47% non-paddy agricultural land, 2.65% paddy fields, and 24.88% non-agricultural land. Strategically located between the Sulawesi Sea and Tomini Bay, Gorontalo plays a significant role as a hub for inter-island trade in the northern and southern regions of Sulawesi. This strategic location also positions Gorontalo as a potential route and center for cattle transportation within the northern part of the island. According to statistical data, the beef cattle population in 2022 in these five regions totaled 2,386,800 heads, with Gorontalo accounting for 266,700 heads (Central Agency of Statistics, 2024). Several breeds of beef cattle currently being developed by local farmers in Gorontalo include Bali cattle, Brahman, Ongole crossbreeds, Madura, and Diti Gorontalo cattle (Dako *et al.*, 2023). In 2022, East Kalimantan had a beef cattle population of 108,613, while the consumption demand reached 431,028, resulting in a significant shortfall. This translates to a need for an additional 322,415 cattle, or approximately 7,300.78 tons of meat, representing a 72% gap. To address this deficit, East Kalimantan currently relies on importing live cattle from Java and Sulawesi, as well as importing frozen meat from countries outside Indonesia (East Kalimantan Livestock and Animal Health Service, 2024). With the IKN population projected to reach 2 million by 2045, the demand for beef, a crucial source of protein, is expected to rise substantially each year. This increased demand presents both an opportunity for beef cattle farmers in East Kalimantan to increase their income and a potential threat to the availability of affordable animal feed for local residents.

Despite its significant potential, the beef cattle farming system in Indonesia (Gorontalo) still faces challenges. For example, the application of feed and reproductive technologies to increase productivity is still limited, and the management of livestock care remains relatively simple for most farmers (Agus and Widi, 2018). Beef cattle production in Gorontalo also faces obstacles in terms of technology, farm management, and supporting infrastructure, which hinder the improvement of production capacity (Mukhtar *et al.*, 2023). In addition to cultivation aspects, the limited supporting infrastructure provided by the government for beef cattle development remains insufficient, hindering the increase in production capacity. The inefficient distribution and logistics system is a major obstacle in distributing beef cattle to various regions in Indonesia, including from Gorontalo to Balikpapan City, East Kalimantan. Balikpapan City is crucial for IKN because it is in close proximity, with the fastest travel time being 1.5 hours, making it a potential hinterland area for IKN. The geographical location of Gorontalo and Balikpapan City can be accessed via

MATERIALS AND METHODS

both sea and air transport; however, the limited frequency of crossings has led some farmers and livestock breeders to prefer Palu City in Central Sulawesi as an alternative route for shipping beef cattle and other food commodities, as the infrastructure provided there is more supportive.

A comprehensive approach is needed to address the various challenges in the development of beef cattle farming in Gorontalo, ensuring a sustainable supply of beef cattle to IKN. Initial information from the Department of Agriculture and Livestock in Gorontalo Province indicates that beef availability in Gorontalo is currently sufficient to meet local demand. In 2022, total meat production reached 3,085.1 tons. Gorontalo annually exports beef cattle to Kalimantan Island, utilizing the Kwandang Port - Tarakan Port - Balikpapan Port route. This demonstrates Gorontalo's self-sufficiency in beef production. In 2023, over 2,500 cattle were shipped to Kalimantan, with the highest shipment volumes observed during the Eid al-Adha period. One of the strategies that can be implemented is preparing an optimal supply chain strategy for beef cattle to meet the demand for beef in IKN, covering the entire process from production and distribution to marketing. The development of this commodity supply chain presents a significant opportunity for boosting the local economy and poses a challenge in competing with imported frozen beef products from countries such as Australia, Brazil, and India in the Indonesian market. The development of an optimal beef cattle supply chain strategy in Gorontalo is crucial to ensure a stable and competitive supply to IKN. Establishing strategic partnerships with business actors, feed suppliers, and financial institutions can provide solutions in terms of capital, access to technology, and quality feed (Fathan *et al.*, 2024). Both the central and regional governments, with industry players in the meat supply chain, need to collaborate to strengthen distribution infrastructure (Sartika *et al.*, 2023), expedite livestock transport permits between islands in Indonesia, and improve transportation efficiency, particularly from Gorontalo to East Kalimantan. Previous research concluded that strategies for beef cattle development in Gorontalo include improving farming technology and reporting systems, enhancing livestock disease management, feed quality, business licensing ease, and strengthening livestock regulations (Mukhtar *et al.*, 2023; Fathan *et al.*, 2024). However, while these studies focused on internal and external factors related to beef cattle production in Gorontalo, the marketing aspect remains under-explored. Based on these points, the objective of this study is to analyze the potential and identify strategies for optimizing the beef cattle supply chain to meet the logistical needs of the IKN. These efforts will create significant opportunities for Gorontalo to become one of the main beef suppliers to IKN, enhance the welfare of local farmers, and increase regional revenue in Gorontalo.

