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Analysis of Dairy Farm Management Strategy Development in North Sulawesi

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ABSTRACT

This research is intended to find a strategy model for developing a dairy farm in North Sulawesi. This is considered important since it will only be developed by the local government in response to the increasing demand for milk and beef, while the availability of production decreases. The results of the analysis state that the long-term management strategy for developing a dairy farm in North Sulawesi is largely determined by building the driving forces of production and markets.

Keywords: Dairy Farm, Market Driven, North Sulawesi, Product Driven, Strategy Management

INTRODUCTION

Background

The development of a dairy farm is one way to cover the shortage of beef cattle production in North Sulawesi. This is due to the role of dairy cows as milk producers, as well as meat producers (dual purpose). Milk and meat are nutritious foods rich in animal protein. The need for animal protein from year to year continues to increase along with the increase in population, economic improvement and community awareness of the nutritional needs proven by science and technology.

North Sulawesi is a potential area for developing a dairy farm. This is heavily because of the production and market potentials, including natural and climate resources, land resources, forage (HMT) and agricultural production waste, young farmers including farm women, population and strategic location facing the Pacific region to global market.

The potentials have not been fully arranged with excellent planning management. In summary, there was no long-term strategic planning formulation on its development. As a result, it is evident from the prior studies that it failed to increase production, although simultaneously the rate of demand for beef consumption was so rapid that there was a gap between consumption needs and the availability of production. Therefore, the researcher is eager to conduct this research to formulate a long-term development strategy for the dairy farm, along with the increase in population, production, productivity, and competitiveness, to increase the farmers' welfare, the targets of our national policy program.

Thus, the problem formulation is; (1) What is the current strategy to develop a dairy farm in North Sulawesi? (2) What is the expected direction of developing dairy farm? (3) What are the strategies to achieve the expected direction of business development?

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This research is aimed to describe the strength of production and market resources, farmers' perceptions and the formulation of alternative strategies, strategy choices that ultimately become a strategy model. We look forward that the results of this research will be useful for the regional government of North Sulawesi and the development of research at the University of Sam Ratulangi particularly on "food security".

RESEARCH METHOD

Research Design

This study used qualitative and quantitative designs and case study research. It aims to describe, summarize the various conditions, situations, or various problems of the reality in the dairy farm in North Sulawesi. In this study, the chosen events hereinafter referred to as cases are actual (real-life events), ongoing, not that has passed. Bogdan and Biklen (1982) stated, case studies are research that seeks to describe a particular setting, object or event.

Data Collection Technique

In this study, primary data were collected and obtained directly through observation, interviews with those considered to understand the problems of the dairy farm in North Sulawesi, comprising 3 academics of animal husbandry agribusiness researchers from the Faculty of Animal Husbandry of Sam Ratulangi University, 3 local government employees (ASN) responsible for UPTD Tampusu dairy farms.

In addition, 100 farmers were selected from the regions of Bolaang Mongondow Regency, Minahasa Regency and South Minahasa Regency. The secondary data were collected and obtained from relevant articles or literature from the internet, mass media and the Central Bureau of Statistics.

Four kinds of data collection techniques used in this study are Interviews, Observation, Focus Group Discussion (FGD), Questionnaires, Documentation and Joint/Triangulation.

Definition of Variable Operations

(1) External Environment includes the opportunity and threat factors as measured by the weight and rating of each factor and then the opportunity and threat ranking are determined, (2) Internal Environment includes strengths and weaknesses as measured by the weight and rating of each factor to determine the strengths and weaknesses.

Qualitative Data Analysis

Qualitative data analysis was performed using the "four qualitative stage" model analysis approach, starting from the stages of data collection, data reduction, data display, conclusion drawing. Qualitative data analysis according to Bogdan and Biklen (1982) in Moleong (2017: 248), is an effort made by working with data, organizing data, sorting it into manageable units, synthesizing, searching and finding patterns, finding what is important and what is learned, and decide what to tell to others. According to Miles and Huberman (1984) in Sugiyono (2017: 133), activities in qualitative data analysis are data reduction, data display and conclusion drawing.

