Inclusive Business Model in the Sheep Value Chain: A Strategy to Enhance the Sustainability of Livestock Businesses, Indonesia

Julia Marisa [a*], Sukma Aditya Sitepu [a] and Muhammad Fajar [a]

[a] Department of Animal Husbandry, Faculty of Science and Technology, Pembangunan Panca Budi University, Medan, Indonesia.

Authors' contributions

This work was carried out in collaboration among all authors. Author JM designed the study, performed the statistical analysis, wrote the protocol, and wrote the first draft of the manuscript. Authors SAS and MF managed the analyses of the study and managed the literature searches. All authors read and approved the final manuscript.

Original Research Article

ABSTRACT

Aims: Analyzing and comparing the inclusiveness of farmers in every value chain through both cooperatives and non-cooperatives, and designing an inclusive business model in the sheep value chain to support business sustainability.

_____

*Corresponding author: E-mail: juliamarisa@pancabudi.ac.id;

Study Design: The design of this research is quantitative descriptive, using primary and secondary data. The data collection method involves the use of questionnaires through Focus Group Discussions (FGD) and in-depth interviews with respondents.

Place and Duration of Study: The research was conducted from November 2023-January 2024 in Sei Bingai District, Langkat Regency.

Methodology: Data analysis uses a methodology link with four analysis tools, namely value chain maps, business canvas models, and principles of new business models.

Results: The inclusive business model in the sheep value chain in Langkat Regency involves cooperatives and non-cooperative operations. Cooperatives facilitate farmers to jointly purchase sheep, obtain capital loans, and export. Whereas non-cooperative farmers can also operate independently through the contract farming model. The application of technology and green economy principles is also considered important to achieve sustainability. The establishment of village-owned enterprises (BUMDes) can also be used to empower farmers and increase village income. This entire model requires cooperation between farmers, the government, and other parties in the supply chain.

Conclusion: The involvement of farmers in the sheep Value Chain in Langkat Regency is crucial to support business continuity. The inclusive business model in the sheep value chain through cooperatives and non-cooperatives requires cooperation between farmers, the government, and other parties in the supply chain to achieve the sustainability of the farmers' business.

1. INTRODUCTION

Sheep farming business is one of the strategic commodities in Indonesia. One of the provinces in Indonesia that shows positive prospects in the sheep farming industry is North Sumatra, especially in Langkat Regency. Langkat Regency has 23 sub-districts with an area reaching 6,273.29 km and a population of about 1,098,660 people in mid-2023. With such demographics, Langkat Regency has great potential for the development of sheep farming [1].

Langkat Regency is one of the provinces with a high demand for sheep livestock. This indicates that there is a wide market opportunity, especially with the high consumer interest in culinary products made from sheep. This can be linked to the concept of inclusive business, where small-scale farmers, including those in the low economy, can be actively involved in the value chain.

Inclusive business is a business model where low-income individuals are placed as clients or customers, and producers or business owners as suppliers in the value chain [2]. The aim of inclusive business is to ensure that the poor can meet basic needs such as economic, social, and environmental in a sustainable way. This business model involves small-scale farmers in the decision-making of a value chain, thus offering new opportunities to conduct business responsibly and not only produce economic value but also social aspects [3]. However, some existing research still lacks focus on how to implement inclusive business in the context of farming, especially the business of fattening sheep [4,5].

Smallholder farmers can improve behavioral conditions so that they can be more productive in producing sheep meat. The sustainability of the sheep business, especially farmers who sell through cooperatives and collectors in Langkat District, needs to be studied more deeply. This is done to identify the success factors of inclusive businesses from farmers selling to cooperatives and collectors to create sustainability. However, previous research still has not included an in-depth study of the success factors of inclusive businesses in this context, especially in the context of sheep farming in Langkat District.

An approach with an inclusive business model in various sectors contributes to the advancement of the country and overcoming poverty, especially in poor and developing countries [6,7]. This research focuses on the involvement of sheep farmers in Langkat District who are members of village cooperatives and farmers who are not involved with cooperatives. This research is important to carry out because the results can be used as information for farmers in the sheep fattening business to improve their performance through the implementation of an

inclusive business model in the sheep Value Chain to support business sustainability.