The first location for data collection was in Gorontalo Province, which includes Gorontalo City, Bone Bolango District, Gorontalo District, North Gorontalo District, Pohuwato District, and Boalemo District. The second location was in East Kalimantan, Indonesia, specifically in Balikpapan City and North Penajam Paser District. A total of 26 stakeholders were selected as respondents in Gorontalo Province, including beef cattle farmers (3), cattle traders (3), meat retailers (3), and heads of departments or staff related to beef cattle farming such as the Department of Agriculture (Livestock), Department of Food, and Department of Trade and Industry in Gorontalo (17). Twenty-six stakeholders were purposively selected based on their level of interest, knowledge, understanding, and experience related to beef cattle cultivation and market chains. The selected stakeholders from the government are heads of departments or divisions within the department who have a broad and deep understanding of the potential and constraints of beef cattle development in their respective working areas in Gorontalo and Balikpapan provinces. Similarly, the selected respondents from the farmer and cattle trader groups have decades of experience and have covered all regions in Gorontalo Province, resulting in a high level of interest, knowledge, and understanding of beef cattle farming and marketing. Although the total number of selected respondents is not large, their capacity to represent other respondents in providing answers to each question in the questionnaire was quite representative. The SWOT analysis focuses more on the extent to which respondents have a deep understanding of the strengths, weaknesses, opportunities, and challenges in strategic decision-making (Gurel and Tat, 2017).

The research approach used descriptive quantitative (De Pilli *et al.*, 2024), which systematically and in-depth describes the internal (Strengths, Weaknesses) and external (Opportunities, Threats) factors affecting the beef cattle supply chain in Gorontalo Province and the IKN hinterland regions of Balikpapan and North Penajam Paser. Data collection was carried out through questionnaires, observations, and interviews (Halidu *et al.*, 2021). Questionnaires were distributed to stakeholders directly involved in the beef cattle supply chain. There were 7 questions for each of the four factors: Strengths, Weaknesses, Opportunities, And Threats, totaling 28 questions in the questionnaire. The questionnaire included questions related to production, feed availability, and socio-economic aspects of beef cattle. Respondents provided answers that were categorized using a 5-point Likert scale: strongly agree, agree, neutral, disagree, and strongly disagree. The content of each question item was validated through discussions with experts in the fields of beef cattle farming, agribusiness, livestock

development policies, and accounting. To ensure a deeper understanding of the questions, respondents were provided clarification during direct interviews while filling out the questionnaire. The observation method involved direct observation at the research sites to understand the infrastructure, distribution processes, and logistical challenges faced in breeding and transporting beef cattle from Gorontalo to East Kalimantan. Structured and unstructured in-depth interviews were conducted with farmers as producers, the general public as consumers, traders and retailers as intermediaries, and local government representatives as policymakers. The purpose of the interviews was to obtain a deeper qualitative perspective on the issues faced and opportunities for the development of beef cattle farming. Secondary data, including statistics on agriculture, trade, and regional development, were sourced from online publications of government institutions such as the Central Agency of Statistics and the regional governments of Gorontalo and East Kalimantan Provinces.

The analysis of all information and data was conducted using SWOT analysis (Strengths, Weaknesses, Opportunities, Threats). The SWOT analysis process began by identifying the internal (Strengths, Weaknesses) and external (Opportunities, Threats) factors for the development of beef cattle farming. The results of this identification were used to create the Internal Factor Analysis Summary (IFAS) and External Factor Analysis Summary (EFAS) matrices (Asyikin *et al.*, 2020; Azizah *et al.*, 2023; Baskoro and Faisal, 2023), which were subsequently used to formulate strategies for the development of beef cattle farming in Gorontalo.

Data analysis techniques commenced with the calculation of Internal Factor Analysis Strategy (IFAS) and External Factor Analysis Strategy (EFAS) scores. Factors within the IFAS and EFAS tables were assigned weights ranging from 1.0 (highly influential) to 0.0 (not influential), ensuring that the total weight for each factor did not exceed 1.0. The research team determined these weights based on the anticipated strategic impact. A rating scale of 1 (least im-

portant), 2 (slightly important), 3 (important), and 4 (very important) was used to evaluate each factor. Respondents assessed the rating based on the variable's influence on the analyzed factor. The weighted score for each variable in IFAS and EFAS was obtained by multiplying the weight and rating. Subsequently, the total score for each IFAS and EFAS factor was calculated by summing up the scores of all variables. The total score indicated the extent of each factor's influence on the strategy for optimizing the beef cattle market chain. A grand strategy was derived by comparing the total scores on a Cartesian diagram, resulting in a coordinate intersection point between IFAS and EFAS. The quadrant in which this intersection point was located served as the basis for determining the optimal market chain strategy for beef cattle in Gorontalo.

