

Strategy for Development of Cattle Breeding and Reproductive Businesses in the Cikedung People's Livestock Area

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ABSTRACT

Cikedung District, a region with significant livestock potential, has yet to be comprehensively evaluated regarding cattle production and reproductive performance, agricultural waste utilization, cattle population, and rearing pattern diversity (intensive and semi-intensive). This study aims to formulate development strategies for local cattle breeding enterprises in the Cikedung area. Data were collected through observations and analyzed using the SOAR (Strengths, Opportunities, Aspirations, Results) framework and the AHP (Analytical Hierarchy Process). The findings indicate that the development of cattle breeding businesses in Cikedung is influenced by internal factors, including production performance, calf births, and increased availability of green fodder, as well as external factors, such as marketing technology and expanded market access. The priority strategies identified are (1) enhancing sales and marketing, (2) standardizing livestock quality, and (3) strengthening the capacity of livestock farmers to produce higher-quality cattle at competitive prices, thereby increasing farmers income. Key recommendations include adopting group-based livestock management approaches, expanding market access, optimizing the use of livestock resources, and fostering collaborations with government entities and stakeholders to advance cattle breeding initiatives in Cikedung.

Keywords: Cattle Breeding, SOAR, AHP, Intensive, Semi-Intensive

ABSTRACT

Kabupaten Cikedung yang merupakan wilayah dengan potensi peternakan yang cukup besar, belum dikaji secara komprehensif terkait produksi dan performa reproduksi sapi, pemanfaatan limbah pertanian, populasi sapi, dan keragaman pola pemeliharaan (intensif dan semi intensif). Penelitian ini bertujuan untuk merumuskan strategi pengembangan usaha peternakan sapi lokal di kawasan Cikedung. Data dikumpulkan melalui observasi dan dianalisis menggunakan kerangka SOAR (Strengths, Opportunities, Aspirations, Results) dan AHP (Analytical Hierarchy Process). Temuan penelitian menunjukkan bahwa perkembangan usaha peternakan sapi di Cikedung dipengaruhi oleh faktor internal antara lain kinerja produksi, kelahiran anak sapi, dan peningkatan ketersediaan pakan hijauan, serta faktor eksternal seperti teknologi pemasaran dan perluasan akses pasar. Strategi prioritas yang diidentifikasi adalah (1) peningkatan penjualan dan pemasaran, (2) standarisasi kualitas ternak, dan (3) penguatan kapasitas peternak untuk menghasilkan sapi berkualitas tinggi dengan harga bersaing sehingga meningkatkan pendapatan peternak. Rekomendasi yang diberikan antara lain penerapan pengelolaan ternak berbasis kelompok, peningkatan akses pasar, optimalisasi sumber daya ternak, dan membina kerjasama dengan pemerintah dan pemangku kepentingan untuk memajukan usaha peternakan sapi di Cikedung.

Kata kunci: Peternakan Sapi, SOAR, AHP, Intensif, Semi Intensif

INTRODUCTION

Indramayu Regency is a center for cattle farming development in West Java, with a beef cattle population reaching 11,364 in 2020-2021 (BPS 2022). Farmers in this area raise local cattle, such as Peranakan Ongole, and crossbred cattle through artificial insemination technology, such as Limosin crossbred cattle and Simmental crossbred cattle. In terms of quantity, the development of cattle farming has had a positive impact on increasing community income (Fathurohman *et al.* 2018). In 2020-2021, the number of beef cattle in this area reached 1,832 but decreased by 13.7% to 1,580 head in 2021-2022 due to the foot and mouth disease (FMD) outbreak. The cattle population increased again after the government handled foot and mouth disease (FMD), this can be seen from the availability of large mothers and the high birth rate. This condition shows the need for sustainable cattle breeding development to make Cikedung District a center for livestock-based breeding.