The purpose of this study is to analyze and compare the inclusiveness of farmers in each value chain, both through cooperatives and non-cooperatives, in the hope that non-cooperative farmers can demonstrate their inclusivity and live prosperously. In addition, this study also aims to design an inclusive business model in the sheep Value Chain to support business sustainability.

2. METHODOLOGY

2.1 Research Approach

A quantitative descriptive research approach. This approach is used to describe primary data from analysis and phenomena occurring at the research site. The collected data include value chain maps, business canvases, principles of new business models, and prototype cycles. In addition to primary data, secondary data are also used, consisting of supporting data such as the profile of the research location, the socio-economic conditions of farmers, population numbers, respondent characteristics, and the institutional profile of farmers.

The methods used in this research include the use of questionnaires through Focus Group Discussion (FGD) and in-depth interviews with respondents. The research material involves cooperative and non-cooperative sheep farmers as well as field studies related to the Inclusive Business Model of Farmers in the Sheep Value Chain. The research objects involve agricultural practitioners, including producer farmers and groups.

2.2 Location and Time of Research

This research will be carried out from November 2023 to January 2024 in Sei Bingai District, Langkat Regency, because this area is one of the areas with great potential in developing a sheep farming business.

2.3 Variable Operational Parameters

The parameters observed in this research are related to the inclusive business model that involves cooperatives and non-cooperatives in the sheep Value Chain. The indicators used in this research are based on core activities such as inbound logistics, operations, outbound logistics, marketing and sales, and supporting activities such as firm infrastructure, human resources management, technology development, and procurement.

These operational variable parameters are used to measure farmer involvement in the value chain and to design an inclusive business model that can support the sustainability of the sheep farming business in Langkat Regency. By considering these operational variables, the research can provide a deeper understanding of the factors that influence farmer involvement in the sheep value chain and design a suitable business model to enhance the sustainability of the farmers' business [8].

2.4 Population and Sample

The population in this study encompasses all sheep farming business breeders in Sei Bingai Subdistrict, Langkat Regency. The population consists of 20 farmers, which are made up of 11 cooperative farmers and 9 non-cooperative farmers. The study uses a census method, where all farmers in the population are made as research samples. As such, this study aims to obtain a comprehensive and representative understanding of farmer involvement in the value chain, as well as to design an inclusive business model in the sheep value chain in Langkat Regency.

2.5 Data Collection Technique

The data collection techniques in this study include the use of questionnaires through Focus Group Discussions (FGD) and in-depth interviews with respondents, document analysis, informal discussions, and direct observations. Through these methods, the researchers can obtain comprehensive information about the involvement of farmers in the value chain and design an inclusive business model in the sheep Value Chain in Langkat Regency. These diverse data collection techniques allow researchers to gain a deep understanding of the field conditions and the factors affecting the sustainability of the sheep farming business in that area.

2.6 Data Analysis

Data analysis uses a methodology link with three analysis tools, namely value chain maps, business canvas models, and principles of new business models. The link methodology serves as a tool to evaluate the extent to which farmers are included in their supply chains. The process

of value chain mapping involves understanding all stages of sheep production, from the provision of raw materials such as mutton, cultivation, processing, marketing, and distribution to the end consumer. This value chain analysis allows us to understand the relationships and influences between different actors. As mentioned by [9], commodity value chain analysis aids us in comprehending the flow of production and how various actors can integrate with existing factors.

The canvas business model is employed as a tool to understand and identify the resources held by sheep farmers. As indicated by Osterwalder and Pineur (2010), a business model represents the fundamental concept of how an organization creates, delivers, and captures value. Therefore, at the heart of the business model concept is the company's value chain [6,8], which can be utilized as a tool to maximize opportunities [10].

The principles of the new business model are used to assess business interactions between farmers and consumers, thus enabling the determination of appropriate measures to increase the inclusivity of farmers. There are several principles in the new business model used to establish success in enhancing inclusivity between farmers and consumers. [11] mentions that these include four principles: Principle 1, partnership and collaboration among sheep farmers; Principle 2, product diversification; Principle 3, modern technology; and Principle 4, market development

3. RESULTS AND DISCUSSION

3.1 Sheep Inclusive Business Model

Inclusive business models in sheep farming involve the participation of various parties, including cooperatives and non-cooperatives. In the context of cooperatives, an inclusive business model can mean empowering sheep farmers through cooperatives, where they can share resources, knowledge, and market access. Cooperatives can also assist sheep farmers in accessing financial services, new technologies, and training needed to improve their productivity and efficiency. Meanwhile, in the context of non-cooperatives, an inclusive business model can involve collaboration with various parties, such as private companies, research institutions, and the government. For instance, private companies can play a role in supporting sheep farmers through partnership programs, where they can provide support in terms of marketing, distribution, and product development.

