

Development Strategy of Beef Cattle Based on Environment and Potential Resources

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Abstract. The purpose of developing beef cattle farming is to increase the population and productivity of cattle products followed by increasing farmers' income, creating jobs and improving the genetic quality of beef cattle. The problem is that beef cattle farms in North Sulawesi are carried out in traditional management instead of eco-friendly; they are mostly developed by grazing on agricultural land. This study aims to identify the potential strategies to support the development of eco-friendly beef cattle farms. This study used a survey to analyze the role, opportunities and challenges of beef cattle farms in North Bolaang Mongondow Regency. The locations were purposively sampled to include the central area for government-initiative beef cattle development i.e. Sangkub, Bintauna and East Bolangitan districts. The data were subject to internal and external analysis using IFAS matrix, EFAS matrix and SWOT analysis. The results showed that the actual beef cattle population could be increased to 1.37 times. Development is carried out with an orientation to environment and sustainability using LEISA concept. The development of beef cattle was in a condition dominated by strength (the strength value of 1.882 or 76.59%). Opportunities are more quickly responded in the face of the threat of beef cattle development (the opportunity value of 1.842 or 68.09%). In conclusion, the development of beef cattle has a role in increasing the income of farmers and has market opportunities and the challenges can be minimized by increasing the productivity and quality of beef cattle that are environmentally oriented. Technology introduction is needed for the development of sustainable beef cattle farms.

Key words: beef cattle, development, strategy, environment

Abstrak. Tujuan pembangunan peternakan sapi potong adalah meningkatkan populasi dan produktivitas hasil ternak yang diikuti dengan meningkatnya pendapatan petani peternak, menciptakan lapangan pekerjaan serta meningkatkan mutu genetik ternak sapi potong. Permasalahannya peternakan sapi potong di Sulawesi Utara masih dilakukan secara tradisional dan belum berwawasan lingkungan. Sapi potong dikembangkan oleh sebagian besar petani peternak dengan cara digembalakan di lahan pertanian. Berdasarkan permasalahan tersebut maka perlu dilakukan penelitian untuk mengetahui strategi yang dapat dikembangkan dalam menunjang pengembangan peternakan sapi potong yang berwawasan lingkungan. Tujuan penelitian ini adalah untuk menganalisis peranan, peluang dan tantangan peternakan sapi potong di Kabupaten Bolaang Mongondow Utara. Penelitian ini dilakukan di Kabupaten Bolaang Mongondow Utara dengan menggunakan metode survei. Lokasi penelitian ditentukan secara purposif sampling yaitu kecamatan Sangkub, Bintauna dan Bolangitan Timur yang dijadikan wilayah pusat pengembangan sapi potong oleh pemerintah. Analisis data yang digunakan adalah analisis internal dan eksternal dengan menggunakan matriks IFAS (Intenal Factor Analysis Summary) dan matriks EFAS (External Factor Analysis Summary) serta analisis SWOT. Hasil penelitian prospek pengembangan peternakan sapi potong dianalisis berdasarkan potensi lahan yang menunjukkan populasi riil dapat ditingkatkan sampai 1,37 kali. Pengembangan peternakan sapi potong dilakukan dengan berwawasan lingkungan melalui pengembangan dengan konsep LEISA (Low External Input Sustainability Agriculture). Kesimpulan, pengembangan sapi potong berada pada kondisi yang didominasi oleh kekuatan yang ditunjukkan dengan nilai kekuatan 1,882 (76,59%). Peluang lebih cepat direspon dalam menghadapi ancaman pengembangan sapi potong, yang ditunjukkan dengan nilai peluang sebesar 1,842 (68,09%). Pengembangan sapi potong memiliki peranan dalam peningkatan pendapatan petani peternak dan memiliki peluang pasar, serta tantangannya dapat diminimalisir dengan cara meningkatkan produktivitas dan mutu ternak yang berwawasan lingkungan.

Kata kunci: sapi potong, pengembangan, strategi, lingkungan

Introduction

Livestock subsector as an integral part of agricultural sector plays an important role in supplying meat as a source of animal protein. It shows that the growth of livestock subsector is crucial to achieve food sovereignty. The development of livestock depends partly on the development of beef cattle commodities (Happyana, 2017; Purnomo et al., 2017).