RESULTS AND DISCUSSIONS

CATTLE POPULATION, PRODUCTION, AVAILABILITY AND BEEF CONSUMPTION NEEDS

The beef cattle population in Gorontalo in 2023 is 267,728 head, showing an increase from 230,435 head in 2018 (Table 1). This increase in population is attributed to both births and the import of breeding cattle from outside Gorontalo. The largest population in 2023 comes from the Gorontalo Regency with 103,503 head, while the smallest population is from the city of Gorontalo with 3,847 head. Based on the population trend in Table 1, Gorontalo has the potential to become a source region for beef cattle to support the IKN in East Kalimantan.

In 2018, beef production from cattle raised in Gorontalo was 3,704.860 kg or 3,704.8 tons. However, production decreased in 2020 to 2,487.3 tons, but resumed its increase in 2022 to 3,085.1 tons (Table 2). The highest beef production in 2022 came from Gorontalo Regency, which contributed 1,002.9 tons, primarily due to the larger cattle population compared to other regencies in Gorontalo. Although Gorontalo City has a lower population, beef production there exceeds that of several districts in the province. This can be attributed to the presence of a greater number of cattle

Table 1: Beef cattle population in gorontalo province (Head).

Regency	Year					
	2018	2019	2020	2021	2022	2023
Boalemo	40,795	40,895	42,308	43,046	43,216	43,374
Gorontalo	84,365	92,774	96,681	99,177	101,733	103,503
Pohuwato	30,246	32,056	32,543	33,830	34,735	35,100
Bone Bolango	43,007	46,835	47,384	48,317	49,471	9,502
North Gorontalo	28,657	30,784	32,405	32,979	33,726	32,046
Gorontalo City	3,365	3,650	3,662	3,735	3,847	3,847
Gorontalo Province	230,435	246,994	254,983	261,084	266,728	267,372

Source: Livestock sector, agricultural service of gorontalo province.

Table 2: Beef Production in Gorontalo Province (tons).

Location	Year					
	2018	2019	2020	2021	2022	2023
Boalemo	400.2	502.5	293.5	237.81	330.6	330.6
Gorontalo	839.9	823.7	695.4	1,036.8	1,002.9	1,002.9
Pohuwato	229.4	287.5	268.1	282.9	313.9	313.9
Bone Bolango	228.9	274.4	225.7	272.1	264.1	264.1
North Gorontalo	372.5	267.1	228.1	233.7	242.1	242.1
Gorontalo City	1,633.6	1,674.5	776.2	835.7	931.4	900.6
Gorontalo Province	3,704.8	3,830	2,487.3	2,899.3	3,085.1	3,054.3

Source: Livestock sector, agricultural service of gorontalo province.

slaughterhouses and a larger consumer base within the city. While most beef cattle farming occurs in the district areas, where ample land is available, farmers and traders often opt to slaughter their animals in Gorontalo City. This preference stems from the lower distribution costs associated with reaching consumers in the city. This total beef production includes the slaughter of adult male and cull female cattle, as well as imported frozen beef. The decline in beef production in 2020 was caused by the COVID-19 pandemic, which led to a reduction in livestock slaughter activities.

Table 3: Beef availability and demand in gorontalo province (tons).

Variable	Year	
	2022	2023
Availability		
Starting Stock (tons)	92.0	317.0
Production (tons)	3,440.8	3,856.3
Imports (tons)	217.4	63.6
Exports (tons)	1,945.4	583.8
Total Availability (tons)	1,804.8	3,653.1
Consumption Demand		
Household Demand (tons)	1,235.1	1,276.3
Non-Household Demand (tons)	252.2	1,322.3
Total Demand (tons)	1,487.4	2,598.7

Source: Gorontalo province food service departement.

In 2023, the availability of beef from cattle in Gorontalo was 3,653.1 tons, marking an increase compared to the previous year (2022), which was 1,804.8 tons (Table 3). The total beef availability was sourced from the stock at the beginning of the year, production from local farmers, and imports of frozen beef from outside Gorontalo Province. The beef consumption requirement in 2023 for the internal population of Gorontalo was 2,598.7 tons, higher than in 2022, which was 1,487.4 tons (Table 3). The total consumption requirement includes beef needed for household consumption as well as for non-household purposes such

as restaurants, hotels, and catering services. The difference between the consumption requirement and the beef availability in Gorontalo in 2023 was 1,054.4 tons. This excess can be used as stock reserves, with a portion potentially allocated for export to the IKN.

