

## **Priority Development of Dairy Farming Business to Support Government Policies in The Special Region of Yogyakarta And Central Java**

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### **ABSTRACT**

The implementation of government policies that align with the need to increase dairy productivity in Indonesia is crucial. Ensuring policy compatibility with the dairy sector's needs requires setting priorities through a direct, participatory, and bottom-up approach involving dairy sector stakeholders. This study aims to identify priority development programs for dairy farming businesses within the framework of government policies that align with the real needs of dairy sector stakeholders. A quantitative approach was used, employing the Analytical Hierarchy Process (AHP) pairwise comparison method. Dairy productivity was set as the main goal, assessed through three key criteria: capital, dairy farming infrastructure, and the quality of human resources. The evaluated alternatives included the use of information technology, livestock seed grants, mentoring, institutional support, government policies, and supply chain improvements. Data were collected via questionnaires from seven key informants representing dairy farmers, policymakers from the Department of Agriculture, Food, and Fisheries, Sleman Regency, non-governmental organizations (NGOs), dairy farmer associations, academics, researchers, and the dairy processing industry. The research was conducted in the Special Region of Yogyakarta and Central Java Province in August 2024. The findings indicate that mentoring is the most prioritized government policy program among dairy farmers, with a relative weight of 0.242. Additionally, the quality of human resources emerged as the most critical criterion for dairy sector stakeholders, with a relative weight of 1.000. These results highlight that improving the quality and education level of human resources in the dairy sector is a key factor in enhancing dairy productivity. The findings suggest that government programs should focus more on long term, farmer centered mentoring strategies, supported by consistent policy implementation, qualified facilitators, and collaboration with cooperatives and educational institutions to ensure sustainable dairy sector development.

**Keywords:** *Alternatives, Analytical Hierarchy Process, Criteria, Government Policies, and Priorities*

### **BACKGROUND**

Milk is an essential and prioritized food component, serving as one of the primary sources of animal protein in Indonesia. Milk is also a highly nutritious food product containing a wide range of essential nutrients (Smith et al., 2022). It is a significant source of high-quality protein, vitamins,

minerals, and fatty acids (Tunick and Van Hekken, 2015). Additionally, milk has a high biological value due to its essential amino acid content, which is essential for human health, and its high digestibility (Marangoni et al., 2018). This composition makes milk a widely favored and consumed protein source among Indonesians. In several countries, such as the United States and New Zealand, school milk programs have been implemented to promote milk consumption among students (Marsh et al., 2018; Nguyen, 2021).

According to the Dairy Commodity Outlook released by the Agricultural Data and Information Center in 2022 (Ministry of Agriculture, 2022), Indonesia's dairy production has experienced a decline of 0.10% per year, amounting to 893,563 tons from 2013 to 2022. This downward trend is projected to persist until 2026, with an estimated annual decrease of 0.17% (Ministry of Agriculture, 2022). As a result, a significant milk supply deficit has emerged. The Agricultural Data and Information Center reported a dairy deficit of 62.81 thousand tons in 2022 (Ministry of Agriculture, 2022). Although this deficit slightly decreased to 61.79 thousand tons in 2023, it is expected to rise again to 98.64 thousand tons in 2024 (Ministry of Agriculture, 2022).

The continuous decline in dairy production is attributed to several factors, including the scarcity of forage, the high cost of concentrate feed ingredients, genetic degradation in dairy cattle, and suboptimal farm management (Ministry of Agriculture, 2022). These challenges stem from various factors, such as farmers' knowledge levels, access to capital, and institutional support. The level of farmers' knowledge significantly influences their attitudes and decisions regarding dairy cattle management (Soerahman et al., 2016). Moreover, most smallholder farms still rely on traditional knowledge passed down through generations without empirical validation (Pratiwi et al., 2016).

Beyond knowledge levels, another crucial factor affecting dairy farmers' performance is access to capital. Financial resources significantly impact milk production among smallholder farmers (Adane, et al., 2016). Capital availability is also a fundamental component of sustainable agriculture in Indonesia (Sembada et al., 2019). However, this contradicts the economic reality faced by smallholder farmers, who generally have limited capital reserves. Prolonged income realization and declining revenues due to aging livestock further restrict farmers from generating sufficient financial capital (Sunarto et al., 2016).

Livestock infrastructure plays a vital role in enhancing dairy productivity and ensuring national food security. Wenggol et al. (2024), in their study, also stated that accessibility infrastructure influences food productivity. Infrastructure encompasses physical facilities that provide social and economic transport, irrigation, drainage, buildings, and public utilities essential for fulfilling basic human needs (Muller et al., 2015). Infrastructure development is a crucial element in national food security strategies and is considered a top priority in national development (Mulyani et al., 2020; Elmanuah and Santoso, 2024). However, infrastructure development in the livestock sector remains suboptimal and uneven. Fadillah et al. (2023) also added that smallholder farmers in Indonesia are unable to control or improve milk quality because there is currently no standardized infrastructure for monitoring milk quality, animal diseases, and management practices. This condition results in low and inefficient farmer productivity.

To address these challenges, the Indonesian government has introduced several policies and regulations. Law No. 18 of 2009 concerning Animal Husbandry and Animal Health (amended by Law No. 41 of 2014) forms the legal foundation for livestock development, including the obligation to improve animal health services, the quality of livestock, and farming practices. Additionally, Law No. 19 of 2013 on the Protection and Empowerment of Farmers mandates that each village with agricultural potential should be supported by at least one agricultural extension officer to improve farmers' capacity and productivity. At the strategic level, Presidential Regulation No. 18 of 2020 concerning the National Medium - Term Development Plan (RPJMN) 2020 - 2024 identifies food security and sustainable agriculture as national development priorities, emphasizing increased livestock production, including dairy, and improved farmer welfare. Furthermore, the Ministry of Agriculture Regulation No. 13/Permentan/OT.140/3/2017 on the Guidelines for the Development of Dairy Cattle Farming specifically outlines measures for dairy revitalization, including support for superior breeds, farm infrastructure, and farmer training.

The research focuses on Yogyakarta and Central Java, regions that play a vital role in Indonesia's dairy sector, significantly contributing to national food security through substantial milk production and robust livestock development. In Central Java, Boyolali Regency reached approximately 140,000 liters in 2024. According to the 2023 Dairy Cattle Establishment Statistics by BPS, Boyolali's prominence underscores the region's capacity in dairy production. Similarly in Yogyakarta, the agricultural sector, including dairy farming, contributed 2.06% to the province's Gross Regional Domestic Product (GRDP) in 2023, underscoring its economic importance. By examining these regions, the study seeks to enhance dairy productivity and support national food security through targeted development programs.

This research offers a novel contribution by integrating stakeholder perspectives through the Analytical Hierarchy Process (AHP) to determine the most effective priority development programs in the dairy farming sector. Moreover, by focusing specifically on Yogyakarta and Central Java, this study fills a gap in region-specific dairy development research and highlights the local challenges and strategic roles these areas play in national food security. The inclusion of diverse stakeholders such as farmers, policymakers, academics, and industry practitioners ensures that the findings are not only evidence-based but also grounded in practical realities. This approach supports more inclusive and context-sensitive policy recommendations, which are essential for achieving sustainable improvements in dairy productivity in Indonesia. Therefore, the aim of this study is to identify priority dairy farming development programs that are aligned with the real needs of stakeholders and can support more effective and efficient implementation of government policies to improve dairy productivity.