Beef cattle is a business component that supports livestock development. The purpose of developing beef cattle farming is to increase the population and productivity of livestock products followed by increasing the farmers' income, creating jobs and improving the genetic quality of beef cattle. The development of cattle farms needs to be encouraged to anticipate the tendency of cattle and beef imports. National beef production only fulfilled 50% of national beef demand; therefore, it is predicted that Indonesia still needs to import around 35% beef. (Sahala et al., 2016; Directorate General of Animal Husbandry and Health, 2018).

The problem is that beef cattle farms in North Sulawesi are still carried out in a traditional management instead of eco-friendly. Beef cattle are developed by most farmers by grazing on agricultural land. In addition, the development of beef cattle farming is passed on from the ancestors to generations. It is indicated by the conventional knowledge of managing managing beef cattle (Muis, 2015). Also, it implies that beef cattle business has not been developed according to recommendation. Farmers' experience in developing business-oriented beef cattle is very low; a household cattle farming has 1 to 3 cattle and develop it traditionally.

Based on these problems, the research was conducted to develop strategies to support the development of eco-friendly beef cattle farms. This study analyzed the role, opportunities and

challenges of beef cattle farms in North Bolaang Mongondow Regency.

Materials and Methods

The material of this research was cattle population, land resources and human resources. Cattle population referred to the tendency to increase the beef cattle ownership. Land resources represented the carrying capacity index as the potential availability of feed resources with an increase in cattle population. Human resources were the livestock development actors including farmers, government and traders. This research was conducted in the North Bolaang Mongondow Regency using a survey method. The primary data were collected using a questionnaire. The research location was determined by purposive sampling, namely the districts of Sangkub, Bintauna and East Bolangitan as the central area for the government-initiated beef cattle development. The measured variables were carrying capacity index, and the internal and external factors of developing beef cattle farms. The carrying capacity index was the maximum potential of land resources that can be used to develop forage. Internal factors were related to opportunities and threats, while the external factors were to strengths and weaknesses in developing beef cattle farms. The data were subject to internal and external analysis using IFAS (internal factor analysis summary) matrix and EFAS (External Factor Analysis Summary) matrix, and SWOT analysis.

Results and Discussion

The beef cattle farming in the research area is prospective in the long run. The cattle population tends to increase by 7.69% from 2016 to 2018 (Department of Agriculture, North Bolaang Mongondow Regency, 2018). It is indicative of beef cattle farming development which obtains the government's attention. The increased population of beef cattle is supported

by the availability of land resources (Table 1) and farmer resources.

Table 1 shows that based on IDD value, the land carrying capacity in North Bolaang Mongondow Regency is considerably high, indicating a higher maximum potential of land resources than the feed demand (Salendu et al., 2017). The 1.37 IDD value shows that the existing land potentially increases the actual population up to 1.37 times. The available land can be optimized by introducing quality forages. These efforts provide benefits for farmers who focus on beef cattle feedlot (Sahala et al., 2016 and Happyana, 2017).

Table 2 shows internal factor (strengths and weaknesses) as listed in the IFAS matrix (internal factor analysis summary), and Table 3 presents the identified external factors

(opportunities and threats) as listed in the EFAS Matrix.

Table 2 shows that the total score of the strengths to utilize and the weakness to overcome is 2.457. It is indicative of a strong internal condition. The strength value is 1.882 (76.59%) and weakness is 0.575 (23.41%), implying that the development of beef cattle in the study area has more dominating strength than weakness. The greatest strengths were observed in the interest in farming, increasing population and human resources.