STRENGTHS, WEAKNESSES, OPPORTUNITIES AND THREATS (SWOT ANALYSIS)

IDENTIFICATION OF INTERNAL AND EXTERNAL FACTORS: The identification of internal factors (Strengths, Weaknesses) and external factors (Opportunities, Threats) revealed 7 indicators in each factor, which can be used to formulate a strategy for optimizing the beef cattle supply chain. The results of identifying the indicators in the internal factors include (Table 4):

STRENGTHS:

- The availability of land in Gorontalo is still adequate for beef cattle development.
- The climate in Gorontalo is generally suitable for beef cattle farming
- Human resources in Gorontalo are adequate for the development of beef cattle farming.
- The quality of beef cattle from Gorontalo is fairly good.
- Farmer groups are actively involved in the development of beef cattle.
- Traders from Gorontalo are relatively united in market competition.
- Livestock breeding, feed, and veterinary medicines are sufficiently available for the development of beef cattle.

WEAKNESSES:

- Lack of business and operational capital.
- The land available for cattle farming is largely mountainous and not in a single, contiguous area.
- Farmers lack discipline in applying modern livestock farming technologies.
- There is a shortage of field workers and extension agents specializing in beef cattle farming.
- Concentrate feed, supplements, and veterinary medicines are still imported from outside the region.

- The capital turnover for beef cattle farming is relatively slow.
- The availability of quality breeding stock for cattle farming is often insufficient.

Table 4: Internal factor rating (strengths and weaknesses).

No	Description	Actual Point	Weight	Rating	Score
1	Sufficient land availability	86.15%	0.077	3.000	0.232
2	Climate suitable for beef cattle	84.62%	0.076	1.000	0.076
3	Available human resources	82.31%	0.074	2.000	0.147
4	Good quality of beef cattle	86.15%	0.077	3.000	0.232
5	Active farmers	78.46%	0.070	4.000	0.281
6	Cohesiveness among Gorontalo cattle traders	80.77%	0.072	2.000	0.145
7	Availability of livestock, feed, and medicine	79.23%	0.071	3.000	0.213
Total Strengths			0.518		1.325
1	Lack of business capital	90.00%	0.081	4.000	0.323
2	Mountainous terrain	79.23%	0.071	4.000	0.284
3	Low farmer discipline	73.85%	0.066	2.000	0.132
4	Insufficient number of livestock instructors	71.54%	0.064	2.000	0.128
5	Feed and medicine sourced from outside Gorontalo	77.69%	0.070	3.000	0.209
6	Slow business capital turnover	74.62%	0.067	3.000	0.201
7	Frequent shortages of livestock and medicine	71.54%	0.064	1.000	0.064
Total Weaknesses			0.482		1.340
Total IFAS			11.16	1.000	
IFAS Score					-0.015

Source: Primary data processing, 2024.

The total internal factor score for Strengths is 1.325, while the score for Weaknesses is 1.340 (Table 4). The Strength score is lower than the Weakness score, with a difference of -0.015. This indicates that optimizing the beef cattle commodity market chain in Gorontalo Province to meet the logistical needs of the IKN in Penajam Regency, East Kalimantan Province, still requires further internal improvements. The identification results for indicators in the External Factors include (Table 5).

OPPORTUNITIES:

- The establishment of the new national capital in East Kalimantan could increase demand for beef cattle.
- The local government is highly supportive of beef cattle development.
- Transportation between Gorontalo and the IKN is available and efficient.

- The long-standing trade relationship between Gorontalo and East Kalimantan will facilitate smoother trade connections with IKN.
- Some Gorontalo residents who have migrated and work in Kalimantan are involved in the beef cattle trade.
- Many workers from Gorontalo are interested in expanding trade to IKN.
- Banking institutions are supportive of beef cattle development.

Table 5: External Factor Rating (Opportunities and Threats).

No	Description	Actual Point	Weight	Rating	Score
1	Opening of the IKN in East Kalimantan	83.85%	0.078	4.000	0.314
2	Support from local government	86.15%	0.081	4.000	0.323
3	Availability of Gorontalo-IKN transportation	77.69%	0.073	3.000	0.218
4	Long-standing trade relations between Gorontalo and East Kalimantan	73.85%	0.069	1.000	0.069
5	Gorontalo residents in East Kalimantan engage in cattle trading	76.92%	0.072	2.000	0.144
6	High motivation among residents to trade with IKN	72.31%	0.068	2.000	0.135
7	Support from the banking sector	79.23%	0.074	3.000	0.222
Total Opportunities			0.515		1.425
1	Competition from outside Gorontalo	80.77%	0.076	4.000	0.302
2	Unpredictable trade requirements at IKN	73.08%	0.068	2.000	0.137
3	High demand	73.08%	0.068	1.000	0.068
4	Lack of permanent trade partnership	76.92%	0.072	4.000	0.288
5	Farmers' limited direct market access	63.85%	0.060	2.000	0.120
6	Inadequate support from business loans	73.85%	0.069	3.000	0.207
7	Variable quality in feed development	76.92%	0.072	3.000	0.216
Total Threats			0.485		1.338
Total EFAS			10.68	1.000	
EFAS Score					0.087

Source: Primary data processing, 2024.