## RESEARCH METHODS

The research was conducted in the Special Region of Yogyakarta and Central Java Province in August 2024. The respondents in this study were experts in dairy farming development, selected through purposive sampling. The first respondent group consisted of dairy farmers residing in the Special Region of Yogyakarta or Central Java, with at least ten years of experience in dairy farming and serving as the head of a dairy farmer group. The second respondent group comprised government

representatives responsible for policymaking. Specifically, the respondent in this category was the Head of the Department of Agriculture, Food, and Fisheries in Sleman Regency. The third respondent group included members of non-governmental organizations (NGOs) actively involved in dairy farming development for at least ten years. These respondents played a significant role in farmer empowerment within the Special Region of Yogyakarta or Central Java and possessed in-depth knowledge of the farmer empowerment process. The fourth respondent group consisted of dairy cooperative managers with a minimum of ten years of experience, extensive knowledge of the dairy industry, and involvement in cooperatives located in Central Java or Yogyakarta. The fifth respondent group comprised academics specializing in dairy farming development, holding a doctoral degree, and conducting research in Central Java or Yogyakarta. The sixth respondent group consisted of researchers who actively study effective farmer empowerment strategies for improving livestock productivity. These respondents held doctoral degrees and were based in Central Java or Yogyakarta. The final respondent group included entrepreneurs operating in the dairy industry with a broad range of product differentiation, at least ten years of experience, and business operations located in the Special Region of Yogyakarta or Central Java.

A total of seven respondents were selected for this study. Although the number may appear limited, it is considered sufficient and representative for the Analytical Hierarchy Process (AHP) framework, which emphasizes expert judgment rather than large sample sizes. The strength of AHP lies in its ability to capture the insights of knowledgeable stakeholders who are deeply familiar with the subject matter. In this case, the selected respondents represent a diverse range of expert backgrounds, including farmers, policymakers, NGOs, cooperatives, academics, researchers, and industry practitioners. All of whom possess in depth expertise and long term involvement in the dairy sector within the research locations. Their collective input provides a balanced and comprehensive perspective for the prioritization analysis. A detailed classification of the study respondents is presented in Table 1.

**Table 1.** Research Respondents

Respondents	Number of people
Dairy farmers	1
Policymakers from the Department of Agriculture, Food, and Fisheries	1
Non-governmental organizations (NGOs)	1
Dairy farmer associations	1
Academics	1
Researchers	1
The dairy processing industry	1
Total	7

Source: Primary Data (2024)

Data for the study was collected through in dept interviews using a structured questionnaire and analysed using Expert Choice 11 software. The research employed the Analytical Hierarchy Process (AHP) method, which is an appropriate approach for determining the most critical and relevant dairy farming empowerment programs that align with farmers' needs. According to Baffoe (2019), the AHP method involves several key stages. The process begins with defining the problem and identifying the objectives to be achieved. This is followed by objectively determining the critical

criteria required to reach those objectives. Once the criteria are established, the next step is to identify alternative solutions that can address the problem. Afterward, a hierarchical model is constructed, which consists of three levels: the goal at the top, the criteria in the middle, and the alternatives at the bottom. The hierarchical model used in this study is illustrated in Figure 1.

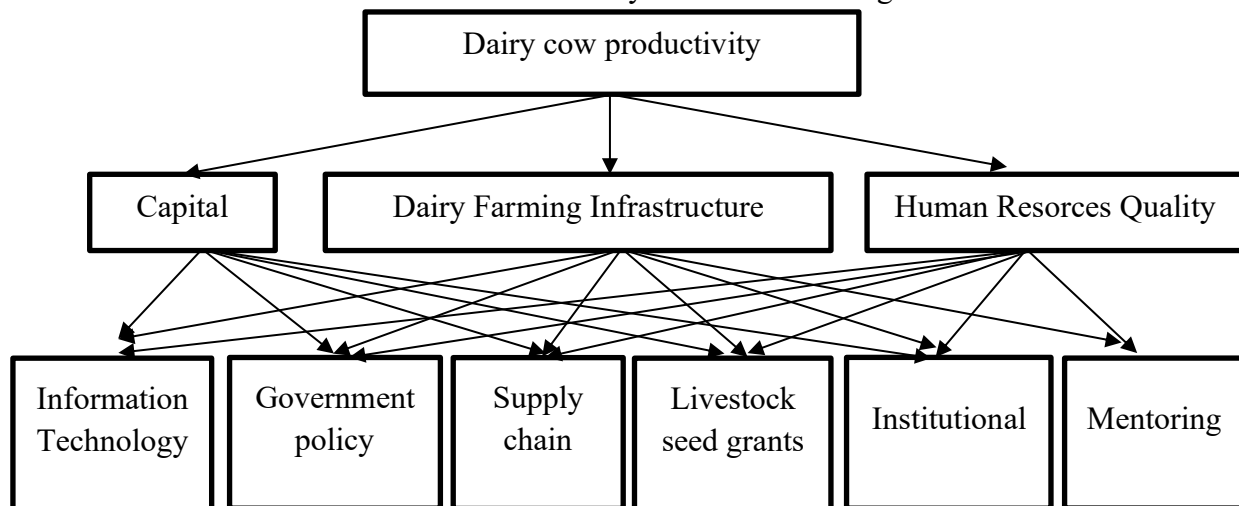


Figure 1. The Hierarchical model

Following the development of the hierarchy, pairwise comparisons are conducted between the criteria and the available alternatives. These comparisons are carried out on a one-on-one basis, where respondents assess the relative importance of each element using a predefined measurement scale. This stage is facilitated with the help of Expert Choice 11 software, and the resulting comparison scores are presented in Table 2.

**Table 2.** Pairwise Comparison

Intensity of Interest	Definition	Information
1	Equally important	Both element are equally important
3	Slightly more important	One factor being compared is slightly more important than the other component.
5	More important	One factor being compared is more important than the other component.
7	Much more important	One factor being compared is much more important than the other component.
9	Absolutely more important	One factor being compared is absolutely more important than the other component.
2, 4, 6, 8	A compromise of the above values	For example, a value between 3 and 5, such as 4, represents a choice that qualifies between slightly more important and more important.
Reciprocal	Reverse	If the pair is reversed, then the intensity is its reciprocal.

Source: Baffoe (2019)

To ensure the reliability of the judgments, the next step involves calculating the Consistency Index (CI) using the formula  $CI = (\lambda_{max} - n) / (n - 1)$ , where  $n$  represents the matrix size. The Consistency Ratio (CR) is then obtained by dividing the CI by the Random Index (RI), a standard Priority Development of Dairy Farming Business to Support Government Policies in The Special Region of Yogyakarta And Central Java (Noor, et al., 2025)

value based on the matrix size. A CR value of less than 0.1 is required to confirm acceptable consistency in the respondents' evaluations. The RI values used in this study are shown in Table 3. Finally, the aggregation of individual scores for each alternative yields a composite weight vector, which is then used to establish a final ranking of the alternatives.