Farmers in Cikedung raise Ongole crossbred cattle using a semi-intensive pattern. In contrast, some intensive breeders raise crossbred cattle, such as Simmental Ongole crossbreed (Simpo), Limousin Ongole crossbreed (Limpo), and Brahman crossbreed. Developing local cattle breeding requires effective management, including sustainable use of natural resources and human and animal feed. According to Hajirin (2017), the availability of alternative feed from agricultural waste is one of the determining factors for the success of livestock development in Cikedung. This potential is expected to maintain the stability of the cattle population and increase the region's capacity as a source of community-based breeding. To sustain this, it is necessary to determine the priority of the cattle breeding business strategy as a strategic step to increase farmers' population, competitiveness, and welfare. With the right development strategy, cattle farming in Cikedung can develop sustainably and compete amid prospective market opportunities.

MATERIAL AND METHODS

This research was conducted in February-March 2024 in the community livestock area of Cikedung District, Indramayu Regency, West Java, which was selected purposively because it has the largest cattle population in the area. The material used in this study was 38 livestock farmers consisting of 15 intensive livestock farmers and 23 semi-intensive livestock farmers who had livestock of various ages. The livestock population includes 83 bull calves, 72 heifer calves, 57 weaned bull calves, 48 weaned heifer calves, 21 yearlings, 97 heifers, 37 male cattle, and 274 female cattle. Using questionnaires, primary data were obtained through observation and interviews with intensive and semi-intensive livestock groups, experts, and related parties. Secondary data came from service reports, BPS, and other supporting literature. This study uses SOAR analysis (Strengths) (Opportunities), (Aspirations) (Results). The stages carried out are:

- a. Make a list of essential factors on internal factors (strengths and aspirations) and external factors (opportunities and results)
- b. Each factor must to determine its weight value by giving a scale of 0.0 (insignificant) to 1.0 (most important). Total weight value equal to 1.0. The weight of each variable is obtained by determining the value of each variable against the total value using the formula:

$$a_i = \frac{X_i}{\sum_{i=1}^n X_i}$$

Description:

a_i = Weight of the i -th variable

X_i = Value of the i -th variable

n = Number of Data

i = 1, 2, 3, ... n

- c. Next, give a rating to each factor by giving a scale starting from 4 (very good), 3 (good), 2 (not good), to 1 (very bad).
- d. The weight of each factor is multiplied by the rating that has been given to determine its weighted value.
- e. Add up the weighted values to get the total weighted value of the group.

Table 1. Calculation of IFE or EFE matrix

No	IFAS/ EFE Internal Factors	Weight	Rating	Score
1				
2				
Total				

At the analysis stage, the adjustment is made using the IE matrix by entering the results of the IFE and EFE weightings into the IE matrix. The following are the Priority Strategies for Developing Cattle Farming in Cikedung District, AHP data analysis.

- a. Create a Hierarchy

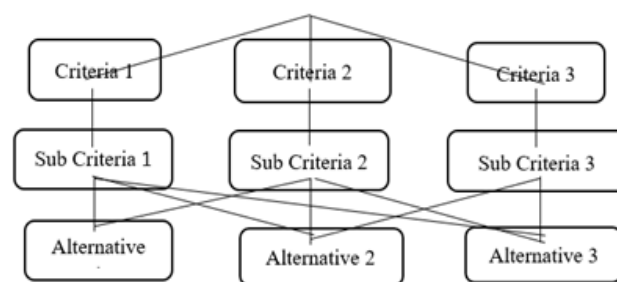


Figure 2. Hierarchical structure of cattle breeding business development strategy in the community livestock area of Cikedung District
 Data source: Processed data (2024)

- b. Assess criteria and alternatives

The assessment principle is the basis for applying the AHP method, which contains the preference for several alternatives for the criteria. The preference scale 1 indicates

from the lowest level to the highest level 9 on the scale. The pairwise comparison scale is shown in Table 2.