THREATS: Changes in the external environment may also pose Threats to the organization. The Threats in optimizing

the beef cattle commodity market chain in Gorontalo to meet the logistical needs of the IKN in East Kalimantan include:

- Competitors from other regions are seeking to supply beef cattle to IKN.
- Unpredictable trade requirements from IKN.
- The projected high demand may exceed the beef cattle production capacity in Gorontalo.
- The absence of a permanent trade partnership between Gorontalo and IKN.
- Cattle farmer groups lack access to markets outside the region.
- People’s Business Credit loans from banks have not yet effectively supported beef cattle development.
- The development of cattle feed has not diversified.

Table 6: SWOT matrix for optimizing the beef cattle market chain in gorontalo province to meet the logistics needs of the ikn in east kalimantan province.

Strengths		Weaknesses	
Oppor- tunities	SO (Strenght-Opportunity) Strategy: • Development of an Integrated Distribution Network • Collaboration with Migrant Traders • Training and Development of Human Resources within the Market Chain • Product Diversification and Value-Added Offerings	WO (Weakness-Opportunity) Strategy: • Financing and Investment Programs for the Market Chain • Development of Market Chain Infrastructure • Technology Training and Outreach for Farmers • Partnerships with Feed and Breeding Providers	
Threats	ST (Strenght-Threath) Strategy: • Strengthening Product Quality and Differentiation • Binding Supply Contract Agreements • Technological Innovation in Production and Distribution • Development of Marketing and Branding Strategies	WT (Weakness-Threath) Strategy: • Optimizing Capital Management and Business Efficiency • Enhancing Livestock and Supply Chain Infrastructure • Outreach Programs and Technical Support for Farmers • Development of Local Feed and Breeding Solutions	

Source: Primary data processing, 2024.

The total external factor score for Opportunities is 1.425, while the score for Threats is 1.338 (Table 5). The opportunity score exceeds the threat score, with a difference of 0.087. This indicates that optimizing the beef cattle commodity market chain in Gorontalo Province to meet the

logistical needs of the IKN in Penajam Regency, East Kalimantan Province, still requires continued external improvements to mitigate various Weaknesses and address potential Threats.

SWOT MATRIX

Alternative strategies for developing an optimal beef cattle market chain in Gorontalo Province to meet the logistical needs of the IKN in East Kalimantan Province are presented in Table 6. A total of 16 alternative strategies are distributed across four categories: Strengths-Opportunities (SO), Weaknesses-Opportunities (WO), Strengths-Threats (ST), and Weaknesses-Threats (WT).

SWOT ANALYSIS DIAGRAM

The SWOT analysis indicates that the optimal strategy for the beef cattle commodity market chain in Gorontalo Province to meet the logistical needs of the IKN in East Kalimantan Province falls in quadrant 3, representing a Turnaround strategy (Table 6, Figure 1). This strategy emphasizes focusing efforts on optimizing the beef cattle market chain in Gorontalo through the following actions:

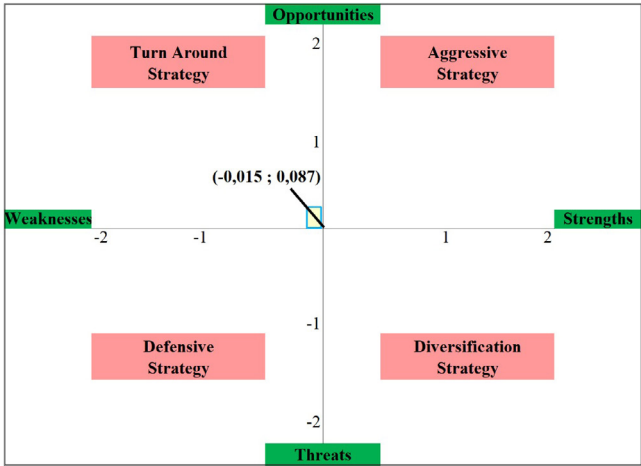


Figure 1: Diagram of swot analysis for optimization of beef cattle market chain strategy in Gorontalo to support beef needs in Nusantara Capital City (IKN), Indonesia.

FINANCING AND INVESTMENT PROGRAMS FOR THE MARKET CHAIN: Addressing capital shortages by forming partnerships with financial institutions that provide specialized financing for the beef cattle supply chain. This program includes working capital loans, infrastructure investments, capacity enhancement, and utilizing opportunities from banking support and government programs.

