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Analysis of the Potential and Development Strategies for Swines Farming in Dairi Regency

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ABSTRACT

One of the regency that has the potential to develop swines in North Sumatera Province is Dairy. The purpose of this study was to determine the potential of livestock resources, the area and carrying capacity of swines and alternative strategies that were effective in developing swines in Dairi Regency. This research was conducted in June- August 2023 by applying the stratified sampling method to all districts in Dairi Regency and utilizing purposive sampling to select districts with the highest population, namely Silima Pungga-pungga District, districts with moderate population, namely Siempat Nempu District and district with low population, namely Lae Parira District. Samplig is done using the method of determining the quota of 30 respondents in each district. Analysis of the data carried out is descriptive analysis, LQ, livestock density, feed concentration index, carrying capacity of agricultural and plantation waste, and SWOT analysis. Based on the results, dairy Regency has the potential to develop swines. The livestock density is still low and has the potential to be increased. The production of dry agricultural and plantation waste is 859.881,18 tons and 8.431,51 ton. DDLP and IDDLP are classified as high, while IKP is not evenly distributed. Respectively the capacity based on the production of dry agricultural waste is 755.054,504 adult swines. The appropriate and prioritized strategy is SO strategy. Dairi Regency is suitable for swines farming development.

Keywords: Analysis, Dairi, Swines, Potential, Strategy

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1. Introduction

Swine farming is one of the endeavors in animal husbandry. Swines are livestock that efficiently produce meat and provide the most efficient nutrition among other livestock, thus economically suitable for being raised for slaughter [1]. Swine farming has experienced rapid progress and has become a promising enterprise. Swine farming falls under the category of industrial-scale business, requiring good governance [2].

The development of swine farming is needed to meet the high demand for animal protein in relatively short periods. This is based on the advantageous characteristics of swines such as prolificacy (reproducing in large numbers), efficient conversion of feed into meat, short time to reach harvesting age, and high carcass percentage [3]. Other benefits of swine farming include the ease of obtaining swine feed because swines are omnivores (eating both meat and plants), and swine manure can be used as fertilizer for crops .

The swine population in North Sumatra is the second largest after the East Nusa Tenggara province. North Sumatra province consists of 25 regencies, one of which is Dairi Regency. Dairi Regency is one of the

regions in North Sumatra that serves as a center for swine farming, with its population spread across 15 sub-districts, 8 urban villages, and 161 villages, covering an area of 1,927 km2.

The population of swines in Dairi Regency from 2018 to 2022 was 110,090, 2,639, 1,510, 1,764, and 4,155 respectively. There was a decrease in the swine population in 2019 by 97.61 percent, in 2020 by 42.76 percent, while in 2021 there was an increase of 17.68 percent. There was a significant increase in the swine population in 2022 by 135.4 percent. The decrease in swine population in Dairi Regency was caused by African Swine Fever (ASF), while the increase in population was influenced by the increasing demand for pork due to the decreasing spread of ASF [4].

To meet the feed needs for livestock, sufficient land and production are required for the sustainability of swine farming. In 2022, Dairi Regency had a harvested area of food crops reaching 53,838.00 ha, a harvested area of corn of 40,701.00 ha with a production of 248,749.30 tons, and a harvested area of cassava of 585.50 ha with a production of 12,275.13 tons. There was also an area for sweet potatoes with a harvested area of 1,282.75 ha producing 32,544.41 tons. The harvested area of Arabica coffee was 13,824.80 ha with a production of 15,609.50 tons, and the harvested area of cocoa was 2,257.90 ha with a production of 1,160.60 tons, as well as 6,187.10 ha with a production of 1,815.60 tons [5].

In facing the increasing consumption of pork while its production is still limited, and abundant natural resources yet to be optimized, research on the potential and development strategies of swine farming is needed.

2. Materials and Methods

This research was carried out in Juny- august 2023 in Dairi Regency, North Sumatra Province, in sub-districts with swines livestock populations. This study uses primary and secondary data sources. Primary data was obtained from respondents, and secondary data was obtained from relevant agencies such as BPS Dairi Regency and the Livestock Service Office of Dairi Regency.

