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Sustainable LEISA Dairy Cattle Development Strategy in East Kolaka Regency

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Abstrak: This study aims to formulate a strategy for sustainable dairy cattle development using the LEISA (Low External Input Sustainable Agriculture) production approach in East Kolaka Regency, Southeast Sulawesi. The study was conducted in Lalolae and Ladongi Districts, which were purposively selected as dairy cattle development areas. Primary data were collected through interviews, observation, and documentation, while secondary data were obtained from relevant institutions. Data analysis used the IFE, EFE, IE, SWOT, and QSPM matrices. The results showed that the IFE (3.54) and EFE (3.70) values were in a strong internal position and a supportive external environment, placing the dairy cattle business in Quadrant I of the IE matrix. This position reflects a "growing and building" condition, thus requiring an intensive development strategy. The SWOT analysis produced several alternative strategies, while the QSPM results indicated that increasing production capacity and strengthening farmer institutions were the main priorities. Sustainable LEISA-based dairy cattle development in East Kolaka Regency can be achieved through optimizing local production resources, empowering institutions, and increasing collaboration between farmers, the government, and the private sector. It is concluded that the dairy farming sector in this region has high potential to be developed within an intensive and growth-oriented development framework.

Keywords: Agriculture; LEISA; Milk; Sustainable, SWOT

Introduction

The livestock subsector plays a vital role in contributing to national economic development and food security (Hartati et al., 2024). One livestock commodity with strategic value in meeting animal protein needs is dairy cattle (Amam & Harsita, 2019). Currently, milk demand continues to increase in line with population growth. However, domestic milk production remains insufficient to meet national consumption needs. Based on data from the Directorate General of Livestock and Animal Health (Ditjen PKH, 2024), national milk production only covers approximately 21% (1 million tons) of the total demand (4.7 million tons), while the remaining 79% is met through imports of processed dairy products such as powdered milk and liquid milk. Irajani et al. (2024) stated that this high dependence on imports indicates a significant gap in national milk self-sufficiency and emphasizes the need to strengthen the domestic dairy sector.

The designation of East Kolaka Regency, Southeast Sulawesi Province, as a potential dairy cattle development area is a government effort to increase national milk production. This regional designation is stipulated in Regent Decree Number 100.3.3.2/92 of 2023 concerning the Determination of Dairy Cattle Development Areas. According to Asminaya et al. (2020), this region has favorable agro-ecological conditions, abundant feed resources, and a highly motivated farming community, thus offering the potential for development as a sustainable dairy production area. However, most dairy farming systems

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in this area are still small-scale and traditionally managed, with limited implementation of Good Dairy Farming Practices (GDFP) (Asminaya et al., 2024). This condition results in low productivity and efficiency of livestock farming (Asminaya et al., 2025a). Currently, in Lalolae District and Ladongi District, East Kolaka Regency, there are 14 heifer dairy cows, 1 mother cow and 1 calf which are raised using the LEISA (Low External Input Sustainable Agriculture) pattern, namely animal feed (odot grass) is planted around the pen using organic fertilizer from livestock manure which is then given to the livestock to fulfill their living needs.

The LEISA approach is a relevant model of sustainable agriculture for dairy farming. According to Asminaya et al. (2018), the LEISA principle emphasizes the utilization of local resources, organic nutrient recycling, and ecological balance. Kaur et al. (2022) stated that farmers' tendencies towards low-input systems vary greatly depending on the crop production phase, which includes land use technology, natural pesticides and inorganic fertilizers, seed propagation technology, simple irrigation and drainage methods, and low-input processing. According to Kusuma et al. (2025), LEISA can ensure the availability of feed reserves throughout the year and is able to reduce operational costs of feed through the independent and sustainable use of local resources. Lainawa et al. (2024) stated that the implementation of LEISA on 0.2-0.4 ha of land is economically and ecologically feasible in the integration of vegetable crops, cattle, laying ducks, tilapia, carp, and tilapia.

The LEISA principle in dairy cattle husbandry systems can reduce production costs, increase feed self-sufficiency, and support the long-term sustainability of livestock businesses. However, empirical studies on strategies for developing LEISA-based dairy cattle systems in Indonesia, particularly in eastern regions such as East Kolaka, are still very limited.