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Descriptive Analysis

Descriptive analysis is used to express respondents' perceptions with the help of Likert scale analysis model. Likert scale answer forms include strongly agree, agree, doubtful, disagree, and strongly disagree.

Three-Stage Analysis of Strategy Formulation

A three-stage analysis of strategy formulation was carried out for the needs in the 4-stage qualitative analysis process. According to David & Forest (2015: 44) in formulating a complete strategy, there are three stages of strategy formulation (framework), namely stage I is input, stage II is matching, and stage III is decision.

1) Input Stage*:* the results of the external and internal environment analysis are the basic inputs formulated into the EFE matrix and the IFE matrix. Furthermore, determining the variable weights uses the "paired comparison" method (Kinnear and Taylor, 1991) in Nazwirman and Wulandari (2016). According to Kinnear (1991) in Mappigau and Esso (2011), the weight of each variable is obtained by determining the value of each variable against the total value of the whole variable by using the formula;

$$\alpha i = \frac{Xi}{\sum_{i=1}^{n} Xi}$$

Where; αi = Variable weight of -i n = Amount of data
Xi = Variable Value x of-i i = 1, 2, 3, …, n

2) Matching Stage: At this stage, opportunities and threats (external) are matched with strengths and weaknesses (internal) based on information obtained at the input stage. The analytical tools used at this stage are the Internal-External (IE) matrix and the Strength-Weakness-Opportunity-Threat (SWOT) matrix.
3) Decision Stage*:* The decision stage is the final stage in the formulation of strategy. At this stage the best alternative strategy is chosen and the priority is to be applied by the company. The analytical tool used is QSPM (Quantitative Strategic Planning Matrix). QSPM is a tool to indicate which alternative strategies are the best and most feasible to implement.

RESULTS AND DISCUSSION

Land, Topography and Climate

Based on agricultural statistics in 2017, North Sulawesi's land area is 1,500,000 hectares. Of this area, 72% is non-paddy agricultural land, widely used as agricultural land, horticultural farming and livestock farming.

The climate of the North Sulawesi region is tropical, which is affected by monsoons. Rainfall is uneven with annual figures ranging from 2000-3000 mm, and the number of rainy days is between 90-139 days. Minimum air temperatures for Tomohon City, Langowan in Minahasa Regency, Modoinding in South Minahasa Regency, Modayag in Kotamobagu City, and Pasi in Bolaang Mongondow Regency averaged 20.4° C. While the maximum average temperature is 30° C.

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State of Population and Labor

The Central Statistics Agency (BPS) of North Sulawesi in 2018 recorded the population of North Sulawesi in 2017 of 2,461,028 people. In general, the average male population is 4% more than the total female population. According to the 2019 survey of the North Sulawesi Central Bureau of Statistics, the number of people working in the agriculture sector on February 2018 remained 27.59%, and in 2019 in the same month, it decreased to 24.27%.

Table 1: Number of Regency / City Residents in North Sulawesi 2013-2017

Regency / City	Total Population of Regency / City (People)				
	2013	2014	2015	2016	2017
Bolaang Mongondow	225.768	229.604	233.189	236.893	240.505
Minahasa	322.282	325.680	329.003	332.190	335.321
Sangihe Islands	128.423	129.103	129.584	130.024	130.493
Kepulauan Talaud	86.926	87.922	88.803	89.836	90.678
South Minahasa	201.668	203.317	204.983	206.603	208.013
North Minahasa	194.869	196.419	198.084	199.498	200.985
North Bolaang Mongondow	74.237	75.290	76.331	77.383	78.437
Sitaro Islands	65.129	65.284	65.582	65.827	65.976
Southeast Minahasa	103.129	103.818	104.536	105.163	105.714
South Bolaang Mongondow	60.220	61.177	62.222	63.207	64.171
East Bolaang Mongondow	66.790	67.824	68.692	69.716	70.610
Manado City	420.401	423.257	425.634	427.906	430.133
Bitung City	198.794	202.204	205.675	208.995	212.409
Tomohon City	96.973	98.686	100.373	101.981	103.711
Kotamobagu City	114.779	117.019	119.427	121.699	123.872
North Sulawesi	**2.360.388**	**2.386.604**	**2.412.118**	**2.436.921**	**2.461.028**