The method of analyzing the potential for developing swines in Dairi Regency is carried out in several stages. The first stage is to record the population of pigs in Dairi Regency. Then the second is sampling, which is carried out by stratified Sampling of the Dairi sub- districts with a population of high, medium and low livestock. Then, *purposive Sampling was conducted* to select the sub-districts from each group. The high livestockpopulation group is Silima Pungga-pungga, the medium group is Lae Parira District, and the low group is Siempat nempu District. Then *purposive Sampling was carried out* to determine the number ofrespondents from each sub-district selected by the method, which took 30 respondents in each sub-district.

The data analysis used is a descriptive analysis which aims to describe the livestock resources in Dairi Regency. In addition, analysis of *Location Quotient,* Livestock Density, Feed Concentration Index, Agricultural and Plantation Waste Carrying Capacity, Agricultural and Plantation Waste Carrying Capacity Index, and SWOT Analysis were also carried out.

3. Results and Discussion

a. Livestock Resources
Livestock resources can be seen in human resources, natural resources, and livestock management. The existing livestock resources will determine the SWOT and suitable strategies to be developed later. Human resources are one of the main factors in the running of a livestock business because a livestock business is influenced by the decisions of farmers [6].

b. Human Resources
Analysis of human resources can be seen from the age of the breeder, the experience of raising livestock, and the purpose of raising livestock. According to [6], the productive age of breeders is 15-55 years old, while that outside of that is included in the unproductive category. Based on the survey results, 90% of the respondents are aged 15-55 years, while the other 10% are outsidethe age of 15-55 years. The survey results show that 22% of respondents have 11-20 years of experience raising livestock, while the other 78% are under 11 years old. In terms of the purposeof raising livestock, there are still many breeders (as many as 88% of respondents) who make their business only as a side business, not their primary business. In comparison, the other 12% make raising livestock their primary business.

c. Natural resources
Analysis of natural resources can be seen from water sources and land ownership to feed processing technology. Based on the survey results, 100% of the respondents used water from the wells of each farmer. This is because healthy water is readily available and is always available. The majority of land owners

(93%) have their land for raising livestock, while the rest use other people's land. Furthermore, the feed processing technology used by farmers is still very minimal. Based on the survey results, 97% of respondents have not used feed processing technology.

d. Maintenance Management
According to [7], to maximize livestock's potential, its maintenance management can be improved. Maintenance management consists of maintenance systems, labour, housing and equipment, feed management, capital, animal health, marketing, waste management, and institutions.

Based on the results of the survey, the maintenance system carried out by the majority of farmersuses an intensive system. The labour used by farmers also comes from their own families. The cages and equipment used are still traditional, which can be seen in Figure 1. Feed managementby farmers is still not optimal. Farmers do not know whether the feed provided is sufficient or not. The capital used by breeders is their capital. Livestock health is also often a problem for farmers. Diseases that often occur are bloating and intestinal worms. The marketing of livestockis usually sold to agents, and some sell to consumers directly. Then livestock waste managed byfarmers is still not being used optimally. Whereas livestock waste, such as faeces, can be used ascompost. Finally, institutions such as related

Figure 1. Swines farming in Dairi regency

e. *Location Quotient* (LQ) analysis
Based on h result Based on the research, Dairi Regency has five base sub-districtsfor swines, namely Sei Balai, Fifty, Fifty Pesisir, Datuk Lima Puluh, and Laut Tador sub- districts. At the same time, the base sub-districts for swines are Sei Balai, Datuk Fifty, Fifty, Datuk Tanah Datar, and Laut Tador sub-districts. The other sub-districts are classified as non-basic areas. A base area is an area that can meet the needs of livestock. Meanwhile, non-basic areas havenot been able to meet the needs of livestock because the number of livestock is still very minimalwhile the population is already dense.

f. Swines Livestock Density
The density of swines in Dairi Regency is divided into three, namely, economic density, farming, and area. The economic density in Dairi Regency is classified as dense, which means that the demand for livestock is high due to the busy population. The density of farming is classified as moderate because farming is still extensive and has not been utilized by farmers. The area's density is relatively rare because the area in Dairi is still extensive, but the livestock is still tiny. [8] states that an area included in the rare category can still be added to livestock based on the aspect of natural resources carried out intensively in its development.