Previous research also indicates that inclusive business models can have a positive impact on sheep farming. For example, research by [12] and [13] shows that cooperatives and non-cooperatives can play a significant role in supporting sheep farming, including in terms of improving the quality of seeds, maintenance techniques, and market access.

An inclusive business model is a business model that arises from the existence of partnerships that support business actors. Partnerships contribute to reducing the gap between actors in the chain, thus forming mutually beneficial relationships. According to the link methodology, the inclusive business model involves identifying the value chain, the canvas business model, and the principles of a new business model, each of which will be discussed in the following.

3.2 Rantai Nilai Domba

The value chain of sheep farmers, both cooperative and non-cooperative, in Langkat Regency involves several key stages, which include production, processing, distribution and marketing, as well as sales and consumption. For more details, refer to Fig. 1.

Based on Fig. 1, the inclusive business model in the value chain of sheep in Langkat Regency can be realized through cooperation between farmers and other parties in the supply chain, such as through the contract farming model. The establishment of a village-owned enterprise (BUMDes) can also be an option to empower farmers and increase village income. Other important aspects in this model include breed selection, feed provision, pen arrangement, and disease control. Furthermore, involving technology and green economy principles can help achieve sustainable development goals. In general, this business model supports the sustainability of sheep farming and improves the welfare of farmers in Langkat Regency.

The value chain of sheep farming in Langkat Regency is a complex process involving several key stages, from production to distribution and marketing of the final product. Both cooperative and non-cooperative farmers play a significant role in maintaining this value chain.
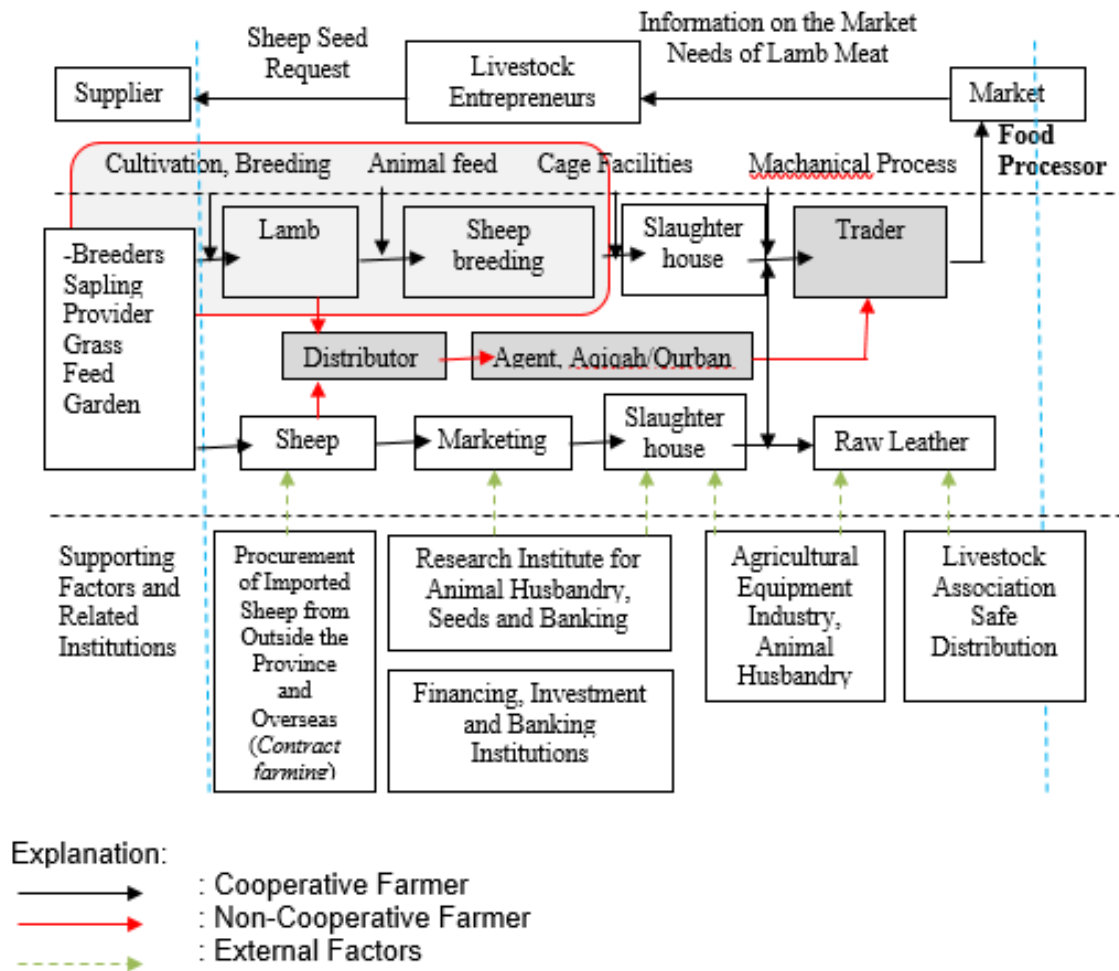
Fig. 1. Value chain of sheep farmers