Source: North Sulawesi Central Bureau of Statistics 2018

Based on 2018 Animal Husbandry and Animal Health Statistics, the percentage of labor availability in the livestock sector for North Sulawesi Province is only 0.16 percent. It is a large gap compared with East Java by 43.95 percent or Central Java, by 20, 80 percent. It is slightly superior to the neighboring Gorontalo province by 0.10 percent. This means that the interest of the younger generation to work in the livestock subsector is relatively small.

Potential State of Feed Carrying Capacity

Based on the 2016 Ministry of Agriculture report, the potential carrying capacity of animal feed in North Sulawesi is at the low category by 771,640 ha (88.01%), the medium category by 68,952 ha (7.86%) and the high category is 36,194 ha (4.13%). Areas with high potential for animal feed carrying capacity are in Bolaang Mongondow Regency (14,565 ha) and Minahasa (7,872 ha). South Minahasa Regency and North Bolaang Mongondow have high potential for animal feed carrying capacity, therefore it is potential for the development of dairy farm. The research of Paul C. Paat from the North Sulawesi Agricultural Technology Research Institute, shows that Southeast

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Minahasa Regency is fairly potential for the development of ruminant animals since it is borne out with abundant land and feed resources. About 85% or 30,000 ha of agricultural land is dry land while irrigated rice fields are 15% or 3,500 ha. Dry land is generally used for farming coconut, vanilla and clove plantations while food crop agriculture includes corn, beans and lowland vegetables.

Of the 51,666 tons of agricultural waste, the largest contribution came from corn straw (39 thousand tons), while the second was rice straw (9,300 tons). Being processed into fibrous feed, a cow can consume around 3 tons of feed per year. It implies that agricultural waste can supply feed for the needs of around 17 thousand head of cattle for basic living needs.

Furthermore, Tiwow, et al (2016) study shows that a land area of 32,010 hectares can produce 11,541 tons /year of cattle grass and 123,934 tons of straws a year. This means the potential availability of feed is 135,484 tons per year on average. The survey shows that North Sulawesi has 4 regions as priority areas for the development of dairy farm, i.e. Bolaang Mongondow Regency, Minahasa Regency, Southeast Minahasa Regency and Tomohon City.

Bolaang Mongondow Regency is a district with a potential to develop a fairly wide area in North Sulawesi. This implies carrying capacity of feed in the district is relatively high. Whereas Minahasa Regency, Southeast Minahasa Regency and Tomohon City are superior on nature and climate support.

Farmers' Perception

The Likert Scale method is used to measure farmers' perceptions about the development of dairy farms in North Sulawesi. The level of approval is 5- scales choice with a gradation (arrangement of degrees or levels) consisting of Strongly Agree (SS), Agree (S), Doubtful (RR), Disagree (TS) and Strongly Disagree (STS).

Table 2: Farmers' Perceptions of Potential Production Resources for Dairy Cattle Businesses In North Sulawesi

No	Question to Farmers (100 Respondents)	SS	S	RR	TS	STS
1	Climate and topography are eligible	25	20	23	17	15
2	Land resources available	20	19	29	17	15
3	Access to capital is easy to obtain	10	7	18	37	28
4	Workers (especially young farmers) are willing and able to work as dairy farmers	25	16	20	19	20
5	Farmers have livestock expertise and management skills	22	13	30	14	21
Total		**102.00**	**75.00**	**120.00**	**104.00**	**99.00**
Average		**20.40**	**15.00**	**24.00**	**20.80**	**19.80**