This study aims to integrate the strategic management analysis framework (IFE–EFE–IE–SWOT–QSPM) with the LEISA production approach to formulate a comprehensive and applicable strategy for sustainable dairy cattle development. This integrated approach is still rarely applied in the context of smallholder dairy farming, especially in areas with socio-economic and environmental conditions that differ from the main production centers in Java. This study is expected to provide a scientific basis for policymakers, extension institutions, and farmer groups in designing strategies that can optimize internal farm resources, utilize external opportunities, and reduce dependence on milk imports. Strengthening the local dairy cattle industry through a sustainable and integrated strategy is expected to contribute to regional economic growth, national milk independence, and improve the welfare of farming communities.

Method

This research was conducted in Lalolae and Ladongi Districts, East Kolaka Regency, Southeast Sulawesi Province. This location was determined by purposive sampling because it has been designated as a dairy cattle development area, in accordance with Regent Decree Number 100.3.3.2/92 of 2023, concerning the Determination of Dairy Cattle Development Areas in East Kolaka Regency. Key respondents in this study consisted of 9 people, including 2 Agricultural Extension Workers, 1 representative of the East Kolaka Agriculture and Livestock Service, 2 sub-district officials, 1 Animal Health Worker, and 3 livestock farmers. Data collection was carried out through interviews, observation, and documentation.

The variables observed included: internal factors of farmers, namely: land availability, husbandry patterns, feed sources, water sources, production potential, reproductive potential, disease management and control, knowledge, and experience. External factors of farmers, namely: farmer groups, markets and marketing, milk demand, dairy cattle development policies, livestock health workers, inseminators, extension services, financial institutions, accessibility, and telecommunications.

The data obtained were then tabulated and analyzed using the IFE, EFE, and IE matrices (David, 2011), SWOT (Satmoko & Astuti, 2006), and QSPM. The results of the analysis were interpreted descriptively to describe the actual situation.

Results and Discussion

IFE Matrix

The research results show that the main strengths include: adequate land availability, relatively high farmer motivation, local labor availability, and farmers still being of productive age. The main weaknesses include: limited business capital, limited farmer knowledge, low application of business technology, and a simple maintenance system (Table 1).

Table 1 shows that the key strength factor has the highest score, namely 0.51 (adequate land availability). This key factor is the main strength of the dairy cattle business in East Kolaka Regency. Lalolae and Ladongi Districts each have an area of 60.21 km² and 194.43 km², respectively. Lalolae District has an area of 84.20, 73.75, 171.25, 983.80, and 193.00 ha, respectively, for oil palm, coconut, coffee, cocoa, and pepper. Annual production of oil palm, coffee, and cocoa is 30, 30, 40, and 130 tons,

respectively. Meanwhile, Ladongi Regency has areas of oil palm, coconut, coffee, cocoa, and pepper of 28.00, 668.00, 164.50, 7,704.00, and 778.50 ha, respectively. Annual production of oil palm, coffee, and cocoa is 20, 180, 20, and 310 tons, respectively (BPS, 2024).

Oil palm and coconut plantations can serve as alternative grazing areas for livestock, while coffee, cocoa, and pepper stands can serve as alternative feed sources for dairy cattle. According to Suprapti & Ramlah (2013), one cocoa fruit can produce 70-74% pods, 24% seeds, and 2% placenta. Coffee fruit can produce 45% coffee pods, 10% fruit flesh, 5% husk, and 40% coffee beans (Rahmawati et al., 2018). A commonly used stand for pepper plants is the gamal tree (*Gliricidia sepium*). Gamal leaves can be used as a protein source for dairy cattle. Amin et al. (2023) stated that the number of gamal trees planted per hectare depends on the spacing. At a spacing of 3 m x 3 m, 3,261 gamal trees can be planted per hectare, with gamal leaf production per tree reaching 13.14 kg per harvest. According to Media et al. (2022), one of the internal factors contributing to strength is the land used as a feed source. Sufficiently large land areas can be a driving force for dairy cattle development in East Kolaka Regency. Dairy farms in Lalolae and Ladongi Districts have ample grassland for growing green fodder.