**Table 3.** Random Index score

N	1	2	3	4	5	6	7	8	9	10
RI	0	0	0,58	0,9	1,12	1,24	1,32	1,41	1,45	1,49

Source: Baffoe (2019)

## RESULT AND DISCUSSION

The pairwise comparison matrix for the criteria produced a weight vector, as presented in Table 4. The weight vector results were then ranked from the highest to the lowest weight. The criterion with the highest weight represents the top priority. Overall, the AHP calculation results were consistent, with a consistency ratio (CR) < 0.1, indicating reliable decision-making.

**Table 4.** Pairwise Comparison Criteria

Criteria	Weight vector	Ranking
The Quality of Human Resources	0,476	1
Capital	0,308	2
Dairy Farming Infrastructure	0,216	3

Source: Primary Data (2024)

The weight vector of each criterion indicates its priority level based on the perspectives of the respondents. A higher weight value signifies a higher priority level for that particular criterion. According to Table 4, the ranking of criteria from highest to lowest priority is as follows: the quality of human resources, capital, and dairy farming infrastructure.

While capital and dairy farming infrastructure were acknowledged as important ranking second and third respectively in priority, the research findings suggest that these aspects were not viewed as the main priorities by respondents. This is primarily because capital and infrastructure, while essential, cannot function optimally without adequate human resource quality. Several informants emphasized that even with access to funding or modern infrastructure, the lack of knowledge, skills, and management capacity among farmers would still limit the effectiveness of these investments. For instance, well-equipped facilities or financial support would be underutilized if farmers lack the technical know-how to operate and maintain them efficiently. Moreover, respondents noted that external support for capital and infrastructure development is often available through government programs or cooperatives, making these resources relatively more accessible compared to consistent, long-term human resource development. Therefore, based on the perspectives of practitioners and experts, strengthening the quality of human resources serves as the foundational step upon which other components, like capital and infrastructure, can yield optimal results in dairy farming development.

The quality of human resources, with a weight vector of 0.476, emerged as the highest-priority criterion compared to the others. The quality of human resources is a critical factor in dairy farming

development, as it directly influences the technical aspects of farm management. Additionally, The quality of human resources serves as both the driving force and the key subject in livestock management. The quality of human resources in farm management encompasses skills, knowledge, and daily operational proficiency (Amam & Soetrisno, 2020).

The significance of this factor was explicitly highlighted during discussions with respondents. Informants with backgrounds in non-governmental organizations (NGOs) and research emphasized the crucial role of knowledge and skills in advancing the dairy farming sector. They strongly asserted that farmer empowerment and mentoring programs should be prioritized. This statement is validated by the study conducted by Fadillah et al. (2023), which found that the level of knowledge and awareness of Indonesian dairy farmers regarding milk quality parameters was low. Both sources emphasized the importance of farmer empowerment and assistance programs. The government's role in intensifying initiatives to enhance farmers' knowledge and skills is crucial. A lack of knowledge among farmers leads to suboptimal livestock production (Warsito et al., 2020). This, in turn, results in an unfavorable economic condition for farmers, hindering the development of the dairy farming industry. Addressing the knowledge gap between farmers' current understanding and the required expertise is a shared responsibility among researchers, the government, and the farmers themselves (Mason et al., 2023). Various knowledge enhancement programs include knowledge development, harmonization, regulation and storage, knowledge sharing, and practical application (Mason et al., 2023). Training and knowledge enhancement programs for farmers will lead to behavioral changes among smallholder dairy farmers, subsequently improving milk quality and increasing productivity. As the largest milk-producing countries in the world are dominated by smallholder dairies, such programs must be adapted to local circumstances and should incorporate farmers' knowledge and characteristics related to milk quality adoption practices (Nyokabi et al., 2021).

In addition to knowledge, insufficient skills also negatively impact farmers. Skill improvement must begin by motivating farmers to develop clear learning goals (Matsuo, 2019). Well defined learning objectives help provide an effective learning orientation. One method to enhance skills is through STEAM (Science, Technology, Engineering, Arts, and Mathematics) education, which integrates scientific and technical knowledge into livestock management practices (Liu et al., 2024). Furthermore, skill development can be achieved through various methods, including intensive workshops, problem-based learning, cooperative learning strategies, and case studies (Gunarathne et al., 2021). Based on stakeholder survey responses and the AHP calculations, priority alternatives for improving dairy cow productivity were identified. The selected priority alternatives are presented in Table 5.

**Table 5.** Priority alternative options to achieve dairy cattle productivity

Alternative	Weight vector	Ranking
Mentoring	0,242	1
Livestock Seed Grant	0,186	2
Government Policy	0,182	3
Institutional	0,170	4
Supply Chain	0,134	5
Information Technology	0,086	6

Source: Primary Data (2024)

According to Table 5, the ranking of priority alternatives for improving dairy cow productivity based on the perspectives of key stakeholders, including dairy farmers, policymakers from the Department of Agriculture, Food, and Fisheries, academics, researchers, non-governmental organizations, the dairy processing industry, and dairy farmer associations places mentoring as the most critical intervention. This is followed by livestock seed grants and government policies, which are considered essential for supporting farmers in improving herd quality and productivity. Institutional support ranks next, highlighting the importance of strengthening farmer organizations and cooperatives to enhance collaboration and resource sharing. Supply chain improvements are also deemed crucial to ensure efficient milk distribution and market accessibility. Lastly, the utilization of information technology (IT) is ranked as the lowest priority, indicating that while digital innovations are beneficial, they are perceived as less urgent compared to direct farmer support and policy interventions.

### **Mentoring**

Based on the analysis, mentoring was identified as the top priority alternative, with a weight vector of 0.242. Mentoring is a crucial strategy in determining the success of community empowerment programs (Maryani et al., 2018). There are three fundamental principles of community mentoring: (1) learning from the community, meaning that empowerment initiatives should be designed by, from, and for the community; (2) the mentor as a facilitator and the community as the main actor, indicating that mentors should guide and support rather than take control, allowing the community to lead the process; and (3) mutual learning and experience sharing, which emphasizes the need to integrate local knowledge with external innovations in a way that is wise and complementary (Maryani et al., 2018).

Currently, many farmers in Indonesia still rely on traditional knowledge. This is consistent with the study by Pratiwi et al. (2016), which found that the majority of smallholder farms continue to use theories without clear sources, merely passing down knowledge from previous generations that still require empirical validation. This highlights the importance of effective mentoring to enhance farmers' understanding and knowledge of modern livestock farming practices.

Farmers receive mentoring facilitated by the government through the Agricultural Extension Program. This program is structured in a tiered manner, ranging from the village/sub-district level to the national level. According to the Agricultural Data and Information Center in the 2023 Statistics on Human Resources and Farmer Institutions, the number of agricultural extension officers in Indonesia in 2022 was 67,433. Meanwhile, data from the Central Statistics Agency indicate that there were 83,794 villages/sub-districts in Indonesia in the same year. According to Act No. 19 of 2013 on Farmer Protection and Empowerment, each village with agricultural potential must be supported by at least one agricultural extension officer. Furthermore, based on official data from the Ministry of Agriculture, the number of villages with agricultural potential is 71,749 villages. This discrepancy between the number of extension officers and villages is a national issue, and similar conditions are observed at the regional level. In Yogyakarta, for instance, there are 438 villages with agricultural potential but only 386 agricultural extension officers, indicating that not every village has a dedicated officer. Likewise, in Central Java Province, there are 8,562 villages with agricultural potential, but only 3,118 extension officers are available. These figures reveal a significant gap between the number



of agricultural extension officers and the number of villages, highlighting the challenge in implementing the one village, one extension officer policy.

