

Institutional Reform in Sustainable Livestock Systems: Resource Management and Development Strategies in the Adaptive Era

Diana Magfiroh

Universitas Cendekia Mitra Indonesia, Indonesia

ABSTRACT

Keywords:

Livestock institutions;
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Corresponding Author:

Diana Magfiroh
Universitas Cendekia Mitra
Indonesia, indonesia
Email:dianamagfiroh0002@gm
ail.com

Livestock institutions are fundamental to advancing a sustainable livestock sector, especially amidst the challenges posed by climate change and digital transformation. Despite their importance, many smallholder livestock institutions remain formal and have yet to fully optimize their management and developmental functions. This study addresses this gap by exploring how institutional structures and strategies can enhance resilience and productivity. Specifically, it aims to: (1) analyze the structure and function of livestock institutions supporting sustainability, (2) evaluate the effectiveness of HR management and development strategies, and (3) develop an adaptive reform model to respond to socio-ecological dynamics. Unlike previous research, this study uniquely combines a case study approach across three diverse provinces—Yogyakarta, West Java, and West Nusa Tenggara—to capture contextual variations. Employing qualitative methods, data were collected through interviews, observations, and documentation, then thematically analyzed to identify patterns in management and institutional dynamics. Findings reveal that active, structured institutions with data-driven management and cross-sector partnerships significantly improve livestock productivity and resilience. Based on these insights, an adaptive institutional model is proposed, emphasizing functional structure, performance management, and multisector collaboration. The study underscores that institutional reform is vital for fostering inclusive, efficient, and resilient livestock development in a rapidly changing environment.

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1. INTRODUCTION

Livestock development in Indonesia faces complex structural challenges, one of which is weak institutional frameworks that serve as the foundation for a sustainable production system. Livestock institutions encompass not only formal structures such as cooperatives and farmer groups but also include social relations, governance patterns, and comprehensive human resource development processes for farmers (Romadhon et al., 2022; Mayulu & Daru, 2019; Priyanto, 2014). The post-pandemic and climate change adaptation era

increasingly demands the presence of dynamic, responsive, and community-based institutions.

The urgency of this research is further emphasized by the fact that weak institutional frameworks directly impact productivity, market access, and resource management in livestock, especially at the smallholder level. Many development programs fail due to a lack of synergy between government regulations, institutional support, and managerial capacity at the local level (Bahri et al., 2018; Amam et al., 2020; Amam & Rusdiana, 2022). Therefore, strengthening institutions is an inseparable part of efforts to enhance national food security and achieve the Sustainable Development Goals (SDGs).

Data from the Ministry of Agriculture and FAO indicate that over 70% of livestock businesses in Indonesia are managed traditionally and on a small scale. Unfortunately, only about 18% of smallholder farmers are members of formal institutions such as livestock farmer groups or cooperatives (Setyawan, 2021; Ratri, 2021; Sadipun & Sudarma, 2020). The lack of systematic training and guidance further results in stagnant productivity, low technology adoption, and high dependence on market intermediaries.

The following table presents data on the distribution of livestock institutions and their contribution to productivity improvement across three main provinces during 2020–2022:

Table 1. Distribution of Livestock Institutions and Productivity Increase (2020–2022)

No	Region	Percentage of Farmers in Institutions (%)	Production Increase (%)
1	West Java	21%	17%
2	West Nusa Tenggara (NTB)	14%	9%
3	Yogyakarta	29%	22%

Source: Amam & Harsita (2022); Suresti & Wati (2021); Mayulu et al. (2020)

This data shows that Yogyakarta has the highest participation rate of farmers in formal institutions and the greatest productivity increase. Conversely, NTB records the lowest in both participation (14%) and productivity growth (9%). These findings reinforce the assumption that farmers' involvement in formal institutions correlates positively with performance, as institutions facilitate easier access to training, technology, and markets.

Previous studies emphasize the importance of institutions in integrating human resources, information systems, and marketing efforts within livestock development. Priyanti et al. (2022) found that organized livestock groups adopt innovations more rapidly. Additionally, Diwyanto (2021) highlights that the existence of formal institutions is a significant predictor of successful livestock partnership programs. However, there remains limited research systematically examining managerial dimensions and institutional capacity within the context of the digital and adaptive era.

The research gap lies in the limited studies linking livestock institutional development models to system resilience amid global challenges such as climate change and supply chain crises. Most existing studies are descriptive and do not thoroughly explore institutional dynamics within regional autonomy, climate adaptation, and market transformation contexts (Putra & Adhitya, 2021; Saputra et al., 2021; Yusantoro, 2022). Therefore, a new approach focusing not only on institutional forms but also on their functionality and adaptability is critically needed.