Table 1. Results of IFE matrix analysis on dairy cattle farming businesses in East Kolaka Regency

Internal Factors	Heavy	Ranking	Weighted Score
Strength (S)			
Sufficient land is available	0.13	3.78	0.51
Farmers' motivation is relatively high	0.13	3.67	0.48
Local labor available	0.11	3.22	0.37
Breeders are at a productive age	0.13	3.56	0.45
Total Strength Score			1.80
Weakness (W)			
Limited business capital	0.13	3.78	0.51
Farmers' knowledge is limited	0.12	3.44	0.42
The application of business technology is low	0.11	3.11	0.34
The maintenance system is simple	0.13	3.67	0.48
Total Weakness Score			1.75
Total Weighted Score			3.54

The highest score for the main weakness factor was indicated by limited business capital at 0.51 (Table 1). Dairy cattle farmers in Lalolae and Ladongi Districts. East Kolaka Regency. have limited capital to develop their livestock businesses. This limited capital makes it difficult for farmers to meet business needs such as purchasing quality feed. repairing barns. procuring production support equipment. and expanding their business scale. As a result. the productivity and efficiency of dairy cattle farming are suboptimal. According to Yusup et al. (2022), the main weakness in formulating a dairy cattle business development strategy is limited business capital at the farmer level.

Overall, the results of the IFE matrix analysis indicate that the total strengths score (1.80) is greater than the total weaknesses score (1.75). This indicates that dairy cattle businesses in East Kolaka Regency are able to effectively utilize internal strengths and overcome existing weaknesses. The total weighted score obtained from the IFE matrix analysis shows a score of 3.54. This score is in the range of 3.00–4.00 and indicates that the internal position of dairy cattle businesses in East Kolaka Regency is strong.

EFE Matrix

The results of the EFE matrix analysis indicate that key external factors produce four opportunity factors and four threat factors. Key opportunity factors consist of: the existence of local government policies for dairy cattle development. The availability of dairy cattle breeding assistance from the government. The tendency for milk demand to increase, and the marketing of dairy cattle production, is quite open. Key threat factors consist of: dairy cattle are susceptible to disease, feed availability in certain seasons is very low, access to financing is limited. and dairy cattle are very sensitive to climate/weather changes (Table 2).

Table 2 shows that external factors are key for dairy farming in East Kolaka Regency with the main opportunity being government assistance in the form of dairy cattle stock (score 0.51). The dairy cattle stock assistance program in Lalolae and Ladongi Districts provides opportunities for farmers to increase the number and quality of their livestock. Providing superior cattle stock is expected to increase milk production and make livestock farming more competitive. The Ministry of Agriculture, through the Food Crops and Livestock Service of Southeast Sulawesi Province, distributed 10 head FH crossbred female dairy cows to Lalolae District in 2021 and 10 head FH crossbred female dairy cows to Ladongi District in 2022 (Asminaya et al., 2024).

The greatest threat to dairy farming in East Kolaka Regency is based on the EFE matrix analysis. is the very low availability of feed during certain seasons (score 0.54) (Table 2). During the dry season, the availability of green fodder in the Lalolae and Ladongi Districts is very limited and does not meet livestock needs. The availability of green fodder as the main feed often decreases drastically during the dry season. This condition is a serious threat because feed is a significant determinant of livestock productivity. especially milk production and dairy cow health.

The feed provided must meet the nutritional needs of dairy cows and be adjusted to the physiological needs of the cows. Feed that can be given includes green fodder and concentrates. Green fodder consists of grasses (elephant grass, setarian, benggala, kolonjo, etc.). leaves (turi leaves, lamtoro, gamal, etc.), and agricultural waste (rice straw, corn straw, soybean straw, peanut straw, etc.). Concentrates consist of energy concentrates (grains, tubers, and agro-industrial by-products) and protein concentrates (legumes and agro-industrial by-products). According to Asminaya et al. (2025b), providing concentrates can increase milk production. Feeding must be adjusted to the needs of dairy cows and is usually determined by their age and milk production level. Green fodder and concentrates are given at 70% and 30%, respectively. Asminaya et al. (2018) stated that the availability of feed will greatly determine the carrying capacity, livestock density, livestock productivity, and the sustainability of dairy farming businesses.