Based on the research conducted by Maryani et al. (2018), mentoring programs have been proven to enhance entrepreneurial motivation among livestock farmer groups. The imbalance in the number of extension officers responsible for mentoring farmers inevitably affects farmers' performance, which in turn impacts their productivity. This issue should be a key consideration for the government in increasing the number of agricultural extension personnel. Furthermore, mentoring programs should not be limited to government-supported agricultural extension officers. Non-governmental organizations (NGOs) and educational institutions can also play a crucial role in providing diverse and comprehensive mentoring initiatives to support farmers effectively.

Although mentoring is the highest-ranked alternative in terms of priority, several shortcomings and inefficiencies remain in its implementation. One major issue in the mentoring process is its lack of continuity, which disrupts farmer empowerment efforts. As a result, farmers may face losses, such as livestock mortality or poor animal health (Kimko et al., 2021). This issue was also highlighted by informants from livestock cooperatives and farmer groups, who stated that government-led mentoring programs often lack sustainability. This inconsistency makes it difficult for farmers to acquire and apply technical knowledge effectively. The low quality of mentoring is largely attributed to the inadequate competency of facilitators (Hayati, 2020).

In addition to the lack of continuity, another issue in the mentoring process is the misalignment of the mentoring curriculum (Muslim, 2017). Informants reported that facilitators often deliver material that farmers are already familiar with, resulting in little to no additional knowledge gain. This redundancy causes farmers to lose interest in participating in further mentoring sessions. When farmers' engagement declines, the knowledge absorption process becomes ineffective (Muslim, 2017).

These various issues need to be addressed by the government as the highest policymaking authority. First, the government can involve the community in decision-making processes, including the development of mentoring curricula for farmers (Muslim, 2017). Community involvement will help create a curriculum that aligns with farmers' actual needs, thereby reducing the mismatch between training materials and farmers' expectations. Second, the government can improve the quality and commitment of facilitators (Mardikanto et al., 2015). A higher level of dedication among facilitators will allow mentoring programs to be conducted more extensively and intensively, ultimately enhancing the effectiveness of farmer mentoring programs.

### **Livestock Seed Grants**

The analysis also shows that livestock seed grants ranked second among the alternatives chosen by the informants, with a weight vector of 0.186. Livestock seed grants refer to programs that provide superior breed assistance to farmers to enhance productivity and ensure the sustainability of livestock businesses. In the dairy sector, dairy cattle seed grant programs serve as one of the key strategies to boost domestic milk production. The success of milk production depends on both genetic and environmental factors, including farm management practices. According to Riski et al. (2016), dairy cattle productivity is influenced by several factors, such as genetic quality, feed management, age at first calving, lactation period, milking frequency, dry period, and overall cattle health. Poor

livestock management can result in significant losses for dairy farms, affecting various aspects of production and ultimately hindering the growth of milk output. Pratiwi et al. (2016) emphasize that reproductive management is a crucial aspect of dairy farming, as it directly impacts the dairy cattle population. Furthermore, the study explains that effective reproductive management ensures population growth by increasing birth rates and guaranteeing continuous milk production each year.

Interviews with informants revealed that the government has previously provided dairy cattle seed grants to farmer groups. However, these grants were often misallocated, such as distributing dairy cattle that were no longer productive. A notable example of this issue occurred with the Sarono Bangkit Farmer Group. According to informants, the Sarono Bangkit Farmer Group once received a grant of 40 dairy cattle, but all of the cattle were either no longer productive or not pregnant, making them unsuitable for sustaining dairy farming operations. As a result, farmers were reluctant to keep these cattle, and some of the grant livestock were ultimately sold instead of being utilized for milk production.

The lack of knowledge among farmers in dairy cattle management, particularly in reproductive management, increases the risk of financial losses due to the disruption of dairy cattle production cycles. Livestock seed grants serve as one of the key strategies to ensure the sustainability of dairy farming operations. Additionally, these grants play a crucial role in providing high-quality breeding stock to farmers. The expected impact of livestock seed grants includes increased milk production, cattle population growth, and improved farmer welfare. However, these benefits can only be fully realized if accompanied by adequate supporting instruments, such as effective mentoring programs to enhance farmers' knowledge and skills. Without proper training, seed grant programs may fail to ensure long-term sustainability and could lead to increased dependency on external assistance.

These evaluations should be carefully considered by the government. More concretely, the government can refocus the livestock seed grant program as an initiative that fosters farmer self-sufficiency. First, there is a need to shift the paradigm of the seed grant program. Assistance for farmers should empower them to become independent by reallocating funds from ineffective subsidies to more targeted and effective support programs (Patunru and Respatiadi, 2017). Encouraging self-reliance among farmers will help reduce dependency on government assistance. Second, effective and precise targeting of beneficiaries is essential. The misallocation of assistance is often caused by the absence of a prioritized set of criteria for selecting the most eligible recipients for aid programs (Supriyanto et al., 2022). Misdirected aid can have destructive consequences for both farmers and the government. Inefficient allocation of government funds may fail to generate significant positive impacts if the aid is not distributed to the right recipients. Third, adequate program monitoring is crucial. One of the key strategies to optimize the livestock seed grant program is to implement strict supervision regarding farmers' commitment to properly raising the cattle they receive (Yanti et al., 2023).

### **Government Policy**

Government policy ranks third in priority, with a weight vector of 0.182. It is also a crucial factor in dairy farming, playing a key role in maximizing dairy cattle productivity. Government policies influence all aspects of dairy farming that affect livestock productivity, including price

regulations, seed grant programs, mentoring initiatives, feed subsidies, breeding stock, veterinary medicine, and infrastructure development. These policies directly impact the operational management of dairy farms, which in turn affects overall milk production. Effective policies can drive growth in the dairy farming sector and ensure a stable milk supply to meet public demand. According to Amam and Harsita (2019), insufficient government support and inadequate policies for dairy farmer institutions result in limited facilities and infrastructure, ultimately preventing farmers from achieving their production goals.