Table 2. Analytic Hierarchy Process (AHP) Preference Scale

Intensity of Importance	Definition
1	Both elements are equally important.
3	One element is slightly more important than the other.
5	One element is more important than the other elements.
7	One element is clearly more important than the other.
9	One element is absolutely more important than the other elements.
2,4,6,8	Intermediate values between two adjacent considerations.

c. Prepare the matrix and check its consistency

A pairwise matrix to normalize the weight of the level of importance of each item in the hierarchy is done using the Microsoft Excel program by calculating the Consistency Index (CI) and Consistency Ratio (CR). Furthermore, checking consistency by looking at the value If $CR \leq 0.1$, it is stated to be consistent.

RESULTS AND DISCUSSION

Characteristics of cattle breeders in Cikeding sub-district

The characteristics of farmers are also closely related to their level of ability to manage their business. The following attributes of farmers are presented in Table 3. The study results showed that 84.21% of cattle breeders in Cikeding District were aged 15-65 years, with 15.79% over 65 years. Based on BPS and WHO standards, the productive

age is 15-64. Breeders of productive age are considered to be able to work better, enthusiastic, and motivated (Fadli *et al.* 2020). The education level of breeders consists of no school (26.31%), elementary school (26.31%), junior high school (10.52%), high school (13.15%), and diploma/bachelor's degree (23.68%). Higher education supports breeders to manage their livestock productively and innovatively (Makatita 2021). Livestock farming experience in the Cikeding community livestock area varies. Namely, 47.36% of breeders have 5-10 years of experience, 26.31% have 11-15 years of experience, and 26.31% have >15 years of experience. Long experience improves the ability of farmers to make decisions related to production and reproduction (Haloho and Saragih 2021). The scale of cattle breeding businesses varies, with >20 heads (34.21%), 10-20 heads (28.95%), 5-10 heads (26.32%), and <5 heads (10.52%). A more significant number of livestock tends to encourage increased production; according to Victoria *et al.* (2024), more livestock generates more significant income.

Identification of Internal Factors of Intensive and Semi-Intensive Maintenance Patterns

1. Availability of parent

The availability of mother cows in the Cikeding community livestock area increased in 2023-2024, along with population growth. According to Utomo *et al.* (2021), productivity can be increased by optimizing the reproductive performance of mother cows. The following are the population and mother cows of intensive and semi-intensive maintenance patterns in Cikeding District 2020-2024.

2. Reproductive performance

The reproductive performance of semi-intensive and intensive cattle in the Cikeding District is ideal, resulting in high birth rates. Reproductive performance assessment is done by knowing the number of births, birth

Table 3. Characteristics of cattle breeders in the Cikeding Sub-District

Parameter	Description	Number of farmers	Average	Percentage (%)
Age	<15 Years	-	-	-
	15-65 Years	32	49.96±10.38	84.21
	>65 Years	6	73.3±3.61	15.79
Level of education	No School	10	-	26.31
	Elementary School	10	-	26.31
	Junior High School	4	-	10.52
	High School	5	-	13.15
	Diploma/Bachelor	9	-	23.68
Livestock Experience	<5 Years	-	-	-
	5-10 Years	18	7.05±2.12	47.36
	11-15 Years	10	12.80±1.03	26.31
	>15 Years	10	21.10±4.55	26.31
Business Scale	< 5 Head	4	3.50±1.00	10.52
	5-10 Head	10	6.50±1.26	26.32
	10-20 Head	11	17.09±2.91	28.95
	>20 Head	13	33.00±31.00	34.21

Description: - Mean ± Standard deviation

Table 4. Number of population and parent cattle in intensive and semi-intensive patterns in 2020-2024

No	Year	Number of cattle population (heads)		Number of breeding cows	
		Intensif	Semi Intensif	Intensif	Semi Intensif
1	2020	86	582	34	258
2	2021	88	611	36	249
3	2022	84	523	32	204
4	2023	93	579	37	230
5	2024	96	594	36	238

Source: Processed data (2024)

spacing, age at first mating, and age at first calving (Sutiyono *et al.* 2017).