The total score for external strategic factors based on the EFAS Matrix (Table 3) is 2.705. It indicates that the development of beef cattle in the research area is attempting to take advantage of external opportunities while avoiding threats. The opportunity value is 1,842

Table 1. Results of analysis of PMSL North Bolaang Mongondow Regency

Coefficient/Variables	Value of Variables
PMSL (Maximum potential in units of cattle (AU) based on land resources)	20,088.16
k (Constant requirement of dry matter digested (BKC) by one animal unit)	1.14
POPRIIL (Real population)	12,847.00
TK(Total requirement of feed)(kXPOPRIIL)	14,645.58
IDD (Carrying capacity index)	1.37

Table 2. IFAS (Internal Factor Analysis Summary) matrix for beef cattle development

Factors of Internal Strategies	Value (1)	Rating (2)	Score (1x2)
Strength			
A. Interest in beef cattle farming	0.092652	4	0.370607
B. Cattle population	0.083067	4	0.332268
C. Natural resources	0.092652	3	0.277955
D. Availability of crop farming	0.089457	3	0.268371
E. Human resources	0.095847	4	0.383387
F. Government Program	0.083067	3	0.249201
Subtotal			1.881789
Weakness			
A. Business scale	0.083067	1	0.083067
B. Type of Livestock	0.051118	2	0.102236
C. Capital	0.079872	1	0.079872
D. Artificial insemination	0.060703	1	0.060703
E. Institution	0.060703	2	0.121406
F. Farmers' knowledge	0.063898	1	0.063898
G. Tecnology	0.063898	1	0.063898
Subtotal			0.575080
Total			2.456869

Table 3. EFAS (External Factor Analysis Summary) matrix for beef cattle development

Factor External Strategic	Value (1)	Rating (2)	Score (1x2)
Opportunity			
A. Market	0.136842	4	0.547368
B. Carrying capacity	0.147368	3	0.442105
C. Government Policy	0.157895	3	0.473684
D. Cattle price	0.126316	3	0.378947
Sub Total			1.842105
Threat			
A. Cutting and trading of productive female cattle	0.126316	2	0.252632
B. Cattle production from other regions	0.157895	2	0.315789
C. Sideline farming	0.147368	2	0.294737
Subtotal			0.863158
Total			2.705263

(68.09%) and the threat value is 0.863 (31.91%), which indicates that the farmers responded opportunity more quickly to avoid the threats.

The strategy for developing beef cattle in the research area is formulated through identification and analysis of external factors (opportunities and threats) as well as internal factors (strengths and weaknesses). The results of the SWOT analysis are formulated in the Matrix as shown in Table 4.

Table 4 shows the the strengths are assessed based on conditions that influence the development of beef cattle in the study area. Farmers and the government can harness their power to develop beef cattle as a source of income in the research area. Strength is a special compensation in utilizing the comparative advantage of beef cattle farming. Internal factors (weakness) may hinder the development of beef cattle; therefore, it requires the government intervention to minimize the constrained performance of beef cattle. The weaknesses in developing beef cattle in this study included lack of livestock, capital and institutional resources.

The external factors are formulated from existing opportunities and threats in developing cattle farms. Opportunities in this case are the expected or desired factors by beef cattle development business actors. Threats are the unexpected or unwanted factors by the actors.

The formulation of strategies in Table 4 are combined from various factors then grouped based on internal and external factors. There are four alternative strategies formulated in this study for developing beef cattle in the research area. First, the S-O Strategy (Strength-Opportunity) or aggressive strategy. This measure exploits opportunities to develop the strength of beef cattle farms. Aggressive strategies include increasing farmers' motivation, superior livestock populations from artificial insemination (AI), and land use by utilizing the availability of food crops. The livestock development program according to Ikbal (2015) is associated with reorientation of agricultural policies. Furthermore, aggressive strategies are shown by the government's efforts in developing the animal market, establishing policies for the prevention and control of infectious animal diseases and providing market information.