Source: Processed Data

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Next, it refers to the formula: Tx Pn. Where = Total number of respondents who voted, and Pn = Choice of Likert score, then;

1. Respondents who answered strongly liked (5) = 20 x 5 = 100.
2. Respondents who answered like (4) = 15 x 4 = 60
3. Respondents who answered neutral (3) = 24 x 3 = 27
4. Respondents who answer do not like (2) = 21 x 2 = 42
5. Respondents who answered strongly dislike (1) = 20 x 1 = 20

After all the results are added up, (100 + 60 + 27 + 42 + 20), the total score is 249. The following criteria interpret the score based on intervals;

1. Figures 0% - 19.99% = Strongly (disagree / bad / very poor).
2. Figures 20% - 39.99% = Disagree / Not good).
3. Figures 40% - 59.99% = Fair / Neutral.
4. Figures 60% - 79.99% = (Agree / Good / Like).
5. Figures 80% - 100% = Strongly (agree / Good / Like).

Thus, the final result is related to farmers' perceptions of the potential production resources for the development of dairy farm in North Sulawesi;

Total score / Y x 100
249 / 500 x 100
50 %, are in the category of "Doubtful" (Fair / Neutral)

Table 3: Farmers' Perceptions of Potential Resources for Marketing Fresh Milk from Dairy Cattle Business in North Sulawesi

No	Pertanyaan Kepada Petani (100 Responden)	SS	S	RR	TS	STS
1	Potential demand for traditional markets	27	15	31	15	12
2	Potential demand for modern markets (supermarkets)	17	13	38	25	7
3	Potential demand for modern industrial plants	5	2	28	43	22
4	Potential special requests for students and students	37	35	11	15	2
5	Potential demand for "home industry" to be used as value-added products for example; yogurt, ice cream, dodol milk, and others.	42	27	13	11	7
Total		**128.00**	92.00	121.00	109.00	50.00
Average		**25.60**	18.40	24.20	21.80	10.00

Source: Processed Data

Next it refers to the formula: Tx Pn. Where = Total number of respondents who voted, and Pn = Choice of Likert score, then;

6. Respondents who answered strongly like (5) = 26 x 5 = 130
7. Respondents who answered like (4) = 18 x 4 = 72

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8. Respondents who answered neutral (3) = 24 x 3 = 72
9. Respondents who answer do not like (2) = 22 x 2 = 44
10. Respondents who answered strongly dislike (1) = 10 x 1 = 10

Thus, farmers' perceptions of the potential marketing resources of fresh milk for dairy farm in North Sulawesi;

Total score / Y x 100
328 / 500 x 100
66 %, are in the "Agree / Good / Like" category

EFE Matrix (External Factor Evaluation) and IFE Matrix (Internal Factor Evaluation).

Based on the analysis of the three-stage strategy formulation to obtain an alternative strategy formulation, we continued with the formulation of strategy choices.

Tabel 4: EFE Matrix (*Eksternal Factor Evaluation*)

	Factor Opportunity	Weight (%)	Rating	Score	Priority / Ranking
1	Increased purchasing power of the people	0.13	4.00	0.52	III
2	Demands for nutritious food needs	0.25	4.00	1.00	I
3	The development of culinary business	0.23	3.00	0.69	II
4	Increased investment interest	0.18	2.00	0.36	IV
5	Use of digital technology (digitizing livestock)	0.23	3.00	0.69	II
TOTAL				**3.26**	
	Factor Threat	**Weight (%)**	**Rating**	**Score**	**Priority / Ranking**
1	Competition with industrial dairy products	0.25	4	1.00	I
2	Fresh milk products have not won the trust of local consumers	0.25	4	1.00	I
3	Decreased labor force in the livestock sector	0.15	2	0.30	III
4	Cultural heritage of an extensive livestock system	0.25	2	0.50	II
5	Transfer of land functions	0.10	2	0.20	IV
TOTAL				**3.00**	
Average Total Score (Opportunity + Threat)				**3.13**	

Source: Processed Data.