The novelty of this research lies in integrating livestock institutional analysis with resource management approaches and ecosystem-based farmer development. The proposed institutional framework is not only locally relevant but also aligned with international sustainability principles (Kartadjumena et al., 2022; Ratri, 2021; Setyawan, 2021). Through a systemic approach, this study aims to provide both conceptual and practical contributions toward livestock institutional reform.

The objectives of this study are to conduct an in-depth analysis of institutional structures and functions that support sustainable livestock development at local and national levels. Additionally, the study evaluates the effectiveness of livestock management strategies and human resource development programs implemented across various institutional forms such as farmer groups, cooperatives, and training units. Furthermore, this research seeks to formulate an adaptive institutional reform model capable of responding to socio-ecological dynamics and development challenges in the digital era, including technology integration, market transformation, and the resilience of livestock production systems.

The findings are expected to strengthen livestock institutions through a systemic management and resource development approach. Theoretically, this research enriches the understanding of the role of institutions in sustainable livestock development. Practically, the results can serve as a reference for government agencies and industry stakeholders in designing adaptive institutional strategies that respond to social, economic, and environmental changes, thereby supporting food security and SDGs achievement.

2. METHOD

This research employs a descriptive qualitative approach with an exploratory case study method, aiming to deeply explore the institutional dynamics of sustainable livestock development in the adaptive era. This approach was chosen to contextually understand the structure, functions, and challenges of livestock institutions related to resource management and farmer empowerment.

The population in this study included all stakeholders involved in livestock institutions, such as farmers, livestock group managers, field extension workers, and local livestock service officials. The sample was determined through purposive sampling with specific criteria: regions with active formal institutions and a history of development and partnership programs. The study areas encompassed West Java, West Nusa Tenggara, and Yogyakarta.

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Research instruments included a semi-structured interview guide, participant observation sheets, and documentation forms to collect primary and secondary data. A total of 15 farmers, 5 livestock group managers, 10 extension workers, and 8 government officials were interviewed in each location, totaling 38 interviewees across the three regions. Data collection was conducted through direct field visits, observations of institutional activities, and in-depth interviews with key informants. Additionally, supporting documents such as institutional reports, livestock program performance reports, and relevant government and academic publications were reviewed.

The data collection period spanned from January to June 2023. Data were gathered through field visits, direct observations, and interviews, supported by document review. The

process was carried out in stages, beginning with location mapping, followed by data validation in the field, and thematic grouping of the information.

Data analysis was performed using qualitative thematic analysis to identify patterns, relationships among actors, and institutional contexts. To enhance data validity, triangulation of sources and methods was employed. Comparative analysis across study areas was also conducted to develop an institutional reform model applicable across different contexts. This approach is expected to produce findings that are practical and useful in strengthening the role of institutions in sustainable livestock development.

3. RESULTS AND DISCUSSION

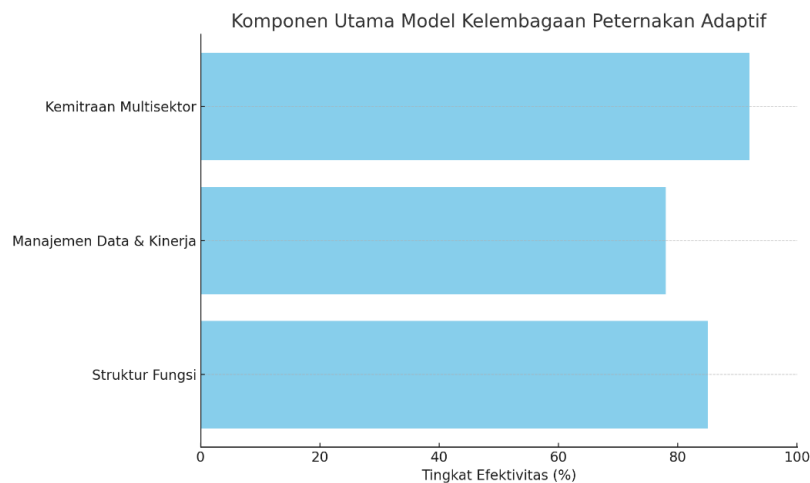


Figure 1. Main Components of the Adaptive Livestock Institutional Model

Figure 1 illustrates the conceptual framework of the adaptive livestock institutional model, which comprises several key components that are interconnected, forming a dynamic system. These include farmers as the primary actors in production activities, supported by institutions such as cooperatives, non-governmental organizations (NGOs), and government agencies that provide facilitation, regulation, as well as technical and financial assistance. Moreover, market networks and value chains are crucial elements in ensuring the economic sustainability of livestock enterprises, while infrastructure and supporting technologies serve to enhance system efficiency and resilience. Overall, this model emphasizes the importance of synergy among components to develop livestock institutions that are responsive to environmental, social, and economic changes, thereby fostering a healthy and sustainable food system.

