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Transformation of People's Livestock Business to Increase Buffalo Production in Indonesia: The Case of Gayo and South Kalimantan

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Abstract

This study explores the development of the communal buffalo farming in Indonesia with the focus on two regions: Gayo Lues, Aceh and Hulu Sungai Selatan-Hulu Sungai Utara (HSS-HSU) in South Kalimantan. Buffalo farming is significant to the Indonesian culture and it has accustomed to the local environment, yet, the country is increasingly relying on imports due to the increasing demand of buffalo meat. The government initiatives that can assist local buffalo farming usually work on technical enhancement, yet they fail sufficiently to consider the social and cultural dimensions, which carry much weight on the long-term wellbeing of the agricultural system. The study employed the use of ethnographic research designs, which included participant observation, in-depth interviews, and Focus Group Discussions (FGD) with stakeholders of buffalo farming communities in both areas. A local dynamic and values investigation based on the structures of buffalo farming was possible through data analysis. The findings indicated that there existed extensive regional disparities within the institutions that serve farming and how farmers conduct their activities. Gayo Lues use the peruweren system to unite livestock keeping and Gayo cultural practices and rituals. HSS-HSU uses hadang to exploit swamp resources to graze buffalos. The study identified methods through which things can be transformed through Village-Owned Enterprises (BUMDes) or Joint Village-Owned Enterprises (BUMDesma). Such ventures will be able to assist in the systematic livestock management, including the capital pooling and stakeholder assistance. According to the analysis, successful change requires a holistic approach, which entails the fusion of technological advancement with a profound understanding of the local culture and traditions. This strategy must balance between the need to modernize and the need to uphold traditions. It must ensure that the population of buffalo remains healthy without losing the community to its farming culture.

Keywords: Buffalo Farming, Village-Owned Enterprises (Bumdes), Cultural Preservation, Sustainable Agriculture, Smallholder Farmers, Livestock Management, Economic Autonomy.

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Introduction

The Indonesian buffalo cattle is a significant component of agriculture in the region and it demonstrates how fertile the local culture is and how the animals have been acclimatized to their environment. They serve as a significant source of life to most of the indigenous people, particularly the swamp buffalo (Bubalus bubalis). They serve as a source of meat, perform the role of animals, and symbolize cultural rituals in most of the traditional ceremonies (Prihandini et al., 2023). The systems of buffalo farming in various regions of Indonesia are not similar and this demonstrates the level to which the animals are related to the people who are residing there (Nayak, 2025). Most of these practices and customs are inherited one generation to another (Prihandini et al., 2023). The cultural significance of buffalo farming has been adapted to local requirements, and the level of demand of buffalo meat in Indonesia is increasing; therefore, the country has to depend on imports to satisfy its demands (Giyono et al. 2020). Such dependence on exogenous sources of animal protein poses significant risks, particularly in cases when the international market transformation or the shift in trade patterns occur (Giyono et al. 2020; Rohaeni et al., 2023). The government has begun to support local buffalo farms, but this has primarily been in terms of making things technically better and not going far enough to solve the social and cultural problems that the farming systems are significant (Atmoko et al., 2023).

Lack of coherent approach to strengthen community buffalo farming into the more resilient and independent system has caused stagnation and the decrease of buffalo population in some areas (Atmoko et al., 2023). The existing approaches tend to overlook the aspect of incorporating local values and practices in farming models, which can make people more engaged and make food security improved (Rohaeni et al., 2023). In order to ensure sustainability and enhance the overall productivity of buffalo farming systems, we should have a more ample approach considering the social and cultural premise of buffalo farming (Rohaeni et al., 2023).

In order to be food independent depending on animal protein, you must employ the resources and knowledge available locally. The development of buffalo production schemes which are localized, such as Gayo buffalo farms in Gayo Lues Regency and swamp buffalo farms in Hulu Sungai Selatan (HSS) and Hulu Sungai Utara (HSU), in South Kalimantan can significantly reduce the level of imported meat, and make the nation more self-sufficient (Rohaeni et al., 2023). By introducing local values and traditional practices to the agricultural system, Indonesia will be able to make buffalo farming more sustainable, robust food security, and more stable economy in the rural regions (Rohaeni et al., 2023).