The results of the analysis (table 4) state that opportunities capable of being a strategy for driving market development, are in how to make public awareness of nutritional food consumption needs caused by the development of information technology, in which purchasing power of the people, investment attractiveness are utilized for the development of the culinary business of fresh dairy products.

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While the threat that must be anticipated with regard to its influence on the development of market forces is that our people are not accustomed to drinking fresh milk, in addition to competition with the industrial dairy products, especially those that already have a "brand image" in the community. While the threat that is quite influential in building the driving force of production is related to the character of the farming community which is hard enough to maintain its traditional attitude, in addition to the decline in the interest of young farmers to work in the livestock sector. Moreover, agricultural lands are converted into residential or diverse land industries.

Tabel 5: IFE Matrix (*Internal Factor Evaluation*)

Faktor Strenght		**Weight (%)**	**Rating**	**Score**	**Priority / Ranking**
1	The commitment of the North Sulawesi regional government to develop dairy farm	0.25	4	1.00	I
2	Sufficient land resources and animal feed availability	0.25	3	0.75	II
3	The North Sulawesi regional government has a UPTD Center for PO Cattle and Tampusu Dairy Cattle	0.25	4	1.00	I
4	Law No.19 of 2013 on the Protection and Empowerment of Farmers	0.13	3	0.39	III
5	Minister of Agriculture of the Republic of Indonesia. Regulation No.13 / Permentan / PK.240 / 5 / 2017 on the Livestock Business Partnership	0.13	3	0.39	III
Sub-Total				**3.53**	
Faktor Weakness		**Weight (%)**	**Rating**	**Score**	**Priority / Ranking**
1	Limited funding sources for dairy cattle development projects in North Sulawesi	0.25	1	0.25	III
2	Imported production facilities dependency	0.13	2	0.26	IV
3	Feed management system (HMT) is not well organized	0.23	1	0.23	II
4	No standard guidelines on plans to develop a dairy farm in North Sulawesi	0.20	1	0.20	I
5	Farmers find difficulties to get production land	0.20	2	0.40	V
Sub-Total				**1.34**	
Average Total Score (Strength + Weakness)				**2.44**	

Source: Processed Data

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The commitment of the North Sulawesi regional government to develop dairy farms in North Sulawesi is a major force for production and market drivers, especially since the local government has UPTD Center for PO and Tampusu Dairy farms declared as livestock breeders and a training ground for farmers. In addition, sufficient land and animal feed resources are key factors for the local government strength to develop a dairy farm in North Sulawesi.

Another supporting strength is that government regulations relating to the protection and empowerment of farmers. While barriers that weaken the driving force of both production and markets are no standard guidelines on the development of the dairy farm.

Results of Internal-External Matrix Analysis (IE)
Internal-External Matrix (IE) is used to determine the strategic position of beef cattle agribusiness development in North Sulawesi.

Table 6: Internal-External Matrix (IE) Dairy Cattle Business in North Sulawesi

	IFE Total Value			
IFE Total Value	Strong 3,0-4,0		Is 2,0-2,99	Weak 1,0-1,99
	High 3,0-4,0	I (Grow and Build)	II (Grow and Build)	III (Keep and Maintain)
	Is 2,0-2,99	IV (Grow and Build)	V (Keep and Maintain)	VI (Harvest or Divest)
	Low 1,0-1,99	VII (Keep and Maintain)	VIII (Harvest or Divest)	IX (Harvest or Divest)

Source: Processed Data

Based on the two key dimensions of the total IFE weight score on the x-axis and the total EFE weight score on the y-axis, the strategic position of dairy cattle breeding business in North Sulawesi is included in cell II, where this can be explained as “grow and build”. This explains that the dairy farm in North Sulawesi has a high industrial appeal. Therefore, the long-term strategy is at how to increase population, production, productivity, competitiveness and farmers welfare.