Government policies play a significant role in ensuring the welfare of farmers. Based on discussions and interviews with informants, several issues and farmer needs are closely tied to the role of government policies. First, the restriction of livestock imports that pose a risk of carrying dangerous livestock viruses. One example is the initial outbreak of FMD in Indonesia, which is suspected to have resulted from the policy of importing meat and live animals from countries that had not yet been declared FMD-free, such as India (Rohma et al., 2022). After 32 years of being FMD-free, Indonesia faced a resurgence of the disease, causing severe negative impacts. An informant from a dairy cooperative stated that during the FMD outbreak, milk production dropped by up to 50%, leading to significant revenue losses for dairy cooperatives. Second, the need for legal certainty in livestock business operations. An informant with an entrepreneurial background highlighted that the government currently fails to provide legal guarantees for investors. The informant provided evidence of legal uncertainty in one of Indonesia's provinces, where an investment was unilaterally canceled by the local government, resulting in financial losses. Legal certainty is essential, as it serves as a form of protection for justice seekers (yustisiabel) against arbitrary actions (Julyano & Sulistyawan, 2019). Third, policies on affordable feed prices. An informant from the livestock farming sector reported that feed prices often experience increases and fluctuations, making this issue highly critical, as feed constitutes the largest cost component in livestock farming. Feed expenses account for 65% to 80% of total production costs (Matialo et al., 2020). Additionally, farmers frequently face feed shortages, further exacerbating their challenges in maintaining livestock productivity.

In general, government policies on livestock-related issues face several challenges that require evaluation. First, government policies are not decided through a participatory approach. Public involvement in decision-making can significantly enhance public satisfaction with policies (Muslim, 2017). Furthermore, active community participation in policymaking can improve policy effectiveness and efficiency (Fathurrohman & Dewi, 2023). Second, the utilization of data in decision-making remains suboptimal. The government needs to prioritize data processing and analysis when formulating policies to ensure that decisions are based on accurate and relevant information. The presence of big data as a basis for public policy-making can be utilized for various analyses, including social data analysis, historical data analysis, and predictive data analysis, which can enhance the accuracy of policy decision-making (Rahmanto et al., 2021).

## **Institutional**

Institutional support ranks fourth in priority, with a weight vector of 0.170. Institutions play a vital role in supporting dairy cattle productivity, particularly through farmer cooperatives, which serve as a platform for empowering small-scale farmers by providing access to superior breeding

stock, feed, and training programs. Additionally, institutions facilitate market access, ensuring stable and profitable dairy product sales. According to Rusdiana and Soeharsono (2019), nearly all dairy farmers are members of cooperatives, as these institutions serve as the backbone of dairy farming development. Through cooperatives, extension services and training programs can be more effectively delivered to farmers. Moreover, institutional support enhances collaboration with researchers and academics, facilitating the adoption of innovative dairy farming practices and milk processing technologies. This institutional framework helps farmers adapt to industry dynamics, ultimately boosting livestock productivity. Hermanto (2018) states that strengthening institutions is a key strategy in addressing future agricultural challenges. Additionally, institutions contribute to the efficient management and enhancement of human resource knowledge, ensuring the sustainability of livestock businesses. Amam and Harsita (2019) emphasize that empowering agricultural and rural institutions is essential for fostering farmer self-reliance, increasing household income, and developing agribusiness ventures.

Based on discussions and interviews with informants, institutional support is a crucial factor in the development of the livestock sector. First, agricultural institutions strengthen farmers' positions. Institutional support enhances farmers' entrepreneurial skills and protects them from vulnerabilities (Rustinsyah, 2019). A strong bargaining position enables farmers within livestock groups to have greater influence in conveying their aspirations to policymakers. An informant from the Sarono Bangkit Livestock Group stated that members and administrators frequently hold internal meetings to discuss various challenges faced by farmers. The outcomes of these discussions often serve as official group stances that are later communicated to relevant policymakers. Secondly, the institutional performance of dairy farmers with a positive and significant effect on dairy cattle productivity in the form of financial resources, technological resources, and physical resources (Soetrisno and Amam, 2020). An informant from a livestock group administration shared that members frequently engage in discussions about their experiences in overcoming challenges. These exchanges allow farmers to expand their knowledge and skills, improving their ability to manage livestock more effectively.

However, based on discussions with informants, several challenges hinder the strengthening of farmer institutions. First, many inputs and suggestions from livestock groups are often ignored by policymakers. The lack of responsiveness from policymakers in addressing constituent proposals leads to ineffective policies (Kimko et al., 2021). Informants stated that policymakers often appear selective in considering feedback from livestock groups, resulting in policies that do not align with farmers' actual needs. Second, policymakers show inconsistency in supporting the institutionalization of livestock farmers. An informant from a livestock group noted that communication and attention from policymakers are inconsistent. At the beginning of a new administration, government officials tend to engage actively and aspirationally with farmers. However, as time passes, dialogue and consultations become infrequent and less intensive. This lack of sustained engagement results in misaligned government policies (Asyiah et al., 2018). When policymakers fail to maintain consistent communication and commitment, they lose a clear understanding of on-the-ground conditions and the actual needs of their constituents.

## Supply Chain

The supply chain ranks fifth in priority, with a weight vector of 0.134. A supply chain indeed encompasses a series of interrelated processes that begin with determining customer needs. The process culminates in assembling the product or service and delivering it to the customer (Fagan, 2024). In dairy farming, the supply chain starts with production, which involves livestock management and environmental factors, followed by milk processing and storage, and finally, distribution and marketing until the product reaches consumers. An efficient supply chain is crucial for supporting dairy cattle productivity. A well-organized supply chain ensures the timely availability of essential resources such as balanced feed, superior breeding stock, and adequate infrastructure, thereby improving milk production efficiency (Zhu et al., 2018). Yun and Kurniawan (2019) state that productivity improvements in the agri-food supply chain can be achieved when supply chain members integrate their networks. Furthermore, a well-managed supply chain facilitates quality control in milk production, ensuring that dairy products meet safety and hygiene standards.

Based on discussions and interviews with informants, the supply chain plays a crucial role in ensuring the sustainability of the dairy industry. This was particularly emphasized by informants with entrepreneurial backgrounds. First, a smooth supply chain enables the dairy industry to expand its business optimally. An efficient supply chain also increases external investor confidence in supporting the industry. Informants highlighted that the diverse needs of both the dairy industry and dairy farmers make supply chain efficiency highly significant. When essential resources fail to be delivered in sufficient quantity or within the required timeframe, production imbalances occur, leading to declining profits for both farmers and the dairy industry. Second, adequate supply chain infrastructure significantly improves supply chain efficiency. Informants noted that supply chain infrastructure remains unevenly distributed, creating barriers to industrial and business expansion and resulting in market concentration in specific regions.

Based on discussions and interviews with informants, several key evaluations were identified regarding policymakers' commitment to improving the livestock supply chain. One major issue is the excessive length of the supply chain, which, in certain sectors, leads to inefficiencies and significant losses. Informants noted that an overextended supply chain can result in losses of up to 20% (Yun & Kurniawan, 2019). To address this, government intervention is necessary to streamline the supply chain and minimize inefficiencies. Additionally, a prolonged supply chain increases the risk of product deterioration, particularly for perishable livestock products, as longer distribution times contribute to spoilage and waste. Another critical issue is monopolistic practices, where a single entity dominates a particular segment of the supply chain. Informants reported that monopolies negatively impact fair competition, ultimately disadvantaging smaller businesses. According to Act No. 5 of 1999 on Monopolistic Practices and Unfair Business Competition, such practices hinder market fairness and limit opportunities for smaller industry players. The Business Competition Supervisory Commission (KPPU) must intensify its efforts to regulate monopolistic tendencies, ensuring that market profits are not concentrated in the hands of a few large businesses at the expense of smaller competitors.