Table 2. Results of EFE matrix analysis on dairy cattle farming business in East Kolaka Regency

Internal Factors	Heavy	Ranking	Weighted Score
Opportunity (O)			
Regional government policy on dairy cattle development	0.13	3.67	0.46
Dairy cattle seed assistance from the government	0.13	3.89	0.51
The need for milk tends to increase	0.13	3.67	0.46
Marketing of dairy cattle production is quite open.	0.13	3.67	0.46
Total opportunity Score			1.88
Threat (T)			
Dairy cows are susceptible to disease	0.13	3.89	0.51
Feed availability in certain seasons is very low	0.14	4.00	0.54
Limited access to financing	0.10	3.00	0.31
Dairy cattle are very sensitive to climate changes.	0.13	3.67	0.46
Total Threat Score			1.82
Total Weighted Score			3.70

The EFE matrix analysis also shows that dairy farms in East Kolaka Regency are able to respond strongly to existing opportunities and respond weakly to incoming threats. This is indicated by a higher total opportunity score (1.88) compared to the total threat score (1.82). The total weighted score obtained in the EFE matrix analysis shows a score of 3.70. which is in the range of 3.00-4.00. which indicates that dairy farms in East Kolaka Regency are able to respond strongly to existing opportunities and threats.

IE Matrix

The IE matrix analysis shows that dairy cattle businesses in East Kolaka Regency are in quadrant I. which represents the growth and development phase (Figure 1). In this phase. dairy cattle businesses in East Kolaka Regency rely more on external factors than internal factors. The IE matrix analysis provides a general overview of the strategies that dairy cattle businesses in East Kolaka Regency will implement in developing their businesses. However. the strategies generated by the IE matrix do not provide a specific overview that reflects the appropriate factors for dairy cattle businesses in East Kolaka Regency. Therefore. a SWOT matrix analysis was added at the matching stage to formulate alternative development strategies that are more specific to the conditions of dairy cattle farming businesses in East Kolaka Regency.

SWOT Matrix

The results of the SWOT matrix analysis on dairy cattle farming businesses in East Kolaka Regency can be seen in Figure 2. The results of the SWOT matrix analysis (Figure 2) produce the following alternative strategy formulation for developing dairy cattle farming businesses in East Kolaka Regency.

SO (Strength–Opportunity) Strategy is Based on Strengths and Opportunities

SO strategy is a strategy that utilizes internal strengths to take advantage of external opportunities for a business. Analysis of the dairy cattle business environment in East Kolaka Regency shows that internal strengths are strong enough to be fully utilized to seize significant external opportunities. SO strategies resulting from the SWOT matrix analysis for dairy cattle business development in East Kolaka Regency include: Optimizing LEISA-based land to increase business scale. increasing farmer capacity and strengthening group institutions as well as developing farmer partnerships with the government and private sector to increase production scale. milk availability and marketing of production results.

According to Asminaya et al. (2025a), one form of land use optimization in East Kolaka Regency that can be implemented is the implementation of the LEISA pattern in dairy cattle farming. Dairy cattle in East Kolaka Regency can obtain feed sources by planting odot grass around the pen and utilizing livestock manure as organic fertilizer for livestock forage. Basri (2018) stated that land optimization activities are efforts to increase the utilization of agricultural land resources for livestock businesses. Land optimization can be done through efforts to improve and increase the carrying capacity of the land. so that it can be more productive for livestock farming. Bahari et al. (2023) stated that

increasing the capacity and scale of dairy cattle production can be achieved by increasing the number of cattle. The use of superior seeds, good feed management, and improving milk quality. Ulfa et al. (2020) stated that efforts that need to be developed in fostering and strengthening livestock farmer groups include strengthening the economic institutions of rural farmers. According to Amam & Rusdiana (2022), livestock institutions for dairy farmers can serve as a forum for creative and innovative farmer organizations. Therefore, strategies to strengthen institutions and farmer business groups are important. Sehabudin et al. (2023) stated that collaboration with livestock companies through partnerships is one way to address the problems faced by livestock farmers.