g. Feed Concentration Index
The feed concentration index aims to see the level of feed availability in a sub-district comparedto the district level. Each sub-district has a relatively high index, namely the average index for each sub-district is above 1, which means that the availability of feed for swines in eachsub-district is still more than the availability of feed in Dairi Regency. It can be concluded that the feed availability in each sub-district can still meet the needs of their livestock.

h. Analysis of Agricultural and Plantation Waste Production
Waste production analysis aims to see how much waste is produced by agriculture and plantationsin Dairi Regency. [9] revealed that the new production of agricultural waste is primarily determined by the area of the harvested area, which is calculated from the harvested area multiplied by the production of agricultural waste. Agricultural waste that is used is waste rice straw, corn straw, and cassava leaves. For plantation waste, palm oil and cocoa husks are used. The amount of waste produced per year in the form of dry matter

for agricultural waste is 209,021.94 tons/year. Meanwhile, plantation waste reaches 109,005.1 tons/year [4]. It can be concluded that the amount of waste in Dairi Regency is considerable to be utilized.

i. Analysis of Agricultural and Plantation Waste Carrying Capacity
After knowing the amount of waste produced, it can be seen how many livestock the waste can accommodate. Based on the results of secondary data processing [4], agricultural waste can accommodate a total of 91,676.29 ST of livestock. Comparatively, plantation waste can accommodate 47,809.25 ST of livestock based on dry matter. With this high livestock capacity, the swines in Dairi has the potential to be developed. [10] stated about the carrying capacity of food plant waste, which understanding capacity is something in ensuring the availability of adequate feed in the form of waste agriculture/plantation, which could accommodate populationneeds cattle without conducted processing.

j. Analysis of Agricultural and Plantation Waste Carrying Capacity Index
Based on the results of the carrying capacity of the waste above, it can be concluded that the carrying capacity index of each sub-district in Dairi is high. Based on the results of secondary data processing from the [5], comparing feed with available livestock and their feed needs resulting in a high index, namely with an average index above 3, and the area was recommended to increase its livestock. [11] states the category high in waste carrying capacity means the area is recommended for adding value to cattle.

k. SWOT analysis
The final result of this study is to determine the strategy for developing swines in Dairi Regency. The strengths, weaknesses, opportunities, and threats are known from all parameters, and suitable strategies are to be developed from swines in Dairi Regency. This SWOT analysis is shown in "Table 1".

Based on the SWOT and the resulting SWOT quadrant, a suitable strategy to be developed is the SO strategy, which is a strategy that uses strengths and takes advantage of opportunities simultaneously or is called a *Growth Oriented Strategy*. Other strategies can also be used according to the required alternative, but the priority is the SO strategy [12].

Table 1. SWOT analysis

Internal factors	*Strengths* (S)	*Weaknesses* (W)
	The age of swines breeders is still productive	The farming business is relatively small and is only used as a side business
	Abundant water resources for raising livestock	Breeders are less interested in using the available capital bodies.
	The high demand for swines to export	Utilization of technology, waste and feeding according to needs is still lacking
	Easy maintenance of swines	The livestock rearing systemis still traditional
External Factors	Capital in raising your own	Lack of experience and socialization of farmers
	Own livestock ownership status	The level of knowledge of raising livestock is still low
Opportunities (O)	*SO Strategy*	*WO Strategy*
There is a large livestock addition capacity	Making Dairi Regency a producer of swines	Improve, foster and develop all aspects of human livestock resources
High feed availability and carrying capacity.	Developing human resources for farmers who are still productive with training from the relevant agencies	Conducting socialization of capital institutions in utilizing capital agencies to develop livestock
Livestock density is still rare.	Utilize the availability and planting of forage with facilities from the relevant agencies	Assist both sapronak and seeds to farmers by the government
The existence of a loan agency, such as a bank for farmers	Adding variations in capital and business scale to meet the demand for swines meat by using acapital agency	Adopting innovative technology to increase commodity competitiveness and accelerate livestock development by entering farmer groups
There are farmer groups in each village	Forming and joining farmer groups so that it is easier to give direction and guidance as well as livestock assistance	Utilize and develop farmer service installations
There are policies and facilities from the relevant agencies		