The first stage in the value chain is production, where farmers select quality sheep breeds, manage feed and nutrition, and maintain livestock health. External factors such as climate change, agricultural policies, and the availability of natural resources affect the productivity and efficiency of farming. Recent research by [14] highlights the importance of the role of information and communication technology (ICT) in improving the production management of sheep farming, especially in terms of feed management and livestock health monitoring.

Next, the processing stage plays a crucial role in adding value to the product. Cooperative farmers often have better access to modern and standard processing facilities, while non-cooperative farmers may rely on traditional methods. External factors such as sanitation regulations, the latest processing technology, and access to capital affect the processing capacity of the farm [15].

According to research by [16], the use of efficient processing technology can increase production effectiveness and competitiveness of livestock products.

Distribution and marketing are other crucial stages in the value chain. Cooperative farmers tend to have greater access to organized markets through their cooperative networks, while non-cooperative farmers may rely on local markets and traditional traders. External factors such as transportation infrastructure, trade policies, and consumer preferences affect the distribution and marketing of products. Recent studies by [17] show that promoting sheep farming products through digital platforms can increase visibility and market access for farmers.

The sale and consumption of sheep products are influenced by several external factors, including consumer purchasing power, pricing policies,

and consumption trends. Cooperative farmers may have an advantage in setting stable prices and reaching the market through their cooperative networks. On the other hand, non-cooperative farmers may face challenges in competing with fluctuating prices in the open market. According to research by [18], the success of marketing sheep farming products depends on a good understanding of consumer preferences and the right marketing strategy.

In facing challenges and opportunities in the value chain of sheep farming, both cooperative and non-cooperative farmers in Langkat Regency can utilize modern technology, enhance cooperation among farmers, and effectively adapt to changes in the business environment [19]. Support from the government, non-governmental organizations, and the private sector is also crucial in enhancing the capacity and competitiveness of sheep farming in the region.

External factors play a crucial role in determining the outcome of the sheep value chain, both for farmers who are part of cooperatives and non-cooperatives (see Fig. 1). The supporting external factors for the sheep value chain are as follows: 1) Import procurement of sheep and procurement of sheep from outside the province or abroad; 2) Livestock research institutions, seeds, and banking: 3) Livestock Equipment Industry; 4) Livestock, Sales, and Distribution Associations

3.3 Sheep Canvas Business Model

The Business Model Canvas is a tool used to design and manage the business model of sheep farming in Langkat Regency, both cooperatives and non-cooperatives, in a simple and structured way. Key elements in this model include customer segments, value propositions, distribution channels, customer relationships, revenue streams, key resources, key activities, key partners, and cost structure (see Fig. 2). The main customers include local and regional markets, with a value proposition of high-quality sheep at competitive prices, and sales are conducted through various channels including local markets, social media, and livestock exhibitions [11].

Customer relationships are maintained through after-sales services and loyalty programs, especially in cooperatives. The main revenue streams come from the sales of sheep and by-products, with additional income from consulting

services and training. Key resources include farmland, quality parent sheep, quality feed, skilled labor, and supporting infrastructure. Key activities include sheep maintenance and fattening, animal health management, sheep sales, and marketing and distribution.