MARKET CHAIN INFRASTRUCTURE DEVELOPMENT: Building infrastructure to optimize the beef cattle market chain, such as integrated storage and distribution facilities, livestock health testing laboratories, slaughterhouses, processing facilities, and distribution infrastructure to support a more efficient logistics flow to IKN.

TECHNOLOGY EXTENSION AND TRAINING FOR FARMERS:

Providing technology extension services and training for farmers on efficient and effective beef cattle breeding, supply chain management, and livestock reproductive efficiency. This initiative aims to boost productivity and livestock farming efficiency, helping farmers capitalize more effectively on the market opportunities in IKN.

PARTNERSHIPS WITH FEED AND BREEDING STOCK SUPPLIERS:

Establishing strategic partnerships with feed and superior breeding stock suppliers to address shortages in feed and quality breeding stock. Strong relationships with key partners can ensure a stable long-term supply, enabling farmers to increase beef cattle production capacity and meet IKN market demand.

THE POTENTIAL OF BEEF CATTLE IN GORONTALO

The trend of beef cattle populations across Gorontalo's regencies has shown consistent growth from 2018 to 2022 (Table 1), particularly in Gorontalo Regency and Bone Bolango. This data indicates a promising potential for developing the beef cattle sector in Gorontalo and supports efforts to optimize the supply chain to meet meat demands in the IKN. The steady increase in cattle population each year should be sustained to reduce dependency on cattle imports from outside Gorontalo and to strengthen the existing supply chain. The beef cattle supply chain can be further enhanced through collaboration with small-scale farmers, reducing imports, and maximizing distribution routes from Gorontalo to Balikpapan in East Kalimantan. Balikpapan has the potential to serve as a gateway to IKN, given its strategic position for migrants from other Indonesian islands.

A yearly rise in meat production has accompanied the increasing trend in beef cattle population in Gorontalo. Beef production in Gorontalo has shown fluctuations since 2018 but will remain around three thousand tons by 2022 (Table 2). A significant drop in meat production occurred in 2020, coinciding with the onset of the COVID-19 outbreak in Indonesia, though production levels resumed an upward trend in 2021. Beef is one of the most valuable livestock products due to its high-quality protein, iron content, and essential B vitamins (Geletu *et al.*, 2021). The instability in beef production highlights the need for improvements both in the maintenance process and in distribution to consumers. Production quality can be enhanced by implementing safe and hygienic slaughtering technologies, which will help preserve product quality throughout distribution, especially to Kalimantan, where the IKN is located. Optimizing production could also focus on quality control through improvements in the health of cattle slated for slaughter and the use of effective fattening technologies to produce high-quality beef (Ismail and Al-Ansari, 2023).

The total beef available in Gorontalo in 2023 increased compared to the previous year. The availability of beef in Gorontalo is supported by both internal and external supply, which is sufficient to meet local consumption needs, reaching 2,598.7 tons (Table 3). This data is in contrast to Balikpapan City in East Kalimantan, which is the gateway to the IKN, where beef production in 2023 was 614.7 tons, not yet able to meet local needs of 3,041 tons. The potential for beef supply from Gorontalo to IKN could be maximized if transportation cooperation is improved, such as using sea routes from Gorontalo's port directly to Balikpapan port in East Kalimantan. Currently, Gorontalo has one livestock ferry port, Kwandang Port, with routes connecting Gorontalo to North Kalimantan (Tarakan) and East Kalimantan (Balikpapan). In the past, several large-capacity ships owned by PT Pelayaran Nasional (Pelni), including KM Umsini and KM Kambuna, served these routes, but they are no longer operational. Similarly, the Bouraq airline is no longer available, resulting in slower and less efficient distribution.

A comprehensive approach to addressing the challenges in livestock agribusiness can be implemented through strengthening infrastructure, developing partnerships with various stakeholders in the supply chain, and providing training and technology outreach to farmers (Nuhung, 2015; Putri *et al.*, 2020; Rusdiana and Praharani, 2018). With strong financial support, farmers can better develop their livestock operations and take advantage of market opportunities (Kartadjumena *et al.*, 2022). One key infrastructure needed to expedite the delivery of beef cattle to the IKN is a veterinary health testing laboratory. The availability of such infrastructure is crucial, as local farmers in Gorontalo currently face the burden of maintaining livestock for two weeks while awaiting health inspection results from the Maros Veterinary Center in South Sulawesi. If such infrastructure is available, the detection of dangerous diseases and zoonosis in Gorontalo can be known more quickly (between 1-4 days from sample preparation), so the authorities can immediately issue the Animal Health Certificate (SKKH), which is an administrative requirement for sending cattle between islands. Strengthening cooperation with traders and distributors in East Kalimantan can facilitate the distribution flow of beef from Gorontalo to IKN. This would not only reduce logistics costs but also enhance efficiency and delivery speed, making Gorontalo's beef cattle more competitive in the IKN market.