Threats (T)	ST strategy	WT Strategy
Constraints and limitations of working capital.	Conducting socialization about livestock health and treatment as well as good cage sanitation	Adding infrastructure to support the development of swines farming
Disease outbreaks and livestock health problems occur regularly.	Educate farmers about the market to reduce the influence of agents in pricing	Conduct evaluations in the development of all livestock activities
Breeders tend to sell their business results to agents ratherthan directly.	Conduct online coaching both from social media and offline media with the guidance of the relevant agencies	Optimizing policies by existing agencies
Poor cage sanitation.	Facilitating farmers to be able to sell their livestock to the animal market	Cooperating with various government and private agencies in making policies during the pandemic
The failure of government programs or related agencies	Make a capital loan or do a partnership business either with the loan agency or the government	Conducting socialization and cooperation between breeders to increase experience and knowledge in raising livestock
Underdeveloped animal market		

Conclusion

Farmer resources in Dairi Regency, North Sumatra Province, can be utilized as much as possible based on human resources, natural resources, and maintenance management. At the same time, the development strategy that is suitable to be developed in Dairi Regency is the SO Strategy. Based on the results of this study, swines in Dairi Regency have the potential to be developed.

References

Sharma, K. R., Leung, P., & Zaleski, H. M. (1999). Technical, allocative and economic efficiencies in swine production in Hawaii: a comparison of parametric and nonparametric approaches. *Agricultural economics*, *20*(1), 23-35.

Yang, Q., Qiao, S., & Ying, R. (2024). Agricultural industrial scale, price random fluctuation, and profitability levels: Evidence from China's pig industry. *Frontiers in Sustainable Food Systems*, *8*, 1291743.

Costa, M. D., Matitaputty, P. R., Waas, E. D., Kaihatu, S. S., Nurdin, M., Ralahalu, T. N., & Hau, D. K. (2025, April). Reproductive Performance of Swines, in the Local Community of Ambon Island Towards Sustainable Livestock Business. In *IOP Conference Series: Earth and Environmental Science* (Vol. 1484, No. 1, p. 012004). IOP Publishing.

North Sumatra Province Agriculture Office. (2016). Interim Livestock Development ReportStatistics of North Sumatra Province.

BPS of Districts Dairi. 2020

Tukan, H. D., Hartono, B., & Nugroho, B. A. (2020). Profile of Pig Farms in Bantala Village Lewolema Sub-district East Flores Regency East Nusa Tenggara Province. *International Research Journal of Advanced Engineering and Science*, *5*(1), 74-77.

Amam, Fanani, Z., Hartono, B., & Nugroho, B. A. (2019, November). The power of resources in independent livestock farming business in Malang District, Indonesia. In *IOP Conference Series: Earth and Environmental Science* (Vol. 372, No. 1, p. 012055). IOP Publishing.

Gopakumar, C. P., & Deka, R. P. (2020). Standard operating procedures for managing pig breeding farms.

Herrero, M., Grace, D., Njuki, J., Johnson, N., Enahoro, D., Silvestri, S., & Rufino, M. C. (2013). The roles of livestock in developing countries. *animal*, *7*(s1), 3-18.

Obi, F. O., Ugwuishiwu, B. O., & Nwakaire, J. N. (2016). Agricultural waste concept, generation, utilization and management. *Nigerian Journal of Technology*, *35*(4), 957-964.

Kuncahyo, B. Ecological footprint and biocapacity analysis of upper Cisadane Watershed. *Jurnal Pengelolaan Sumberdaya Alam dan Lingkungan (Journal of Natural Resources and Environmental Management)*.

Yan, Z., Wang, C., Xu, J., Huo, X., & Hussain, Q. (2019). Examining the effect of absorptive capacity on waste processing method adoption: a case study on Chinese pig farms. *Journal of Cleaner Production*, *215*, 978-984. Sustainable swines Breeding Business Financing Scheme. (2019). Director General of Livestock and Animal Husbandry. Jakarta.

S. Anwar. (2020) Study of the Potential for Development of Goats and Swines in North Labuhanbatu Regency to Support North Sumatra Province as a Producer of Goats and Swines. *Thesis*. Animal Husbandry Study Program. Faculty of Agriculture. USU. Medan.