Furthermore, informants emphasized the need to improve product quality within the supply chain, particularly in response to the influx of imported products into the livestock sector (Yun &

Kurniawan, 2019). The lower competitiveness of local products, combined with an oversupply of imported goods, shifts market profits toward foreign producers. Informants noted that several segments of the supply chain have already been significantly impacted by imported products, while local products continue to struggle in terms of competitiveness. This creates a dilemma for industry players, as they wish to support domestic products but find it challenging due to their lower quality compared to imports. To address this issue, the government must activate policies through two key approaches. First, improving the quality of domestic products by providing incentives and financial assistance to support local entrepreneurs in enhancing product quality and competitiveness. Second, tightening the monitoring of imported products through stronger import regulations and oversight, ensuring that imported goods do not dominate and disrupt the domestic livestock market.

### **Information Technology**

The utilization of information technology (IT) ranks as the lowest priority alternative, with a weight vector of 0.086. The implementation of IT can enhance productivity, efficiency, and business competitiveness, while also enabling adaptation to market changes and consumer demands (Purnomo, 2008). IT applications in dairy farming management include livestock monitoring, health tracking, feed management, data analysis, and marketing strategies. By integrating information technology into dairy farm management, farmers can improve operational efficiency and product quality, which in turn positively impacts productivity and business profitability.

The utilization of information technology (IT) in dairy farming in Indonesia is still in the development stage. Some farmers, particularly those operating on a large scale, have begun adopting software-based technologies for farm management, health monitoring systems, and feed management (Ruru et al., 2020). Additionally, some farmers have leveraged social media platforms for product marketing and customer engagement. However, many farmers, especially those in remote areas, face challenges such as limited internet access and a lack of supporting devices. These barriers hinder their ability to fully utilize IT, preventing them from maximizing the benefits of digital technology in improving farm operations.

Support from both the government and private sector is essential for optimizing the utilization of information technology in dairy farming to enhance productivity. Extension programs related to IT awareness and implementation need to be further improved. This initiative can begin with institutional efforts, such as cooperatives, which can play a role in educating, training, and providing access to technology for their members. Additionally, increasing farmers' awareness of the importance of technology-based data collection for better decision-making is crucial in ensuring the effective adoption of IT in the dairy farming sector.

Based on discussions with informants, IT utilization has not been prioritized in the development of the dairy farming industry. Several factors contribute to this situation. First, farmers' limited knowledge of digital technology. An informant from a livestock group administration stated that farmers struggle to use digital technology, as they primarily rely on it for basic communication purposes rather than advanced farm management. Second, the high cost of IT implementation. The use of digital technology requires significant financial investment, which makes it difficult for farmers to access IT adequately. Their financial focus is primarily on meeting household and livestock needs, leaving little room for investing in technology. Third, inadequate infrastructure in livestock

farming areas. An informant from a livestock group administration reported that poor internet connectivity poses a significant challenge to IT adoption. This issue is further exacerbated by limited access to alternative internet services, making it even more difficult for farmers to integrate technology into their operations.

These challenges must be evaluated and addressed by the government as the primary policymaker. First, training and mentoring programs for farmers on IT utilization must be implemented. Maryani et al. (2018) state that mentoring programs can enhance farmers' motivation and knowledge. However, it is crucial to ensure that these programs are conducted continuously and with high quality (Kimko et al., 2021) to ensure that farmers can effectively adopt IT-based solutions in their operations. Second, the government needs to accommodate farmers' IT-related needs. The availability of livestock infrastructure connected to IT plays a significant role in the digitalization of dairy farming (Kochetkova and Shiryaeva, 2022). Therefore, infrastructure development that facilitates digital transformation in the livestock sector must be accelerated in a more concrete manner. Third, financial support is essential for accelerating digitalization. Providing capital assistance to farmers for IT-related needs has a substantial impact on the adoption of digital technology. Financial support can contribute to the development of the livestock sector by improving financial and credit policies to increase livestock and production (Stepasyuk and Titenko, 2020).

Overall, the findings of this study emphasize the critical importance of non-technical support, particularly mentoring, in improving dairy productivity in Yogyakarta and Central Java. Mentoring was identified as the top priority alternative by stakeholders, highlighting the need for continuous and effective capacity building programs. The quality of human resources emerged as the most influential factor among the three main criteria assessed, surpassing capital and infrastructure. This underscores the view that without competent and skilled human resources, technical improvements alone are insufficient to drive sustainable progress in the dairy sector. Additionally, livestock seed grants and policy interventions were also recognized as essential components, although their success heavily depends on proper targeting, consistent implementation, and alignment with farmers' actual needs. These results provide a clear direction for future dairy farming development programs and support a more effective alignment between farmer needs and government policy in order to enhance national dairy productivity and food security.

## CONCLUSION AND SUGGESTION

The results of the analysis and discussion indicate that non-technical approaches, particularly business mentoring from the government, should be the top priority. Meanwhile, technical approaches, such as livestock seed grants, are the next priority that must be incorporated into government programs. Therefore, in livestock development policies, particularly those aimed at enhancing dairy cattle productivity effective government mentoring is essential. An effective government mentoring program should be characterized by continuity, curriculum relevance, and facilitator competency. It must be implemented consistently and be tailored to the specific needs and local conditions of dairy farmers. The government should actively involve farmers in developing mentoring content, assign well-trained and committed facilitators, and ensure regular follow-up to

monitor progress. Collaboration with cooperatives, NGOs, and educational institutions can further enhance mentoring reach and quality. In this way, mentoring becomes not only a one time training activity but a sustained empowerment process that equips farmers with the knowledge, skills, and confidence to manage their dairy businesses independently and productively.

Future research should explore the scalability and long term impact of mentoring programs across different regions in Indonesia. Additionally, further studies could analyze the cost effectiveness of combining technical and non-technical approaches in government assistance programs. Another area worth exploring is the role of digital tools in enhancing mentoring and farmer training, especially in rural areas with limited physical access to extension services.

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### REFERENCES

- Adane, Z., K. Shiferaw, and B. Gebremedhin. 2016. Source of Technical Inefficiency of Smallholder Farmers in Milk Production in Ethiopia. *African Journal of Agricultural Research*. 11(19): 1777-1786. <https://doi.org/10.5897/AJAR2015.10533>
- Amam, A., & Harsita, P. A. 2019. Aspek Kerentanan Usaha Ternak Sapi Perah di Kabupaten Malang. *AGRIMOR*, 4(2). <https://doi.org/10.32938/ag.v4i2.663>
- Amam, A., & Soetrisno, S. 2020. Peranan Sumber Daya terhadap SDM Peternak dan Pengembangan Usaha Ternak Sapi Perah di Kawasan Peternakan Sapi Perah Nasional (KPSPN). *Jurnal Peternakan Indonesia (Indonesian Journal of Animal Science)*, 22(1). <https://doi.org/10.25077/jpi.22.1.1-10.2020>
- Asyiah, S., Adnan, M. F., & Mubarak, A. 2018. Evaluasi Implementasi Kebijakan Pendidikan Gratis Di Kabupaten Pasaman. *JPSI (Journal of Public Sector Innovations)*, 2(1). <https://doi.org/10.26740/jpsi.v2n1.p1-9>
- Baffoe, G. 2019. Exploring the utility of Analytic Hierarchy Process (AHP) in ranking livelihood activities for effective and sustainable rural development interventions in developing countries. *Evaluation and Program Planning*, 72. <https://doi.org/10.1016/j.evalprogplan.2018.10.017>
- Elmanuah E., and E. B. Santoso. 2024. Arahana Pengembangan Infrastruktur dalam Mendukung Ketahanan Pangan Di Kecamatan Bataguh, Kabupaten Kapuas. *Journal of Multidisciplinary Research and Development*. 6(4): 802-807. <https://doi.org/10.38035/rj.v6i4>
- Fadillah, A., B. H. P. D. Borne, O. N. Poetri, H. Hogeveen, W. Umberger, J. Hetherington, dan Y. H. Schukken. 2023. Smallholder Milk-Quality Awareness in Indonesia Dairy Farms. *Journal Dairy Science*. 106:7965-7973.