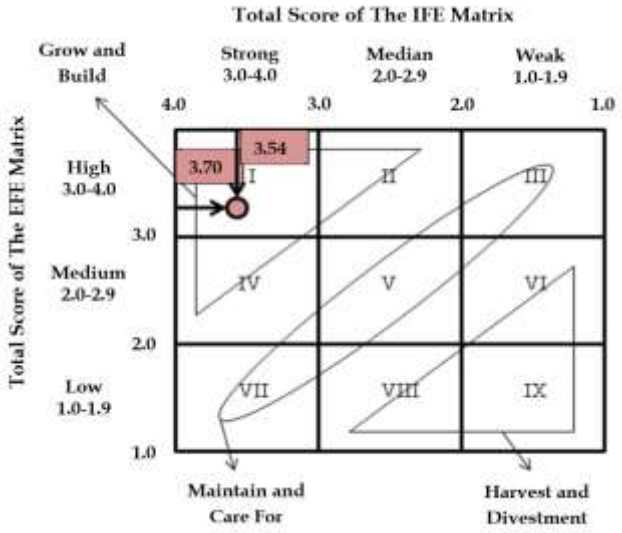

Figure 1. IE matrix analysis of dairy cattle farming business in East Kolaka Regency

WO (Weaknesses–Opportunities) Strategy Based on Weaknesses and Opportunities

The analysis results indicate that existing internal weaknesses can be addressed by exploiting desired external opportunities. The WO strategies resulting from the SWOT matrix analysis for dairy cattle business development in East Kolaka Regency include: providing business capital for farmers; training and technical guidance; optimizing the maintenance system by implementing appropriate LEISA-based technology; and building partnerships for knowledge and technology transfer.

Providing business capital for dairy farmers in Koltim Regency can be done by utilizing government assistance. Yusup et al. (2022) stated that access to seed assistance programs and government support can help farmers overcome capital constraints, allowing them to continue to develop their businesses gradually. According to Ulfa et al. (2020), training and extension services on livestock technology can improve farmers' skills in managing their livestock businesses, making them more efficient. Training and extension activities can increase farmers' knowledge of various aspects of livestock farming, such as feed management, animal health, and marketing. and provide motivation in livestock farming (Yusup et al., 2022; Suherman et al., 2021). Training activities can encourage farmers to modernize their livestock systems and make it easier for them to access government incentives, which in turn increases the competitiveness and productivity of livestock businesses (Ulfa et al., 2020; Sehabudin et al., 2023).

Optimizing livestock systems by implementing appropriate technology based on LEISA can be implemented in Koltim Regency, especially for the provision of sustainable green fodder (Asminaya et al., 2025a). The LEISA scheme aims to reduce dependence on expensive commercial feed inputs while maintaining the environmental and economic sustainability of livestock farming. Local feeds such as elephant grass, legumes, and rice straw available around the farm can be utilized efficiently, either as fresh green fodder or through processing such as fermentation or ammoniation to increase their nutritional content (Asminaya et al., 2018). Utilization of rice straw through fermentation and ammoniation can improve feed quality by increasing protein content and reducing lignin and silica so that it is easier for livestock to digest (Sarnklong et al., 2010). The application of LEISA optimizes local potential by utilizing organic waste, such as the use of organic waste for making compost, bokashi, and biochar. LEISA integrates local wisdom, science, and technological innovation to realize a sustainable agricultural system (Setiyo et al., 2023) while maintaining effectiveness and efficiency (Setiyo et al., 2017). LEISA can reduce dependence on the use of chemical fertilizers and pesticides while maintaining ecosystem balance and biodiversity (Ulma et al., 2023). LEISA contributes to improving the physical and biological properties of the soil, reducing soil erosion and improving soil health (Setiyo et al., 2017). LEISA has the potential to increase production yields and farmer incomes, while encouraging changes in farmer behavior in a more positive direction (Tangkesalu et al., 2021; Tiwari et al., 2022). The quality of the agricultural products produced is also healthier compared to before implementing this system (Setiyo et al., 2023). Farmers can support the sustainability of their livestock businesses by selecting and managing appropriate local feed in accordance with the main objective of LEISA implementation, which is to increase productivity by utilizing local resources optimally and environmentally friendly (Asminaya et al., 2018). Thus, through the implementation of LEISA, farmers can increase

productivity without sacrificing sustainability and environmental well-being.