SWOT Analysis Matrix Results
The next stage of the process is to use a SWOT analysis to obtain an alternative formulation of the strategy, with the following results;

1. Strengths – Opportunities Strategy (aggressive / growing) covers making farming community and cooperatives effective as a means of fostering and facilitating farmers to cultivate dairy farm towards:
   a. the commercialization business process among farmers, which is related to how to conduct full scale production, set prices, build distribution networks, and promotions,
   b. a partnership-based business process in a "corporate farming",

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c. the process of creating reliable farmer human resources that master technology and information and management systems, selling fresh milk products with certain community market priorities, namely groups of students and students, as well as workers in the construction services sector.

2. Weaknesses – Opportunities Strategy (diversification) covers:
   a. Increasing and strengthening the capacity (quality) of UPTD Balai Nursery for PO and Tampusu Dairy Cattle,
   b. Increasing the role of universities to conduct research for the development of technology and human resources of farmers,
   c. Innovating by creating crop rotation method for forages and utilizing quality alternative feed at low cost,
   d. Developing traditional maintenance patterns with a modern (commercial) touch on the housing and grazing systems,
   e. Giving satisfaction to farmer groups and cooperatives utilizing idle lands for dairy farms with regulatory support.

3. Strengths – Threats Strategy (differentiation) covers:
   a. Products are packaged with *ASUH* guarantee standards (safe, healthy, undamaged and halal). The local government is actively building communication through extension activities to maintain farmers' loyalty to government programs,
   b. Stimulating investors to build a fresh cow milk processing industry,
   c. Urging the young farmers as the backbone of the development of dairy farm in North Sulawesi,
   d. Utilizing UPTD Center for PO and Tampusu Dairy Cattle as a farmer business partner towards independence.

4. Weaknesses – Threats Strategy (defensive) covers:
   a. Strengthening farmer institutions and cooperatives to increase production and marketing of dairy farmes in North Sulawesi. Shortly, it will still maintain the traditional business pattern, but it will start to be directed towards developing the commercialization business,
   b. Developing dairy breeding business by building a "village breeding center (VBC)" at UPTD Center for PO Cattle and Tampusu Dairy Cattle,
   c. Preserving local farmers' wisdom,
   d. Increasing the development of HR for young people in rural areas through formal education in dairy cattle agribusiness.

Results of the QSPM (Quantitative Strategic Planning Matrix) Matrix Analysis.
Calculation of quantitative strategy planning (QSPM) is intended to determine priority strategies based on ranking with the results as follows;

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Table 8: Results of the QSPM Matrix Analysis

Strategy Implementation	Total Attractiveness Scores (TAS)	Priority
Empowering farmers with social engineering strategies (institutional system development, extension and local wisdom)	11.99	I
Increasing the existence of Tampusu UPTD (education and training, seed, feed and medicine suppliers and fresh milk processing services)	11.50	II
Empowering the principle of cooperative business model " farming cooperative" in bonds and "corporate" agreements	11.29	III
Empowering farmers as the backbone of developing a dairy farm in North Sulawesi, supported by various regulations	11.17	IV
Utilizing "idle lands" for the needs of forage cultivation (HMT), with crop rotation method	11.16	V
Increasing the role of farm women in managing the "home industry" processing fresh cow's milk into value-added products.	11.15	VI
Developing a culinary market for dairy products from urban to rural areas	11.09	VII
Penetrating markets ranging from supermarkets, traditional markets to students	10.99	VIII
Developing fresh milk product quality with safe, healthy, undamaged, halal (ASUH) packaging and labeling	10.79	IX
Strengthening government services by increasing the role of cooperation among relevant agencies	10.49	X

Source: Processed Data

CONCLUSIONS

The direction of developing a dairy farm in North Sulawesi is aimed at increasing population, production and productivity. This is reinforced by the potential of natural resources, land, animal feed and farmer resources. However, to achieve the intended direction, the strategy model is to build the driving force of production and the driving force of the market.

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