Second, the W-O Strategy (Weakness - Opportunity) or a diversification strategy to overcome the internal weaknesses of beef cattle business in the research area. This strategy perceives that weakness can be minimized by utilizing the existing opportunities that exist. To begin with, it directs the implementation of integrated farming. Beef cattle farming is developed in an eco-friendly manner using LEISA concept (Low External

Table 4. Matrix of SWOT analysis

	Strength (S)	Weakness (W)
Internal Factors	1. Interest in beef cattle farming 2. Cattle population 3. Natural resources	1. Scale of business 2. Type of Livestock 3. Capital
External Factors	4. Availability of crop farming 5. Human resources 6. Government Program	4. Artificial insemination 5. Institution 6. Farmers' knowledge 7. Technology
Opportunity (O)	Strategy SO (Aggressive)	Strategy WO (Diversification)
1. Market 2. Carrying capacity 3. Government Policy 4. Cattle price	1. Increasing farmers' motivation (O1,O3,O4, S1, S2,S3,S4,S5,S6) 2. Increasing land use (O2, O3, S1, S2,S3,S4,S5, S6) 3. Developing the animal market (O1,O3,O4,S1, S2,S3,S4,S5, S6) 4. Establish livestock introduction policies (O1,O2,O3,O4,S1,S2,S3, S4, S5, S6) 5. Strengthen disease prevention and control policies (O3,O4,S1,S2, S5,S6) 6. Strengthen the policy of artificial insemination (AI) (O3,O4,S1, S2, S5, S6) 7. Providing market information (O1,O3, O4,S1,S2, S5,S6)	1. Directing the integrated farming system (O1,O2,O3,O4,W1,W2, W3,W4, W5, W6,W7) 2. Directing the development of business oriented cattle farming (O1,O2,O3, O4,W1,W2,W3,W4,W5,W6, W7) 3. Establish partnerships between government institutions, banking, cooperatives and the private sector (O1, O2,O3,O4,W1,W2,W3,W4, W5, W6,W7) 4. Increasing the availability of inseminators (O3,O4,W1,W2,W3, W4, W5, W6,W7) 5. Increasing empowerment for farmers/traders (O1, O2,O3, O4,W1, W2,W3, W4,W5,W6, W7)
Threat (T)	Strategy ST (Differentiation)	Strategy (WT) (Defensive)
1. Cutting and trading of productive female cattle 2. Cattle production from other regions 3. Sideline farming	1. Implement the policy of cutting and trading productive cattles (T1,T2,S1, S2,S5,S6) 2. Creating conducive cattle farming (T1,T2, T3,S1,S2,S3,S4,S5,S6) 3. Increasing people's knowledge about the importance of animal protein from livestock (T1,T2,T3,S1, S2,S3, S4,S5,S6)	1. Encouraging investor interest (T1,T2,T3,W1, W2,W3,W4,W5,W6, W7) 2. Increasing farmers' knowledge about agro-industry (T1,T2,T3, W1, W2,W3,W4,W5,W6, W7)

Input Sustainability Agriculture). The development is carried out with a business orientation so that the farmers get the maximum profit (Walia and Kaur, 2013) (Nur et al., 2018). Capital strengthening is introduced by establishing partnerships between government, banking, cooperative and private institutions. Inseminator is needed in the socialization and introduction of the cattle breeding system, then empowerment of beef cattle farmers is increased continuously. Cattle according to Martan (2012) is a renewable

natural resource and an inseparable part of the daily lives of rural communities (Jamilah, 2017).

Third, the S-T (Strength-Threat) strategy or a differentiation strategy to minimize the impact of threats by using the existing strength. This strategy engages the government intervention in setting policies related to slaughtering and trading the productive female cattle; creating a conducive business; and increasing the socialization of the importance of animal protein from livestock to improve the quality of human resources.

Lastly, the W-T Strategy (Weakness-Threat) or a defensive strategy to minimize weaknesses and avoid threats. This strategy aims to increase the investor interest as well as the knowledge in applying beef cattle agroindustry and the use of technology in developing beef cattle farms. The development of beef cattle farms has been started since agribusiness area was established (Satiti et al., 2017). The technology applied includes the introduction of forages in an effort to overcome the challenges and constraints of greenhouse emissions due to the presence of cattle farm waste (Bamualim et al., 2008). Cattle waste has an impact on the occurrence of negative externalities generated from methane gas which is likely to cause environmental pollution. Technology is needed to internalize cattle farm waste by introducing knowledge to make organic fertilizer. Organic fertilizers as an alternative in minimizing the use of inorganic fertilizers that are increasingly expensive and scarce. This phenomenon is as stated by Sukamta et al., (2017) and Nenobesi et al., (2017) Rachmadhani et al., (2014).