IFE / EFE	**Strength (S)** Availability of sufficient land Farmers' motivation is relatively high; Local labor available The breeder is still in his productive age	**Weakness (W)** Limited business capital Farmers' knowledge is still limited The application of technology is still low The livestock maintenance system is still simple
Opportunity (O) The existence of regional government policies in the development of dairy cattle There is assistance in the form of dairy cattle seeds from the government The demand for milk tends to increase. The marketing of dairy cattle production is quite open.	**SO Strategy** LEISA-based land optimization (S1) for business scale-up (O1. O2) Increasing the capacity of livestock farmers (S2) to increase production scale. meet milk availability and marketing of production results (O2. O3. O4) Strengthening livestock institutions and business groups (S3. S4) to increase production scale. meet milk availability and marketing of production results (O2. O3. O4) Development of partnerships between livestock farmers and the government and private sector (S2. S3. S4) to increase production scale. meet milk availability and market production results (O2. O3. O4)	**WO Strategy** Provision of business capital for livestock breeders (W1) by utilizing local government policies and seed assistance from the government (O1. O2) Training and technical guidance on LEISA-based livestock technology (W2. W3. W4) to increase livestock productivity. business efficiency. milk availability and production marketing (O3.O4) Optimization of maintenance systems and implementation of appropriate technology based on LEISA (W3. W4) by utilizing government incentives (O1. O2) Partnerships for knowledge transfer and technology application (W2. W3. W4) to increase livestock productivity and strengthen the marketing of production results (O3. O4)
Threat (T) Dairy cows are susceptible to disease Feed availability in certain seasons is very low Limited access to financing Dairy cattle are very sensitive to climate/weather changes.	**ST Strategy** Utilizing extensive land with the LEISA principle (S1) to provide independent feed and overcome climate change/famine seasons (T2) Utilizing the motivation of livestock farmers (S2) in providing and processing feed in certain seasons (T2) Utilizing local labor and productive-age livestock breeders (S3. S4) to increase efficiency. prevent disease and cope with weather/ climate changes with proper maintenance management (T1. T4) Empowering young and productive farmers (S4) to obtain alternative sources of funding (T 3)	**WT Strategy** Improving the capacity of livestock farmers (W2) in mitigating the risks of disease and weather changes (T1. T4) Development of a local livestock feed system based on the LEISA principle (T2) so that livestock farmers' knowledge of livestock maintenance systems increases (W2. W4) Introduction of simple and inexpensive technology in accordance with LEISA principles through training and technical guidance for the continuous and sustainable provision of animal feed (T2) so that the knowledge of farmers and the application of technology in livestock maintenance systems increases (W2. W3. W4) Provision of assistance and access to alternative financing programs for livestock farmers (T3) so that business capital is available for the development of sustainable livestock businesses (W1)

Figure 2. SWOT matrix analysis of dairy cattle farming business in East Kolaka Regency.

Partnerships with various parties, including the private sector and government, are essential to strengthen marketing and knowledge transfer, which in turn can improve the sustainability of dairy cattle farming (Shobirin et al., 2023). Furthermore, modernizing the husbandry system with government incentives can increase farm competitiveness and productivity (Bahari et al., 2023). In East Kolaka Regency, dairy cattle development still faces various challenges, particularly in business management and technology transfer, necessitating partnerships with various parties. Partnerships can be established with cooperatives, private institutions, or Village-Owned Enterprises. Partnerships can also help overcome limitations in business management and marketing. Thus, these strategic partnerships not only strengthen the position of local farmers but also contribute to national efforts to meet domestic milk needs and reduce dependence on milk imports.

ST (Strengths–Threats) Strategy Based on Strengths and Threats

The analysis results indicate that internal strengths are strong enough to be fully utilized to avoid potential external threats. Strengths–Threats (ST) strategy resulting from the SWOT matrix analysis for dairy farming development in East Kolaka Regency includes: land management for independent feed production, improving livestock health readiness through livestock cadres, utilizing local labor, and empowering young farmers.

Utilizing extensive land for growing green fodder can be done in Koltim Regency to ensure year-round availability of feed. Forage planting can be carried out using a three-strata system (STS) with plant vegetation arrangements including: low strata (grass), middle strata (shrub/bush legumes), and high strata (forage trees). This STS pattern allows for a sustainable supply of forage while improving soil fertility and maintaining land sustainability. Utamy et al. (2020) stated that a mixed grass-legume planting system can increase the productivity and quality of forage compared to monoculture. According to Santoso & Indra (2020), the integration of shrub legumes or forage trees in the middle and high strata can increase organic matter from decomposed leaves and roots, improve soil structure, increase fertility, and prevent erosion. In addition, STS can also provide green fodder throughout the year (dry season and rainy season (Oka et al., 2019) and support the sustainability of agro-ecosystems through the integration of animal feed with food crops (Oware et al., 2023), improving soil quality and conservation (Hasan et al., 2005) and increasing livestock holding capacity (Biyatmoko, 2015).