Fagan, M. L., 2024. Supply Chain Management. <https://doi.org/10.4337/9781035329601.00012>



- Fathurrohman, R. A. N., & Dewi, D. S. K. 2023. Dinamika Kebijakan Pemerintah Indonesia Dalam Menangani Endemi Penyakit Mulut Dan Kuku (PMK) Di Tahun 2022. *Jurnal Ilmu Sosial Dan Ilmu Politik (JISIP)*, 12(3). <https://doi.org/10.33366/jisip.v12i3.2670>
- Gunarathne, N., Senaratne, S., & Herath, R. 2021. Addressing the expectation–performance gap of soft skills in management education: An integrated skill-development approach for accounting students. *International Journal of Management Education*, 19(3). <https://doi.org/10.1016/j.ijme.2021.100564>
- Hayati, B. N. 2020. Evaluasi Program Pemberdayaan Masyarakat Kelompok Ternak “Lancar Rejeki.” *Jurnal Sosiologi USK (Media Pemikiran & Aplikasi)*, 14(1). <https://doi.org/10.24815/jsu.v14i1.16901>
- Hermanto, N. 2018. Pengentasan Kemiskinan di Perdesaan: Pengembangan SDM, Penguatan Usaha, dan Inovasi Pertanian. *Forum Penelitian Agro Ekonomi*, 35(2). <https://doi.org/10.21082/fae.v35n2.2017.139-150>
- Julyano, M., & Sulistyawan, A. Y. 2019. Pemahaman Terhadap Asas Kepastian Hukum Melalui Konstruksi Penalaran Positivisme Hukum. *Crepido*, 1(1). <https://doi.org/10.14710/crepido.1.1.13-22>
- Kementerian Pertanian. 2022. Outlook Komoditas Peternakan Susu (Kementerian Pertanian, Ed.). Kementerian Pertanian.
- Kimko, T., Akmal, Fitriani, & Moento, P. A. 2021. Evaluasi Kebijakan Program Bantuan Pemberdayaan Peternak. *Societas: Jurnal Ilmu Administrasi & Sosial*, 10(2).
- Kochetkova, O., and E. V. Shiryayeva. 2022. Perspective architecture of dairy farming enterprises, using modern digital technologies for sustainable development. *IOP Conference Series: Earth and Environmental Science*. Vol 965. <https://doi.org/10.1088/1755-1315/965/1/012062>
- Liu, C. H., Horng, J. S., Chou, S. F., Yu, T. Y., Huang, Y. C., Ng, Y. L., & La, Q. P. 2024. Explore links among marketing knowledge, data literacy, skill improvement, and learning attitude in STEAM application for hospitality and tourism education. *International Journal of Management Education*, 22(1). <https://doi.org/10.1016/j.ijme.2023.100919>
- Marangoni, F. E. Verduci, L. Pallegirino, A. Ghiselli. 2018. Cow’s Milk Consumption and Health Professional’s Guide. *Journal of the American College of Nutrition*. 1-9.
- Mardikanto, Totok, dan P. Soebianto. 2015. Pemberdayaan Masyarakat dalam Perspektif Kebijakan Publik. Bandung: Alfabeta.
- Marsh, S., Jiang, Y., Carter, K., & Wall, C. 2018. Evaluation of a Free Milk in Schools Program in New Zealand: Effects on Children’s Milk Consumption and Anthropometrics. *Journal of School Health*, 88(8). <https://doi.org/10.1111/josh.12649>
- Maryani, I., Mustofa, A., & Septian Emma Dwi, J. 2018. Efektivitas Pendampingan Kelompok Dalam Meningkatkan Motivasi Berwirausaha Peternak Sapi Perah. *JPPM (Jurnal Pengabdian Dan Pemberdayaan Masyarakat)*, 2(1). <https://doi.org/10.30595/jppm.v2i1.2059>

- Mason, E., Cornu, S., & Chenu, C. 2023. Stakeholders' point of view on access to soil knowledge in France. What are the opportunities for further improvement? *Geoderma Regional*, 35. <https://doi.org/10.1016/j.geodrs.2023.e00716>
- Matialo, C. C., Elly, F. H., Dalie, S., & Rorimpandey, B. 2020. Pengaruh Biaya Pakan Terhadap Keuntungan Peternak Babi Di Desa Werdhi Agung Kecamatan Dumoga Barat. *Zootec*, 40(2). <https://doi.org/10.35792/zot.40.2.2020.30194>
- Matsuo, M. 2019. Empowerment through self-improvement skills: The role of learning goals and personal growth initiative. *Journal of Vocational Behavior*, 115. <https://doi.org/10.1016/j.jvb.2019.05.008>
- Muller, M., Biswas, A., Martin-Hurtado, R., & Tortajada, C. 2015. Built infrastructure is essential. In *Science* (Vol. 349, Issue 6248). <https://doi.org/10.1126/science.aac7606>
- Mulyani, S., F. M. Putri, B. W. Andoko, F. Akbar, dan S. Novalia. 2020. Dampak Pembangunan Infrastruktur terhadap kondisi Ketahanan Pangan di Indonesia (Studi Kasus Provinsi Bali). *Jurnal Ketahanan Nasional*. 26(3): 421-438.
- Muslim, A. 2017. Analisis Kegagalan Program Nasional Pemberdayaan Masyarakat dalam Membangun Kemandirian Masyarakat Miskin (Studi Kasus di Provinsi Daerah Istimewa Yogyakarta, Jawa Tengah, dan Jawa Timur). *Jurnal Penyuluhan*, 13(1). <https://doi.org/10.25015/penyuluhan.v13i1.14524>
- Nguyen, V. H. 2021. School-based nutrition interventions can improve bone health in children and adolescents. *Osteoporosis and Sarcopenia*. 7: 1-5. <https://doi.org/10.1016/j.afos.2021.03.004>
- Nyokabi, S., P. A. Luning, I. J. M. de Boer, L. Korir, E. Muunda, B. O. Bebe, J. Lindahl, B. Bett, and S. J. Oosting. 2021. Milk Quality and Hygiene: Knowledge, Attitudes and Practices of Smallholder Dairy Farmers in Central Kenya. *Food Control* 130:108303
- Patunru, A. A., and H. Respatiadi. 2017. Protecting the Farmers (Improving the Quality of Social Protection Schemes for Agricultural Workers in Indonesia). Center for Indonesian Policy Studies. <https://doi.org/10.35497/270482>
- Pratiwi, D. A., Sulistyawati, M., & Hermawan. 2016. Hubungan Antara Tingkat Pengetahuan Dan Sikap Peternak Sapi Perah Dengan Penerapan Prosedur Pemerahan. *E Student Journal*, 5(4), 1–15.
- Purnomo, W. 2008. Pemanfaatan teknologi informasi dan komunikasi dalam pembelajaran SMA YPPGI Nabire. *Jurnal Teknologi Dan Rekayasa*, Vol.2(2004).
- Rahmanto, F., U. Pribadi, dan A. Priyanto. 2021. Big Data: What are the Implications for Public Sector Policy in Society 5.0 Era ?. *IOP Conference Series: Earth and Environmental Science*. 717.
- Riski, P., Purwanto, B. P., & Atabany, A. 2016. Produksi dan Kualitas Susu Sapi FH Laktasi yang Diberi Pakan Daun Pelepah Sawit (Milk Production and Its Quality of FH Cows Fed Oil Palm Frond). *Jurnal Ilmu Produksi Dan Teknologi Hasil Peternakan*, 4(3).