3. Livestock farming experience

Based on research, the percentage of farmers with 11-15 years of experience reached 47.36% with an average of 12.80±1.03 years. Livestock experience is important in improving the ability to manage livestock businesses. Haloho and Saragih (2021) stated that the longer the experience, the easier it is for farmers to make decisions related to development to support business growth.

4. The scale of livestock ownership

Cattle farming in Cikedung District has a scale of ownership of semi-intensive cattle maintenance patterns >20 heads, while the intensive pattern averages 5-10 heads. This difference is caused by the objectives, maintenance patterns, and maintenance management, according to Makatita (2021), who stated that the more cattle owned, the greater the income received.

5. Birth of calf

The percentage of calf births in the intensive pattern reached 72.50%, while the semi-intensive pattern was 64.41%. This high birth rate contributed to the increase in livestock population, especially in the semi-intensive system. High birth rates allow farmers to develop their businesses because population increases can be achieved by minimizing livestock mortality and loss.

6. Low operating costs

Cattle farming in Cikedung District has low operational cost efficiency when running a business, especially in a semi-intensive maintenance system. Low operational costs are caused by cattle farmers utilizing green fodder from surrounding pastures and agricultural waste as a source of livestock nutrition.

7. Quality cattle breeding center

Farmers expect the community livestock area in Cikedung District to develop into a center for cattle breeding and cultivation with better maintenance management (traditional-modern). This effort is supported by the government, IPB University, local entrepreneurs, and other related parties. Farmers make efforts, namely, using artificial insemination (AI), to improve the genetic quality of livestock and produce superior seeds.

8. Increasing livestock productivity

The productivity of cattle in the Cikedung District includes increasing calf birth rates, optimal body weight growth, and feed efficiency. According to the FAO Report (2023), access to feed is the main factor affecting

livestock productivity, so it is necessary to diversify feed sources and train farmers in feed management. Increasing livestock productivity is the main force that increases the competitiveness of Cikedung livestock products, both in local and national markets.

9. Increasing the land source of green fodder

The availability of green land for cattle feed in the Cikedung area is complex, and the ease of providing feed can affect the sustainability of livestock businesses. For this reason, several strategic efforts are made, namely improving land quality by providing fertilizer and planting superior green fodder such as odot grass (*Pennisetum purpureum cv Mott*) (Anggraini and Yulianto 2023). Rotating grazing into several blocks with scheduled rotations provides recovery time for the green fodder so that growth remains optimal.

10. Increasing livestock farmers' knowledge

Cattle breeders in the Cikedung District can manage livestock breeding. This is supported by the profile of breeders, most of whom work as civil servants or retired (31.57%), with a dominant education level of diploma or bachelor's degree (23.68%) with 10-20 years of livestock experience. According to Alam *et al.* (2023), more experienced breeders tend to have better business management skills.

11. Sustainability of livestock breeding efforts

Based on the results of the interview, the sustainability of cattle breeding and breeding efforts in the Cikedung sub-district can be achieved by utilizing the land around the pens to plant green fodder or herbal plants that are used to help livestock infected with diseases, managing waste into fertilizer that can be reused, utilizing agricultural waste around to be used as animal feed.

Identification of External Factors of Intensive and Semi-Intensive Maintenance Patterns

1. Pro-farmer policies

The Indonesian government has implemented various policies to provide protection and support to ensure the sustainability of cattle breeding and breeding efforts in various regions. In line with the central government's policy, the local government also contributes through regulations determining breeding areas in Cikedung, as stated in the Indramayu Regency Regional Regulation Number 8 of 2014. One effective policy is the Special Effort for Mandatory Pregnant Cattle (UPSUS SIWAB) program, as stated in the Regulation of the Minister of Agriculture Number 48/Permentan/PK.210/10/2016. This program

Table 5. Comparison matrix of internal and external factors of intensive and semi-intensive patterns