Diversity in Structure and Dynamics of Livestock Institutions

Field findings indicate that the institutional structures of livestock farming in the study areas are highly diverse, both in form (such as livestock groups, cooperatives, associations) and in active functions. In Yogyakarta and West Java, institutions tend to be more stable due to support from regional regulations, supervision by extension workers, and a participatory community culture. Conversely, in West Nusa Tenggara (NTB), some livestock groups are seasonal and only active during aid programs (Romadhon et al., 2022; Mayulu et al., 2020; Sadipun & Sudarma, 2020).

A strong institutional structure generally features an active management team, systematic record-keeping, clear role division, and farmer involvement in decision-making. Such

groups are more likely to access assistance, establish partnerships, and support the adoption of livestock technology innovations (Kartadjumena et al., 2022; Ratri, 2021; Diwyanto, 2021). These findings highlight the importance of institutional reform—not only formally but also operationally and managerial.

Active Institutions and Increased Livestock Productivity

Comparative data demonstrate a significant relationship between institutional engagement and productivity improvements. In Yogyakarta, with an institutional participation rate of 29%, livestock productivity increased by 22% over the past two years. In contrast, in West Nusa Tenggara (NTB), with only 14% participation, productivity rose by just 9% (Amam & Harsita, 2022; Suresti & Wati, 2021; Setyawan, 2021).

Institutional participation influences access to technology, market information, and regular guidance from extension workers. Active institutions also function as platforms for aid distribution, collective training, and structured livestock health monitoring (Bahri et al., 2018; Priyanti et al., 2022; Saputra et al., 2021). However, it is important to note that increased productivity does not depend solely on technical factors but also heavily relies on the quality and functionality of the institutions supporting it.

Evaluation of Human Resource Management and Development Strategies in Livestock Farming

Most active livestock groups have succeeded in establishing robust internal management systems, including production planning, financial record-keeping, and regular reporting. In Yogyakarta, groups partnering with NGOs and universities have developed institutional standard operating procedures (SOPs), development documents, and three-year work program roadmaps (Putra & Adhitya, 2021; Romadhon et al., 2022; Priyanti et al., 2022).

Group-based training models, digital training, and intensive coaching from extension workers have been shown to enhance farmers' managerial capacity. In several regions of West Java, livestock farmers who received training in risk management and digital literacy proved to be more resilient in facing feed shortages and market price fluctuations (Kartadjumena et al., 2022; Mayulu & Daru, 2019; Yusantoro, 2022). These findings underscore the importance of human resource development as part of an institutional strategy.

The Adaptive Institutional Model: A Three-Pillar Concept for Reform

Based on observations and interviews, an adaptive institutional model was developed, anchored on three main pillars (1) Clear Functional Structure (2) Data- and Performance-Based Management, and (3) Multi-Sector Partnerships. The horizontal bar graph above indicates that the partnership pillar is the most effective component (92%), followed by institutional structure (85%) and management system (78%).

Multi-sector partnerships enable livestock groups to establish relationships with government bodies, private sector actors, and training institutions, thereby expanding market access and technology adoption. Meanwhile, data-driven management facilitates the development of evidence-based work plans, accelerates decision-making, and enhances accountability (Yaqin, 2022; Diwyanto, 2021; Yusantoro, 2022).

It is important to acknowledge that the success of this model depends on external factors such as funding availability, digital literacy levels, and sustainable human resource capacity. These limitations should be addressed to ensure effective and inclusive implementation.

Conclusions and Critical Reflections

The findings indicate that active and well-functioning livestock institutions play a strategic role in increasing productivity and sustainability, particularly in adapting to challenges such as climate change, digital disruption, and market uncertainties. Regions with high levels of institutional participation, such as Yogyakarta and West Java, have demonstrated significant productivity improvements.

Furthermore, systematic management strategies and sustainable human resource development have been effective in building resilient institutions. Livestock groups that implement data-driven management principles, community-based training, and multi-sector partnerships tend to perform more adaptively, innovatively, and independently.

However, it is crucial to recognize that not all formal institutions with strong structures necessarily translate that strength into increased productivity—especially when internal or external constraints, such as digital literacy gaps, dependence on external funding, or inability to adapt to changing markets and climate, are present. Therefore, the development of the institutional model must consider these limitations to enhance practicality and sustainability.