Conclusions

In conclusion, the development of beef cattle was dominated by strength, which was indicated by the strength value of 1,882 (76.59%). Opportunities are more quickly responded in the face of the threat of beef cattle development, as indicated by the opportunity value of 1,842 (68.09%). The development of beef cattle plays a role in increasing the income of farmers and has market opportunities. The challenges can be minimized by increasing the productivity and quality of beef cattle in an eco-friendly management. Technology introduction is required for developing the sustainable beef cattle farms.

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References

- Bamualim, A., A. Thalib., Y.N. Anggraeni and Mariyono. 2008. Environmentally Friendly Beef Cattle Technology. *Wartazoa* 18 (3) : 149-156.
- Department of Agriculture North Bolaang Mongondow Regency. 2018. Report. North Bolaang Mongondow.
- Directorate General of Animal Husbandry and Health. 2018. Animal Husbandry Statistics. Directorate General of Animal Husbandry and Health. Ministry of Agriculture, Jakarta.
- Happyana, D. 2017. Analysis of the profit of small beef cattle fattening in Wonogiri Regency. *Integrated Animal Husbandry Scientific Journal* 5 (2): 33-39.
- Ikbal M. 2015. Evaluation of policies of animal control in Parigi District, Regency of Parigi Moutong. *E-Journal Katalogis* 3 (10) :167-172.
- Jamilah. 2017. Analysis of income of cattle farmers of Aceh. *Journal of Agrifo* 2 (2) : 50-55.
- Martan, D. 2012. Design of a policy model for the development of beef cattle farming (Case Study in South Sulawesi). Dissertation. Doctoral Program of Agribusiness Management. IPB, Bogor.
- Muis JM. 2015. Performance and prospect of development of environmentally friendly beef cattle in West Sumatera. *Widyariset* 18 (1) : 59-70.
- Nenobesi D, W Mella and P Soetedjo. 2017. Utilization of solid waste as livestock manure compost in increasing the carrying capacity of the environment and biomass of green bean plants (*Vigna radiata* L). *Food Journal* 26 (1): 43-56.
- Nur TM, C Fadli and H Satriawan. 2018. Analysis of the potential of integration of palm oil-cattle in Bireuen Regency, Aceh Province. Vol 4 (2) : 69-80.
- Purnomo SH, ET Rahayu and SB Antoro. 2017. Development strategy of beef cattle in small business at Wuryantoro Subdistrict of Wonogiri Regency. *Bulletin of Animal Science* 41 (4) : 484-494.

- Rachmadhani, N.W., Koesriharti and M. Santoso. 2014. Effects of Organic Fertilizers and Inorganic Fertilizers on the Growth and Results of *Phaseolus vulgaris* L. Crops. *Journal of Plant Production* 2 (6) : 443-452.
- Sahala J, R Widiati and E Baliatri. 2016. Financial feasibility analysis of Simmental beef cattle fattening, PO and factors that influence the number of ownership in small animal husbandry in Karanganyar Regency. *Bulletin of Animal Science* 40 (3): 75-82.
- Salendu AHS, IDR Lumenta, HO Gijoh and FH Elly. 2017. Carrying Capacity Index of Cattle Feed on Coconut Land in District of West Bolangitang, Paper presented on International Conference 6th Sustainable Animal Agriculture for Developing Countries, Oct 16-19, 2017 in Batu City Indonesia.
- Satiti R, DAH Lestari and A Suryani. 2017. Agribusiness system and bussiness partnership of beef fattening in cooperatives, Gunung Madu. *JIIA* 5 (4) : 344-351.
- Sukamta MA, Shomad and A Wisnujati. 2017. Management of cattle waste into commercial organic fertilizer in Kalipucang Village, Bangunjiwo, Bantul, Yogyakarta. *Berdikari Journal* 5 (1) : 1-10.
- Walia, S.S and N. Kaur. 2013. Integrated Farming System-An Ecofriendly Approach for Sustainable Agricultural Environment-A Review. *Greener Journal of Agronomy Forestry and Horticulture* 1 (1) : 001-011.