Key partners include feed suppliers, veterinarians, livestock research institutions, and local livestock organizations. Cooperation with local government and financial institutions is crucial for financial support and business development. The main cost structure includes feed costs, health care, labor wages, infrastructure and maintenance, and daily operational costs. Innovation in business management, the use of modern technology, and product diversification are keys to optimizing this business model [20,21,22].

3.4 Principles of the Sheep Business Model

The principles of the sheep farming business model in Langkat Regency can be classified into four parts. First, partnership and collaboration among sheep farmers in Langkat Regency are crucial points in building a sustainable business model. Research by [23] highlights that a solid partnership between farmers, both in cooperatives and non-cooperative networks, contributes to business success. In partnerships, farmers support each other in terms of input procurement, product processing, and marketing, thereby strengthening their position in local and regional markets.

Second, product diversification is a primary strategy in increasing added value and the sustainability of sheep farming businesses. Research by [24] found that sheep farmers in Langkat Regency tend to be more successful if they are able to process sheep products into various types, such as meat, milk, wool, and skin. Product diversification opens opportunities to enter a broader market and provides additional income for farmers.

The use of modern technology is also an important aspect in the sheep farming business model in Langkat. Research by [23] shows that the use of technology in sheep maintenance management, product processing, and marketing can increase efficiency and productivity. Technologies like computerized maintenance management systems and digital sheep health monitoring assist farmers in managing their businesses more effectively.

Customer Segmen		Value Propositions		Chanel	
Cooperative Farmer	**Non-Cooperative Farmer**	**Cooperative Farmer**	**Non-Cooperative Farmer**	**Cooperative Farmer**	**Non-Cooperative Farmer**
➢ Local and National Consumers ➢ Meat Processing Industry	➢ Local Consumers ➢ Collectors ➢ Local Industry	➢ Produk daging berkualitas ➢ Produk olahan ➢ Produk turunan ➢ Keberlanjutan	➢ Quality meat products ➢ Processed products ➢ Derivative products ➢ Sustainability	➢ Direct Seller ➢ ☐ Cooperative ➢ ☐ Supermarkets ➢ ☐ Online	➢ Direct Seller ➢ ☐ Seller ➢ ☐ Local Kiosk

Customer Relationships					
Cooperative Farmer	**Non-Cooperative Farmer**				
➢ Customer Service ➢ Loyalty Program	➢ Personal relationships ➢ Word of mouth marketing				

Key Partnerships		Key Activities		Key Resources	
Cooperative Farmer	**Non-Cooperative Farmer**	**Cooperative Farmer**	**Non-Cooperative Farmer**	**Cooperative Farmer**	**Non-Cooperative Farmer**
➢ Cooperative ➢ Government ➢ Financial Institutions ➢ Distributors	➢ Collectors ➢ Feed provider ➢ Government ➢ Financial Institutions	➢ Maintenance ➢ Processing ➢ Training ➢ Marketing	➢ Maintenance ➢ Processing ➢ Training ➢ Marketing	➢ Breeders ➢ Sheep ➢ Land ➢ Technology	➢ Breeders ➢ Sheep ➢ Land ➢ Simple tools ➢ Technology

Cost Stucture		Revenue Streams	
Cooperative Farmer	**Non-Cooperative Farmer**	**Cooperative Farmer**	**Non-Cooperative Farmer**
➢ Feed Costs ➢ Operational costs ➢ Training costs ➢ Marketing costs	➢ Feed Costs ➢ Operational costs ➢ Marketing costs ➢ Health costs	➢ Meat seller ➢ Partnership ➢ Export sellers	➢ Meat seller ➢ Local Market ➢ Processed products

Fig. 2. Sheep business canvas model

Table 1. Application of inclusive business to cooperative and non-cooperative farmers