The increasing demand for beef consumption in Gorontalo each year (Table 3) presents a unique challenge for the region in meeting these needs. Beef consumption in Gorontalo decreased in 2020 due to the effects of the Covid-19 pandemic but increased again by 2023 with a percentage increase of 22.79%. The growing demand for beef

will drive a corresponding increase in supply requirements, necessitating an efficient transportation system to support the supply chain. This situation presents a significant challenge for Gorontalo, as it competes with frozen beef imports from countries such as India, Brazil, and Australia, which are now widely available in traditional markets at lower prices. This phenomenon directly impacts beef price competition in Gorontalo's traditional markets and has led to a decrease in the sales rate of local cattle. Data from the Central Statistics Agency shows that the number of cattle slaughtered in Gorontalo in 2018 was 6,332 heads and in 2022 it was 4,550 heads, a decrease of 28.14% (Central Agency of Statistics, 2024). Livestock slaughtered at slaughterhouses in Indonesia is dominated by local cattle (60.62%), imported cattle (37.20%), and buffalo (2.18%) (Center for Agricultural Data and Systems, 2020). Thus, to support the availability of beef in the IKN, the supply chain could be enhanced by providing improved livestock holding facilities before or after transport and establishing integrated logistics routes. Generally, the beef supply chain from Gorontalo to the IKN requires advancements in terms of population, production, availability, and a more efficient and reliable distribution system. This strategy could support food security in the IKN while simultaneously strengthening Gorontalo's economy through the sustainable development of the beef cattle farming sector.

Optimization Strategy for the Beef Cattle Market Chain

As a region with significant potential to support beef supply for the IKN, Gorontalo Province faces various challenges, ranging from infrastructure limitations and distribution issues to restricted market access. Analyzing strategies that can be implemented to optimize the market chain is urgent to ensure that Gorontalo can contribute significantly to national logistics demands. The strategy that needs to be carried out is turn around (Weakness-Opportunity Strategy) that is financing and investment, infrastructure development, human resource capacity building, and partnerships with feed and quality livestock suppliers (Table 6, Figure 1). With a comprehensive approach, these strategies aim not only to enhance beef cattle production and distribution in Gorontalo but also to prepare the region to compete with other markets, especially in light of the availability of cheaper and more accessible imported beef. Developing the beef cattle sector contributes to improving the income of cattle farmers and expanding market opportunities, while challenges can be minimized by increasing productivity and environmentally conscious livestock quality (Salendu *et al.*, 2019). Countries like the United States and Australia, renowned for their robust beef cattle industries, optimize their market chains while simultaneously safeguarding production and genetic integrity through the provision of nutritionally balanced feed (Greenwood, 2021).

FINANCING AND INVESTMENT PROGRAMS STRATEGY

One of the primary challenges in Gorontalo's beef cattle market chain is limited capital for infrastructure development and production capacity enhancement. Productivity gains in beef cattle farming tend to primarily benefit downstream sectors in the supply chain, such as collecting traders, retailers, distributors, and consumers (Veyset *et al.*, 2019). Hence, to address this issue, financing and investment programs involving financial institutions and banks provide an effective solution. Developing the beef cattle industry can be achieved by building strong social relationships, both internally (with employees) and externally (with local residents, educational institutions, government officials, financial institutions, and cattle traders from various regions) (Rustinsyah, 2019; Olilingo and Putra, 2020). Further, through solid partnerships, cattle farmers can access working capital loans, investment for facility development, and funding to increase production capacity. Support can also leverage government programs, such as subsidies or incentives for the livestock sector. Sufficient business capital support can expand beef cattle production, mitigate delivery delays caused by complex logistics, and streamline distribution flows to the IKN. Improved port infrastructure and government transportation subsidies will further enhance logistics efficiency, enabling beef cattle from Gorontalo to compete more effectively in the IKN market against imported beef, which is currently widely available in the domestic market. Among the described strategies, improving distribution and marketing infrastructure is crucial for optimizing the Gorontalo beef cattle market chain. However, the availability of such infrastructure must be coupled with an adequate supply of beef cattle for shipment to the IKN. Therefore, increasing production, such as through improving calf birth rates, should be a priority strategy in the short to medium term.