- Rohma, M. R., A. Zamzami, H. Putri, H. Adelia, dan D. Cahya. 2022. Kasus Penyakit Mulut dan Kuku di Indonesia: Epidemiologi, Diagnosis Penyakit, Angka Kejadian, Dampak Penyakit, dan Pengendalian. National Conference of Applied Animal Science. Politeknik Negeri Jember. Jember, Indonesia.
- Ruru, I. M. N., Lenzun, G. D., & Lombogia, S. O. B. 2020. Peran Teknologi Informasi Dalam Penyuluhan Peternakan Di Desa Kanonang Kecamatan Kawangkoan Barat Kabupaten Minahasa. *Zootec*, 40(1). <https://doi.org/10.35792/zot.40.1.2020.27203>
- Rusdiana, S., & Soeharsono, S. 2019. Upaya Pencapaian Daya Saing Usaha Sapi Perah Melalui Kebijakan Pemerintah dan Peningkatan Pendapatan Peternak. *Agriekonomika*, 8(1). <https://doi.org/10.21107/agriekonomika.v8i1.5111>
- Rustinsyah, R. 2019. The significance of social relations in rural development: A case study of a beef-cattle farmer group in Indonesia. *Journal of Co-Operative Organization and Management*, 7(2). <https://doi.org/10.1016/j.jcom.2019.100088>
- Santoso, P. 2010. Analisis Kebijakan Publik. In Analisis Kebijakan Publik.
- Sembada, P., G. Duteurtre, dan C. H. Moulin. 2019. The essential role of farm capital in the sustainability of smallholder farms in West Java (Indonesia). *Cahiers Agricultures*. 28(15): 1-8.
- Siswoyo, H., Setyono, D., & Fuah, A. 2013. Analisis Kelembagaan dan Peranannya terhadap Pendapatan Peternak di Kelompok Tani Sumpay Tampomas Kabupaten Sumedang Provinsi Jawa Barat. *Jurnal Ilmu Produksi Dan Teknologi Hasil Peternakan*, 1(3).
- Smith, N. W., A. J. Fletcher, J. P. Hill, W. C. McNabb. 2022. Modeling the Contribution of Milk to Global Nutrition. *Frontiers in Nutrition*. 8:716100. <https://doi.org/10.3389/fnut.2021.716100>
- Soerahman, A. N., Sulistyati, M., & Taspirin, D. 2016. Hubungan Antara Pengetahuan Dan Sikap Dengan Tindakan Peternak Sapi Perah Dalam Upaya Pencegahan Penyakit Mastitis. *Students E-Journal*, 5(4), 1–11.
- Soetriono and Amam. 2020. The performance of institutional of dairy cattle farmers and their effects on financial, technological, and physical resources. *Jurnal Ilmu-Ilmu Peternakan*. 30(2): 128-137.
- Stepasyuk, L. and Z. Titenko. 2020. Financial and Organizational Implementation of State Support for Livestock Producers. *Modern Management Review*. 27(1): 95-103. <https://doi.org/10.7862/rz.2020.mmr.10>
- Sunarto, E., Nono, O. H., Lole, U. R., & Henuk, Y. L. 2016. Kondisi Ekonomi Rumah tangga Peternak Penggemukan Sapi Potong Pada Peternakan Rakyat di Kabupaten Kupang Economic Conditions of Beef Cattlemen Households in Small Scale Farm at Kupang District. *Jurnal Peternakan Indonesia*, Februari, 18(1), 21–28.

- Supriyanto, A., J. A. Razaq, Purwaningtyas, dan A. Ariyanto. 2022. Keputusan Pemberian Bantuan Sosial Program Keluarga Harapan Menggunakan Metode AHP dan SAW. *Jurnal Manajemen, Teknik Informatika, dan Rekayasa Komputer*. 21(3): 639-652.
- Tunick, M. H., and D. L. Van Hekken. 2015. Dairy Product and Health: Recent Insight. *Journal of Agricultural and Food Chemistry*. 63(43). <https://pubs.acs.org/doi/10.1021/jf5042454>
- Warsito, S. H., Widodo, O. S., & Wulandari, S. 2020. Pengetahuan Manajemen Peternakan Dan Pemanfaatan Hasil Ternak Sebagai Sumber Gizi Masyarakat Di Kecamatan Baron Kabupaten Nganjuk. *Jurnal Layanan Masyarakat (Journal of Public Services)*, 2(2). <https://doi.org/10.20473/jlm.v2i2.2018.69-71>
- Wenggol, K. M. A., F. W. Ballo, dan M. I. H. Tiwu. 2024. Pengaruh Infrastruktur terhadap Produktivitas Pangan di Kecamatan Titehena Kabupaten Flores Timur. *Jurnal Ekonomi, Akuntansi, dan Manajemen*. 3(3): 261-277.
- Yanti, D., Asdi Agustar, & Rusda Khairati. 2023. Efektifitas Program Bantuan Ternak Sapi Potong Sebagai Salah Satu Strategi Penganggulan Kemiskinan Di Kabupaten Padang Pariaman. *Jurnal Niara*, 16(1). <https://doi.org/10.31849/niara.v16i1.13951>
- Yun, Y., & Kurniawan, A. 2019. Pengaruh Integrasi Rantai Pasokan Terhadap Keunggulan Bersaing Melalui Kinerja Rantai Pasokan pada Peternak Sapi Perah di Kabupaten Bandung Barat. *Jurnal Ilmu Manajemen Dan Bisnis*, 10(1). <https://doi.org/10.17509/jimb.v10i1.15079>
- Zhu, Q., Krikke, H., & Caniëls, M. C. J. 2018. Supply chain integration: value creation through managing inter-organizational learning. *International Journal of Operations and Production Management*, 38(1). <https://doi.org/10.1108/IJOPM-06-2015-0372>