Improving livestock health preparedness through livestock cadres is a crucial strategy for improving livestock quality and productivity. According to Kenny et al. (2019), trained livestock cadres can act as agents of change at the local level, educating other farmers about the importance of maintaining livestock health, detecting diseases early, and providing appropriate care. Livestock health cadre training programs have been shown to improve farmers' skills in detecting diseases and expediting their treatment, ultimately improving the health and productivity of their livestock. Lund & Seifert (2020) added that the productive age and high motivation of farmers can be the basis for establishing livestock health cadres in each livestock group. Community-based livestock health cadre training has a positive impact on the sustainability of livestock systems and disease control. Thomson & McLeod (2021) stated that these health cadres can be specifically trained to detect and address livestock disease threats early and ensure the availability of timely treatment.

The presence of a local workforce will be a strength in the development of dairy farming in East Kolaka Regency. Local workers have a good understanding of local conditions, enabling them to raise dairy cattle according to local environmental conditions. thus ensuring the sustainability of dairy farming businesses. According to Nurcahyo & Hariyanto (2018), improving the welfare and productivity of local workers, along with government support, can strengthen the sustainability of dairy farming. Suherman et al. (2021) stated that the greater the number of cattle owned, the greater the labor absorption, thus requiring better management.

The presence of a local workforce contributes significantly to the sustainability of the dairy farming sector. Local workers have a better understanding of environmental conditions, feed resources, diseases, and the local climate, as well as livestock practices that are appropriate to the region's characteristics (Shantharaju et al., 2024). The involvement of local workers, farmers, and end users in the livestock industry can strengthen the adoption process of appropriate technology, while supporting sustainable resource management through knowledge exchange and technology adaptation according to field needs (Ramírez-Gómez et al., 2025). Membership and participation of dairy farmers in cooperatives can improve the welfare of farmers through household income, net returns and profits from fresh milk products (Toiba et al., 2024).

Productive-age farmers represent significant potential for developing dairy cattle farming in East Kolaka Regency. This young age offers advantages in terms of labor, adaptability to new technologies, and incentives to increase production capacity. Productive-age farmers can be encouraged to access alternative financing options such as cooperatives, agribusiness fintech, or CSR programs to reduce dependence on conventional financing. According to Mentayani & Rusmanto (2016), CSR programs are a non-conventional financing alternative. Kharis & Mutrofin (2019) state that CSR programs can be accessed by livestock farmers through partnerships between companies and groups. The use of financial technology can provide ease of access, practicality, convenience, cost efficiency, and help farmers gain access to capital (Rufaidah et al., 2023). Cooperatives can improve access to credit for smallholder farmers (Jiang et al., 2024). The right approach, utilizing technology and alternative financing, can improve the efficiency and sustainability of livestock businesses in certain areas (Kusumawati & Alam, 2021).

WT (Weaknesses–Threats) Strategy Based on Weaknesses and Threats

The WT strategies resulting from the SWOT matrix analysis for the development of dairy cattle farming businesses in East Kolaka Regency include: increasing the capacity of farmers in mitigating disease and weather risks, developing locally based animal feed, providing access assistance, providing alternative financing programs, and introducing simple and inexpensive technology.

Increasing the capacity of livestock farmers through basic training on livestock health management and adaptation to climate/weather change is expected to address farmers' limited knowledge, making them better prepared to face external risks. Said et al. (2024) state that increasing livestock farmer capacity is an effort to enhance the knowledge, skills, and abilities of farmers in carrying out livestock activities, both on a small and large scale.