No.	Cooperative Farmer	Non-Cooperative Farmer
1.	**Market Access:**	
	Cooperatives act as intermediaries that connect small farmers to larger and more profitable markets, at the local, regional, national, and international levels. This provides farmers with access to better prices and more stable markets	Independent farmers often face difficulties in accessing broader markets and typically rely on collectors or local markets that may offer lower prices. However, with the support of inclusive business, independent farmers can be assisted in building their own marketing network or collaborating with major traders.
2.	**Capacity Strengthening:**	
	Cooperatives provide training and technical guidance to farmers on good farming practices, sheep health management, and modern technology. This enhances the skills and knowledge of the farmers, allowing them to improve the productivity and quality of their livestock products.	Although not directly linked to cooperatives, independent farmers can receive training and technical guidance from government programs, NGOs, or private initiatives that focus on improving the skills of small farmers.
3.	**Processing and Added Value:**	
	Cooperatives often have processing facilities that allow sheep to be slaughtered and processed according to cleanliness and health standards. Processed products such as meat and wool have higher added value, providing farmers with the opportunity to earn greater income.	Independent farmers may encounter obstacles in terms of processing facilities, but through collaboration with third parties, they can gain access to processing facilities or processing services that allow them to add value to their products.
4.	**Access to Financing:**	
	Through cooperatives, farmers can access financing with more favorable terms. Cooperatives can provide microloans, access to credit programs from financial institutions, or capital assistance from the government.	Non-cooperative farmers often have limited access to formal financing. Inclusive business initiatives can provide access to microcredit programs, partnerships with financial institutions, or capital support from government and donor institutions to help them expand their businesses.
5.	**Sustainability and Environmental Management:**	
	Cooperatives can implement sustainable farming practices, such as waste management and integrated farming. This not only increases production efficiency but also maintains environmental balance.	Inclusive business programs can encourage independent farmers to adopt sustainable and environmentally friendly farming practices through education and incentives.

Lastly, market development is key to expanding the distribution of sheep products. Research by [24] highlights that wide market access, both locally and regionally, is crucial for the success of the sheep farming business model [25]. Through promotion, cooperation with suppliers and distributors, and participation in livestock exhibitions, farmers can increase the visibility and accessibility of their products in the market [26].

3.5 Implementation of the Sheep Inclusive Business Model

Inclusive business in sheep farming in Langkat Regency, both those incorporated in cooperatives and those independent (non-cooperatives), can be interpreted as efforts to include small farmers in a broader economic value chain and give them fair access to resources, markets, and opportunities for improving welfare. Table 1 is an explanation of how inclusive business is applied to both groups.

From the Table 1, it can be explained that the inclusive business in Langkat District aims to ensure that all sheep farmers, both those who are members of cooperatives and those who are independent, have equal access to economic opportunities. By connecting small farmers to broader markets, enhancing their capacity,

providing access to financing, and promoting sustainable practices, inclusive businesses contribute to the improvement of farmers' welfare and the overall regional economic development [27]. Through this approach, small farmers can increase their productivity, income, and resilience, while contributing to environmental and social sustainability [28].

4. CONCLUSION

The involvement of farmers in the sheep Value Chain is crucial to support business sustainability in Langkat Regency. Through cooperatives, farmers can collectively purchase sheep, export, and meet daily needs. On the other hand, non-cooperative farmers operate independently, from selection of breeds, feeding, maintenance, to selling and distributing sheep to the market. The inclusive business model in the sheep value chain involves cooperatives and non-cooperative operations, with cooperation between farmers, government, and other parties in the supply chain.

DISCLAIMER (ARTIFICIAL INTELLIGENCE)

Author(s) hereby declare that NO generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc) and text-to-image generators have been used during writing or editing of manuscripts.

ACKNOWLEDGEMENTS

COMPETING INTERESTS

Authors have declared that no competing interests exist.