No	Internal Factors	Maintenance pattern					
		Intensive			Semi-Intensive		
		Weight	Rating	Score	Weight	Rating	Score
1	Availability of livestock	0.13	4	0.5	0.13	4	0.51
2	Reproductive performance	0.1	3	0.3	0.1	4	0.41
3	Livestock experience	0.13	4	0.5	0.13	4	0.51
4	Scale of livestock ownership	0.1	3	0.3	0.13	3	0.38
5	Calf births	0.13	4	0.5	0.1	3	0.31
6	Low operational costs	0.1	3	0.3	0.13	3	0.38
7	Quality cattle breeding centers	0.1	3	0.3	0.1	3	0.31
8	Increase in green fodder source land	0.1	3	0.3	0.13	4	0.51
9	Increase in livestock productivity	0.13	3	0.38	0.1	3	0.38
10	Increase in livestock farmer knowledge	0.1	3	0.3	0.1	3	0.31
11	Sustainability of livestock breeding efforts	0.1	3	0.3	0.1	3	0.31
Total		1		3.38	1		3.36

No	External Factors	Maintenance pattern					
		Intensive			Semi-Intensive		
		Weight	Rating	Score	Weight	Rating	Score
1	Pro-breeder policies	0.14	4	0.54	0.13	4	0.54
2	Collaboration between educational institutions and government	0.14	3	0.39	0.13	3	0.38
3	Availability of agricultural waste	0.11	3	0.32	0.1	3	0.32
4	Marketing technology	0.14	4	0.54	0.13	3	0.38
5	Strengthening sustainable breeding systems	0.11	4	0.48	0.13	4	0.51
6	Improvement of population and productivity	0.14	4	0.54	0.13	4	0.51
7	Enhancement of breeders welfare	0.14	4	0.54	0.13	4	0.51
8	Improvement of market access	0.11	4	0.43	0.13	4	0.51
Total		1		3.76	1		3.64

aims to increase the livestock population through artificial mating.

2. Cooperation between educational institutions and government

Cooperation between cattle breeders and educational institutions, such as focusing on research and innovation while cooperating with the government as a policy driver and facilitator. Regulation of the Minister of Agriculture of the Republic of Indonesia Number 13 of 2017 states that livestock business partnerships are cooperation between livestock businesses based on the principle of mutual need, strengthening, and benefit so that it can increase income (Yaqin *et al.* 2021).

3. Availability of agricultural waste

The Cikedung area has extensive agricultural land, resulting in large agricultural production. This condition is in line with the potential for agricultural waste that can be used as alternative feed for livestock. The availability of agricultural waste in Cikedung, such as rice straw, sugar cane leaves, and bran, can be used as alternative feed through the fermentation feed manufacturing process. Fermentation technology can increase nutritional value and reduce crude fiber in agricultural waste and industrial waste (Eoh 2022).

4. Marketing technology

Some farmers have used social media technology such as WhatsApp, Facebook, and other platforms for effective livestock marketing without increasing operational costs. The development of technology has changed various aspects of human life, including the marketing of livestock products, which has now shifted from conventional marketing (offline) to online marketing (Susanto 2020).

5. Strengthening sustainable breeding systems

Strengthening the sustainable breeding system in cattle farming areas can be achieved through various methods, such as selecting superior seeds with a fast growth rate, disease resistance, and good feed conversion efficiency. Furthermore, reproductive management is carried out to regulate the livestock mating cycle, shorten the birth interval, and apply artificial mating.

6. Increase in population and productivity

Farmers in the Cikedung area hope to increase productivity and livestock population, which is important in maintaining the population structure in livestock breeding areas. This increase can be achieved through various strategies, including understanding the benefits of artificial insemination to accelerate the improvement of livestock

Tabel 6. Matriks SOAR (Strengths, Opportunities, Aspirations, Results)