Local feed for livestock is feed ingredients that can be obtained from local resources and utilized efficiently by livestock, either as basic feed, supplements, or concentrate components. Local feed can be derived from agricultural waste or plantation by-products. The availability of local feed can reduce dependence on external feed. The use of local feed, such as agricultural or plantation waste and tree legumes, can be an alternative feed source during the dry season in East Kolaka Regency. According to Sandiah et al. (2022), rice straw and corn cobs are used as feed for dairy cattle in Konawe Regency, Southeast Sulawesi Province. The efficient use of local feed for dairy cattle can reduce production costs. Yusup et al. (2022) stated that locally sourced feed has been proven to increase dairy cattle productivity. Processing rice straw through fermentation or ammoniation can increase protein content and reduce lignin. making the feed more digestible and more nutritious. However, the quality of local feed often varies depending on the season and processing method, so monitoring and adjusting rations is essential to ensure cows receive all the nutrients they need to produce high-quality milk (Yusup et al., 2022).

Providing alternative financing, such as through cooperatives or fintech, can also improve farmers' access to resources for livestock business development. Limited capital and the difficulty of accessing financing for farmers can be addressed through assistance in developing business proposals and accessing financing from various financial institutions. Ikballudin et al. (2022) stated that intensive assistance in empowering livestock farming communities is crucial for the success of livestock business development.

Low levels of technology can be addressed by introducing affordable and easy-to-operate appropriate technology. The use of appropriate technology is expected to help livestock farmers survive the threat of disease, extreme climates, and limited resources, particularly in providing quality feed, formulating rations, and utilizing local feed such as agricultural and plantation waste, as well as agro-industrial waste. According to Christiyanto & Surahmanto (2017), technology is needed to formulate rations that meet livestock needs and are affordable by optimizing the use of agricultural waste. Yusup et al. (2022) stated that the development of simple and inexpensive technology, such as application or sensor-based livestock health monitoring systems, can help livestock farmers detect diseases more quickly and reduce their impact.

QSPM Matrix

The results of the QSPM analysis of dairy cattle farming businesses in East Kolaka Regency are presented in Table 3.

Table 3. Results of QSPM analysis of dairy cattle farming businesses in East Kolaka Regency

Priority	Strategy	Heavy
1	Increased production capacity and scale	8.00
	Strengthening of livestock institutions and business groups	8.00
2	LEISA-based land optimization for business improvement	7.74
	Land management for LEISA-based feed production	7.74
3	Utilization of government assistance to reduce capital limitations	7.13
	Modernization of maintenance systems with government incentives	7.13
	Development of local animal feed as an implementation of LEISA.	7.13
4	Developing partnerships with the government and the private sector	6.50
	Partnerships for marketing, strengthening, and knowledge transfer	6.50
5	Empowering young farmers in alternative funding innovations	6.00
	Empowering young farmers in alternative funding innovations	6.00
6	Livestock technology training and extension	5.50
	Introduction of simple and inexpensive technology in business systems	5.50
7	Improving livestock health readiness through livestock cadre development	5.24
	Utilization of local labor for weather-adaptive barn management	5.24
	Improving the capacity of livestock farmers to mitigate disease and weather risks	5.24

The QSPM analysis results indicate that two main development strategies should be implemented: first, increasing production capacity and scale, and second,

strengthening institutions and livestock groups. A weighted score of 8.00 indicates that these strategies can be implemented as soon as possible in dairy farming in East Kolaka Regency. These strategies are expected to increase production efficiency, strengthen collective farmer organizations, and encourage business independence. The implementation of subsequent strategies, such as optimization of land management, development of LEISA-based feed systems, and so on, will be carried out in stages according to predetermined priorities, and it is hoped that in the long term. All alternative strategies can be implemented to develop dairy farming businesses in East Kolaka Regency. The implementation of LEISA in dairy farming businesses in East Kolaka Regency can contribute to environmental sustainability and reduce dependence on external inputs due to the optimal utilization of local resources and prioritizing zero waste in its implementation. These efforts can encourage the growth of a modern, resilient, and independent dairy industry in East Kolaka Regency, which is in line with the national goal of achieving milk self-sufficiency and rural economic growth.

Conclusion

Dairy farming businesses in East Kolaka Regency are in a favorable position for growth and development (Quadrant I of the IE matrix). The QSPM matrix identifies increasing production capacity and strengthening farmer institutions as key priority strategies for sustainable development. Implementation of subsequent strategies, such as optimization land management, and development of LEISA-based feed systems can be carried out in stages according to predetermined priorities. Implementing LEISA in dairy farming businesses in East Kolaka Regency can contribute to environmental sustainability and reduce dependence on external inputs due to the optimal utilization of local resources and prioritizing zero waste in its implementation.

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