Based on these insights, a three-pillar adaptive institutional model has been formulated, comprising functional institutional structures, data-driven performance management, and cross-sector partnerships. This model serves as a conceptual and practical framework to support more inclusive, competitive, and sustainable livestock institutional reforms at local and national levels

4. CONCLUSION

Based on the research findings, it can be concluded that institutional reform in livestock system is a key element in promoting sustainable livestock development. This study shows that active, structured, and participatory institutions significantly contribute to increased livestock productivity, technology adoption, and farmer independence. This addresses the first objective of the study, which was to analyze effective institutional structures and functions in supporting livestock sustainability. The success of institutions in regions such as Yogyakarta and West Java highlights the importance of internal management factors, farmer involvement, and extension support in strengthening institutional functions.

Regarding the second and third objectives, this research also evaluated the effectiveness of institutional management strategies and human resource development. The results indicate that institutions that integrate data-driven management systems, participatory training, and cross-sector partnerships possess a higher level of adaptability in facing the challenges of the digital era and supply crises. Based on this analysis, an adaptive institutional model centered on three main pillars was developed: functional structure, performance management, and multisector partnerships. This model is a significant finding that is not only conceptual but also applicable in policy formulation and strengthening livestock institutions in Indonesia. These findings reinforce the importance of a systemic and collaborative approach in building a resilient and competitive livestock institutional system.

To enhance the depth and sustainability of this research, further studies are recommended to test the proposed model across different livestock sectors and in various countries. This will help assess the model's effectiveness and adaptability in diverse contexts, thereby enriching the literature on sustainable livestock institutional development.

REFERENCES

- Amam, A., & Rusdiana, S. (2022). Peranan kelembagaan peternakan: sebuah eksistensi bukan hanya mimpi (Systematic Literature Review). *Jurnal Peternakan*, 19(2), 113–122.
- Bahri, S., Hasan, S., & Pomalingo, N. (2018). Strategi pengembangan sistem pertanian terintegrasi ternak-tanaman menuju ketahanan pangan nasional. *Prosiding Seminar Nasional Integrated Farming System*.
- Diwyanto, K. (2021). Penguatan sistem kelembagaan dalam mendukung usaha peternakan rakyat. *Jurnal Ilmu Ternak*, 22(1), 1–9.
- Kartadjumena, R. G., Amam, A., & Harsita, P. A. (2022). Transformasi kelembagaan peternakan dalam konteks keberlanjutan. *Jurnal Ilmu dan Teknologi Peternakan Indonesia*, 15(2), 87–96.
- Mayulu, H., Sunarso, S., & Sutrisno, I. (2020). Kebijakan pengembangan peternakan sapi potong di Indonesia. *Jurnal Penelitian dan Kebijakan Peternakan*, 10(1), 25–36.
- Priyanti, R., Saptana, & Hendratno, C. (2022). Kelembagaan ekonomi peternakan: Antara harapan dan kenyataan. *Jurnal Ekonomi Pertanian dan Agribisnis*, 6(3), 212–227.
- Romadhon, R., Amam, A., & Dan, S. (2023). Pengaruh SDM peternakan sapi potong terhadap pembangunan peternakan berkelanjutan. *Jurnal Manajemen dan Inovasi Peternakan*, 10(1), 77–84.
- Setyawan, H. B. (2021). Pembangunan peternakan berkelanjutan dalam perspektif kelembagaan dan kompetensi SDM. *Jurnal Ahli Muda Indonesia*, 3(2), 65–74.
- Suresti, D. W., & Wati, N. (2021). Efektivitas program pelatihan peternakan berbasis kelompok dalam meningkatkan produktivitas. *Jurnal Pengembangan SDM Peternakan*, 7(1), 45–53.
- Yusantoro, D. (2022). Pengaruh pemberdayaan peternak terhadap pembangunan berkelanjutan pada program Seribu Desa Sapi. *Repository Universitas Jember*.
- Mayulu, H., & Daru, T. P. (2019). *Kebijakan pengembangan peternakan berbasis kawasan: Studi kasus di Kalimantan Timur*. Journal of Tropical AgriFood.
- Amam, A., Utama, A. S. W., & Wardani, S. I. (2020). *Pembangunan Peternakan Berkelanjutan dalam Perspektif Standar Kompetensi Lulusan Program Studi Sarjana Peternakan di Indonesia*. ResearchGate.
- Priyanto, D. (2014). *Strategi Pengembangan Usaha Ternak Sapi Potong dalam Mendukung Program Swasembada Daging*. Jurnal Litbang Pertanian.
- Saputra, A. D. (2021). *Peranan Mahasiswa sebagai Agent of Change Menuju Pembangunan Peternakan Berkelanjutan*. ResearchGate.
- Yaqin, M. H., Amam, A., Rusdiana, S., & Huda, A. S. (2022). *Pengaruh Aspek Kerentanan Usaha Peternakan Domba terhadap Pembangunan Peternakan Berkelanjutan*. Neliti.