The buffalo agriculture change in Indonesia needs a complex strategy that would involve both technical innovations and knowing the local culture and practices. Indonesia can enhance buffalo farming industry by promoting an inclusive environment where indigenous knowledge and practices are appreciated to make sure that as the increasing demand of animal protein is supplied, the cultural heritage of this significant livestock is not lost. The article covers the attempts to change the buffalo farming enterprise of people into two friends who have buffalo clumps in the area that are recognized by the government.

Research Method

The research employs ethnographic methods and techniques in gaining an insight into how the buffalo farming businesses have changed in terms of their social and cultural aspects. The sources of primary data will involve stakeholders in buffalo farming areas of Gayo Lues Regency, Aceh, and South Hulu Sungai (HSS) and North Hulu Sungai Regency, South Kalimantan comprising of farmers, traditional leaders, and local governmental representatives. Participant observation, in-depth interviews, and Focused Group Discussions (FGDs) were used in their data collection, which enabled them to explore the views and practices regarding buffalo farming in the area comprehensively (Adanaciooglu et al 2023; Abdel-Salam & Fahim, 2018).

The use of the ethnographic analysis methods makes it easy to conduct continuous analysis of data and the researcher may explore deeper into the dynamics and local values that inform the buffalo farming systems in the two regions. The method is especially applicable since it acknowledges that cultural practices and agricultural practices are interconnected in a complex way, which is necessary to grasp the sustainability and productivity of buffalo farming (Widaningsih 2023). To illustrate this, the combination of traditional knowledge and modern agricultural technologies will help to increase the efficiency of buffalo farming as the study revealed that the involvement of farmers in the training programs could lead to the significant increase in technical efficiency (Adanacıoğlu et al., 2023).

The points of view of the stakeholders are also quite important as it is essential to understand how significant the community would be in terms of participating in the development of buffalo farming systems. Farmers and local leaders can provide the information that will be used to design the policies that are sensitive to various cultures and address the needs of the communities in question (Abdel-Salam & Fahim, 2018). This is particularly crucial in such areas as Gayo and South Kalimantan, where a local custom and practice is valuable in farming (Fitriani et al., 2023).

To obtain a better sight on buffalo farming, it can be expected that the results of this ethnographic research will have a positive impact. They will put a stress on the need of approaches containing local traditions and values, and strategies that can increase production and value. Maulana et al., (2023) argue that this practice can lead to more sustainable agricultural practices that are consistent with the cultural identities of the people living in the area, which will eventually keep food and economic security in the area at a higher level (Regash, 2024).