REFERENCES

1. BPS, North Sumatra Province in Figures 2024;52.
   Available:https://sumut.bps.go.id/publicatio n/2024/02/28/a2b9ed5089227612befc7827 /provinsi-sumatera-utara-dalam-angka-2024.html
2. Isnawati R, Efendi NF, Wardhana B, 'Farm Veggieway" vegetable inclusion business model study in ponggok sub-district, blitar regency'. Muhammadiyah University of Sidoarjo; 2017.
   Available:http://eprints.umsida.ac.id/1627/
3. Anas WP, Inclusive business analysis of the palm oil value chain in sijunjung regency, West Sumatra Province.
4. Solikin N, Linawati L, Samari S, The financial inclusion of cattle farmers, the gum pattern as strengthening social capital and financial capital, J. Equivalence. 2021;7(2):220–234.
5. Sofiyanti M, Analysis of breeder inclusivity in the beef cattle value chain in blora regency, Central Java.
6. Hilmanugraha I. Factors for the success of inclusive business models in the fresh cow milk value chain (Case Study of KUD Giri Tani Bogor Regency); 2017.
7. Houshyar S, Fehresti-Sani M, Fatahi Ardakani A, Bitaraf Sani M, Cotton M. Comparison of sustainability in livestock supply chain. Environment, Development and Sustainability. 2023 Jul 17:1-25.
8. Marisa J, Syahni R, Hadiguna RA, Nofialdi Nofialdi, Sustainable fishery value chain (SFVC): Case Study in Tilapia Industry. 2024;14(1).
   Available:https://ijaseit.insightsociety.org/in dex.php/ijaseit/article/view/19492
9. Bonney L, Clark PR, Dent B, Fearne PA, Sustainable value chain analysis: An agri-food chain diagnostic. 2009;39.
10. Seppanen M, Makinen S. Towards a classification of resources for the business model concept', Int. J. Manag. Concepts Philos. 2007;2(4):389–404.
11. Marisa J, Syahni R, Hadiguna R, Nofialdi N, Analysis of the added value of sustainable tilapia fish industry of value chain actors in north sumatra, IOP Conf. Ser. Earth Environ. Sci. May 2023;1177(1):012010.
    DOI: 10.1088/1755-1315/1177/1/012010
12. Wulandari E, Sheep export supply chain structure analysis., Jember State Polytechnic; 2022.
13. Sutaryono YA, Kusnadi U, Sheep commodity value chain analysis in West Java., J. Agricultural Science. Indonesia. 2017;22(2):38–48.
14. Hasanah S, Mardiyanto, The role of information and communication technology (ICT) in improving sheep farming production management in langkat regency, J. Teknol. Agriculture. 2023; 8(2):78–89.

15. Sitepu SA, Marisa J, Increasing business income from dairy goat crossbreed etawah farming In payageli village deli serdang district, J. Saintech Transf. Feb. 2020;2(1):102–106.
DOI: 10.32734/jst.v2i1.3675

16. Wijaya A, The effect of using the latest processing technology on the effectiveness of sheep farming production in langkat regency., J. Inov. Technol. Agriculture. 2022;7(2):112–125.

17. Utami S, Use of digital platforms in marketing sheep farming products: Case study in langkat regency., J. Bisnis Dan Manaj. 2023;12(3):210–225.

18. Pratama A, Marketing strategy for sheep farming products based on local consumer preferences: The case of langkat regency., J. Ekon. And Business. 2023;9(1): 34–47.

19. Sitepu SA, Julia Marisa S, Management of etawa peranakan goat dairy farming. Media Scholar Partners; 2020.

20. Budiarto R, Use of modern technology in sheep rearing to increase efficiency and productivity, J. Breeder. Indonesia. 2019;16(1):123–134.

21. Rahman M, Product diversification in sheep farming: Case study in langkat, J. Agribusiness Dan Breeders. 2021; 17(3):210–225.

22. Lestari S, Putra A, Government support in the form of subsidies and training to increase the capacity of sheep farmers, J. Ekon. Agriculture. 2020;11(1):45–58.

23. ahmad R, Utomo D, Siregar R, Use of modern technology in sheep rearing management in langkat regency., J. Peternak. Indonesia. 2023;18(3):210–225.

24. Fitriani F, Fadli, Rahmi, Market development strategy for sheep products in langkat regency., J. Ekon. Agriculture. 2021;11(2):87–98.

25. Marisa J, Sitepu SA, Rianto AA. Analysis of actors and activities in value chain business sheep faulting. In Proceedings International Conference of Science Technology and Social Humanities. 2022, November ;1:69-76.

26. Sitepu SA, Marisa J, Putra A, Asmaq N. Technology in livestock development. Tahta Media Group; 2021.

27. Marisa J, Sitepu SA, Rianto AA, Suhut A. Profits analysis of the sheep breeding business in bulu cina village, Indonesia. Asian Journal of Advances in Agricultural Research. 2023;23(4):33-38.

28. Sitepu SA, Marisa J, Rianto AA, Suhut A. Socialization of goat and sheep reproduction management in bulu cina village, Indonesia. Asian Journal of Community Services. 2023;2(11):975-982.

Peer-review history:
The peer review history for this paper can be accessed here:
https://prh.ikprress.org/review-history/12204