INFRASTRUCTURE DEVELOPMENT STRATEGY

The sustainability index of dry-climate beef cattle farming is significantly influenced by technological and infrastructural attributes (Simamora *et al.*, 2024). Challenges commonly faced by beef cattle farmers in Indonesia, such as production system limitations, disease outbreaks, feed and water shortages, lack of veterinary services, drought, limited market access and infrastructure, and the low genetic potential of local cattle, are also encountered by some beef cattle farmers in Ethiopia (Abebe *et al.*, 2022). Infrastructure limitations in Gorontalo, such as the absence of ISO-standard livestock health testing laboratories, modern slaughterhouses, livestock product processing facilities, and supporting port facilities for inter-island livestock transport, hinder the optimization of the beef cattle supply chain to the IKN. The development of this infrastructure is essential for supporting a more effective and efficient logistics flow. Establishing a laboratory in Gorontalo that meets

quality standards for livestock health testing is expected to reduce dependence on other regions (such as Palu City in Central Sulawesi and Maros City in South Sulawesi) for issuing Livestock Health Certificates. In addition, to support the optimization of the beef cattle market chain, the local government can strengthen infrastructure around port locations to facilitate the transport of beef cattle from Gorontalo to the IKN. Initiatives may include implementing streamlined procedures for faster permit processing, subsidizing sea transportation costs, and providing quarantine services near crossing ports in Gorontalo. These measures can reduce wait times and accelerate the distribution process to Balikpapan and the IKN.

HUMAN RESOURCE CAPACITY BUILDING STRATEGY

Extension and training strategies to improve cattle production in Gorontalo can include improving beef cattle farming management, the use of modern technology in farming, and efficient supply chain management. Recent technologies, such as the use of digital-based livestock health monitoring systems and more effective feed management for farmers, can enhance both productivity and quality of beef cattle (Groher *et al.*, 2020). Extension programs focusing on marketing strategies and logistics management will equip farmers to compete in the more competitive IKN market. A more skilled and knowledgeable workforce will enable Gorontalo cattle farmers to increase production capacity and adapt more swiftly to shifts in IKN market demand.

STRATEGIC PARTNERSHIPS WITH FEED AND QUALITY LIVESTOCK SUPPLIERS

A common challenge faced by beef cattle farmers in Gorontalo is the lack of quality feed supply and superior livestock breeds. Quality feed can enhance feed efficiency, potentially increase producers' profits, and reduce the environmental impact of cattle farming (Kenny *et al.*, 2018). The feed constraint can be addressed by employing technology to ensure a continuous supply of forage (Defalque *et al.*, 2023) and forming partnerships with livestock feed suppliers, especially those providing concentrated feed for fattening cattle. Improved nutritional management for cattle is essential in achieving successful reproductive performance (Gunawan *et al.*, 2020), boosting production capacity, and growing the cattle population. Strategies for obtaining superior livestock breeds include a rigorous selection and breeding process (Ilham, Ciptadi, *et al.*, 2023). Utilizing local livestock as a source of breeding stock is recommended, as these animals have already adapted well to the Gorontalo environment. Although not yet recognized as a distinct local breed of Gorontalo, local cattle and goats hold potential for development as they are preferred by local farmers (Dako *et al.*, 2023; Ilham, Suyadi, *et al.*, 2023). Currently, Bali cattle are still the main choice among cattle breeders in Gorontalo because they are better adapted

to the local climate and meet the specific needs of both breeders and consumers. Partnerships with breeding institutions, both government-run and farmer-managed, can help ensure an optimal supply of breeding stock to increase livestock productivity. Superior livestock genetics, supported by a quality feeding environment, can enhance beef cattle production capacity, enabling Gorontalo to meet IKN demand more consistently. This program will also reduce farmers' dependency on feed and breeding stock from outside the Gorontalo region.

CONCLUSIONS AND RECOMMENDATIONS

Gorontalo has the potential to meet the beef cattle supply needs of the Nusantara Capital City (IKN) in Indonesia. The recommended strategy for optimizing the beef cattle market chain in Gorontalo to meet the logistics needs of the IKN is turn around. Several key strategies can be implemented to achieve this goal. Firstly, financing and investment programs are crucial, engaging financial institutions to strengthen working capital for farmers and industry stakeholders. Secondly, developing livestock health testing laboratories and improving transport infrastructure are essential to expedite cattle shipments from Gorontalo to Balikpapan, East Kalimantan. Thirdly, enhancing farmers' capacity through training programs that promote the use of advanced technology in cattle farming, effective marketing, and efficient logistics is paramount. Finally, establishing partnerships with feed and superior livestock providers is vital to ensure a consistent supply of high-quality cattle. By combining these strategies – financing, infrastructure development, farmer skill enhancement, and strategic partnerships – a robust and competitive beef cattle industry in Gorontalo can be established to effectively supply the IKN market. The practical implications of implementing these four strategies include increased income for beef cattle farmers due to more efficient marketing and increased regional government revenue from livestock health service taxes. Future research could focus on the profit margins realized by farmers as a result of implementing the strategies recommended in this study.

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NOVELTY STATEMENT

The novelty of this research lies in the potential and strategies for optimizing the beef cattle market chain in Gorontalo to meet the logistical needs of IKN.

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CONFLICT OF INTEREST

There are no potential conflicts of interest.

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