	Strengths	Aspirations
		1. Parent availability 2. Reproductive performance 3. Breeding experience 4. Scale of livestock ownership 5. Low operational costs
Opportunities	Strategi SO	Strategi AO
1. Pro-breeder policies 2. Availability of waste 3. Availability of agricultural waste 4. Availability of artificial mating technology 5. Availability of waste 6. Collaboration with educational institutions and the government	1. Optimizing reproductive performance with artificial mating technology to increase population (business development strategy) 2. Management of livestock breeding and breeding businesses with low operational costs (business development strategy) 3. Standardization of livestock quality (Business strategy)	1. Increase farmer resources through training programs with government agencies and higher education (Business strategy) 2. Replacing sources of forage from grazing land by utilizing agricultural waste (business development strategy) 3. Increasing the value of livestock waste (business development strategy)
Results	Strategi SR	Strategi AR
1. Strengthening sustainable breeding systems based on local wisdom 2. Increase in cattle population and productivity 3. Increasing the welfare of breeders 4. Increased market access	1. Increase business scale by increasing livestock sales and marketing (Business strategy)	1. Building a quality cattle breeding center for the sustainability of cattle farming businesses in the region

genetic quality and selecting quality cows to ensure the next generation.

7. Improving the welfare of livestock breeders

Improving the welfare of livestock farmers is the main objective of developing the livestock sector in the Cikedung area. The welfare of livestock farmers can be measured by increasing income and the number of livestock owned, according to the statement of Indrayani and Andri (2022). The more livestock owned, the higher the potential income.

8. Increased market access

Farmers want to increase access to livestock sales through broader markets to increase income. Market access is increased because the quality and population of cattle are improved. What needs to be done is to collaborate with the government, private sector, and non-private sector through mentoring to help cattle farmers increase competitiveness and maintain the sustainability of their businesses (Wulandari 2020).

Internal-External Factors of Intensive and Semi-Intensive Maintenance Patterns

Identification of internal and external factor matrices for cattle development efforts in the Cikedung community livestock area in Table 5. Table 5 shows that internal

factors have differences in intensive and semi-intensive maintenance patterns in operational costs, increasing green fodder resource land, and cattle reproductive performance. In contrast, external factors show differences in increasing market access and marketing technology.

Calculation Results of the Analytic Hierarchy Process Method

The Analytic Hierarchy Process analysis results show that of the four business developments that will be implemented, three business strategies have been created from each aspect, resulting in the analysis results in Table 7. Based on the results of the strategy analysis obtained from the IFAS and EFAS analysis, which was then continued with the AHP analysis, the recommended business strategy for the intensive breeder group is a breeding business that has a priority strategy value, namely increasing sales and marketing with a strategy priority value of 1.173, increasing the capacity of breeders 0.175, and an increase in sales and marketing of 0.173. Meanwhile, the recommended business development for the semi-intensive breeder group is a breeding business with a strategic priority value, namely increasing sales and marketing with a value of 0.078, standardizing livestock quality at 0.367, and strengthening the capacity of breeders with 0.177.

Table 7. Results of Analytical Hierarchy Process Analysis

Maintenance pattern	Business Priorities	Strengthening the capacity of livestock farmers	Livestock quality standardization	Increased sales and marketing	Inconsistency Ratio	Priority
Intensif	Breeding	0.175	0.361	1.173	0.091	1
	livestock waste	0.026	0.065	0.157	0.037	2
	Seedstock	0.013	0.031	0.078	0.028	3
	Agricultural waste	0.005	0.015	0.025	0.011	4
Semi Intensif	Seedstock	0.177	0.367	1.190	0.069	1
	Breeding	0.026	0.065	0.157	0.024	2
	livestock waste	0.016	0.004	0.078	0.029	3
	Agricultural waste	0.005	0.014	0.024	0.014	4

CONCLUSION

The strategy for developing a breeding business in the Cikedung sub-district livestock area is influenced by two main factors, namely external and internal factors. Internal factors influencing breeding efforts are production performance, calf births, and increasing the source of green fodder land. In contrast, external factors are influenced by marketing technology and increasing the market for maintenance patterns. The priority strategies to cover the development of breeding efforts in the Cikedung sub-district livestock area are (1) increasing sales and marketing, (2) standardizing livestock quality, (3) strengthening the capacity of livestock farmers to achieve livestock with better quality and competitive prices and to increase livestock farmers' income.

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