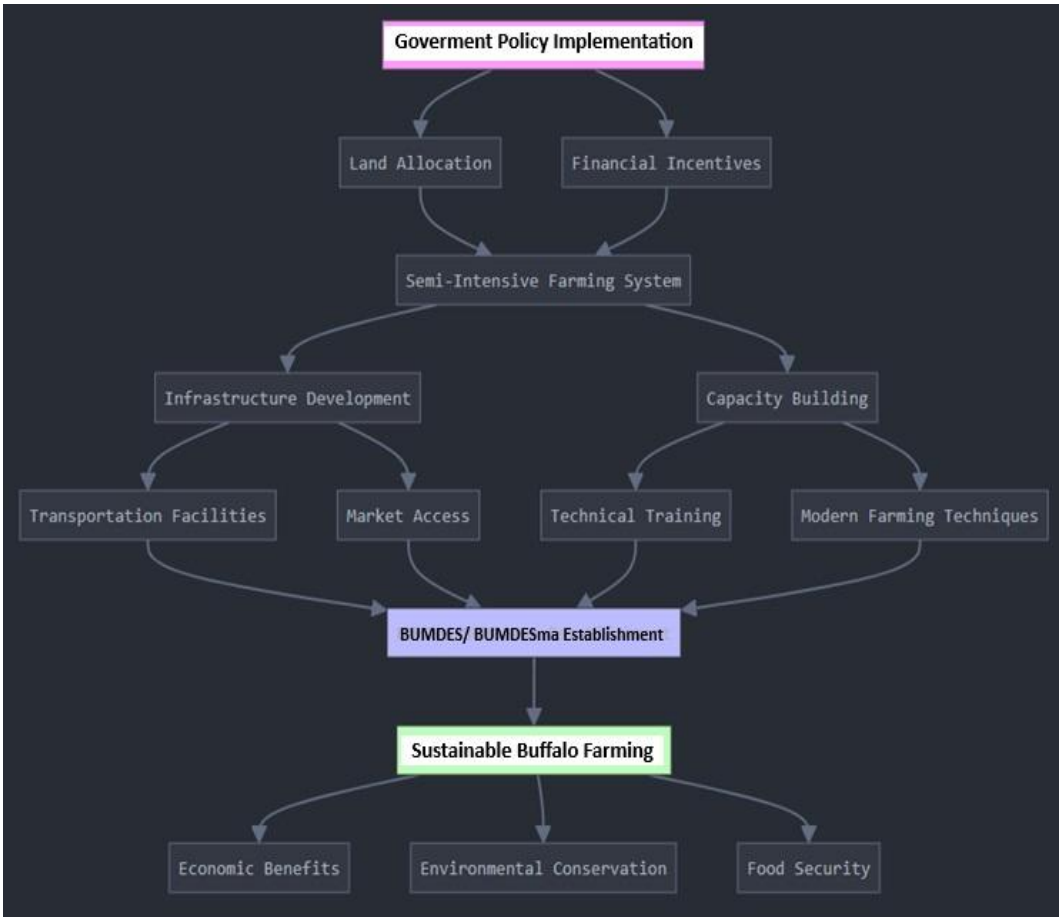


Fig. 1: Buffalo Farming Business Transformation Process

Fig. 1 shows how the conversion of the buffalo farming businesses into a sustainable model can be done. It begins with Government Policy Implementation, which incorporates land allocation and economic incentive to encourage a semi-intensive market system of farming. Such system is backed by Infrastructure Development (Transportation facilities and accessibility to the market) and Capacity Building (technical training and modern farming methods). One of the measures that promote the involvement of the community and the access to resources is the creation of BUMDES (Village-Owned Enterprises) or BUMDESma. In the end, this holistic solution will result in Sustainable Buffalo Farming, which will provide economic, environmental, and food security. The diagram reveals the relationship that exists between policy, infrastructure, capacity building and community empowerment to realize a sustainable buffalo farming system.

This comparative analysis reveals that although both regions have developed systems that suit their local conditions, they face different challenges and opportunities. The Gayo Lues system shows how cultural integration can support sustainable agricultural practices, while the HSS-HSU system shows the potential for economic optimization. However, both systems could benefit from learning from each other – with HSS-HSU potentially adopting more community-based conservation practices and Gayo Lues perhaps incorporating more modern economic strategies while maintaining its cultural foundations.

Results and Discussion

Form of Farm Business and Its Supporting Institutions

It is believed that the research findings of this ethnographic study will have a positive impact in enhancing the comprehensive knowledge on buffalo farming. They will emphasise the need to have strategies that embrace local traditions and values alongside strategies that can add productivity and value. Maulana et al., (2023) state that this strategy can lead to the implementation of agricultural procedures that are more sustainable and resonate with the cultural identities of the communities within the area, which will eventually promote the food and economic security within the area.

In Gayo Lues, the government agencies, Aceh Agriculture and Livestock Service through Gayo Lues Regency Agriculture Office collaborates with the local community groups and groups of farmers to ensure that buffaloes are healthy by giving them medicines/vaccinations. This institute is extremely significant in preserving the peruweren system. Such a system entails several grazing models, which range between semi-wild and semi-intensive systems. Gayo Lues institutions also assist individuals in collaborating to control land and resources. This does not only keep the livestock healthy, but also makes the social relation within the community stronger. Institutional support in HSS and HSU, however, is centered on the utilization of large portions of swamp land to graze buffalos. An example of such is the South Kalimantan Agriculture and Livestock Service which conducts mass vaccination and training of farmers to support the local economy by rendering swamp buffaloes more productive. Microfinance institutions also assist farmers to obtain cash to purchase extra feed to eat during dry season, or enhance their cages. However, the issue of environmental degradation due to excessive grazing in swamplands has not been properly handled by HSS and HSU yet. It demands more detailed policies of the protection of swamp ecosystems. Research is also underway in the traditional livestock farms to assist the local universities and research institutes adapt to the challenges associated with livestock farming in a swamp (El Manaa Barhoumi, 2025; Widaningsih et al., 2023).

These differences in institutional structure also give birth to different roles of each actor involved in the livestock system. In Gayo Lues, farmers and indigenous leaders play a significant role in managing and resolving land-related conflicts, as the peruweren system is seen as part of the cultural identity of the Gayo community. On the other hand, in HSS and HSU, farmers rely more on technical support from the government and cooperatives to optimize the semi-intensive swamp buffalo farming system. Farmer cooperatives are a forum for collecting livestock products and product marketing at HSS and HSU. In Gayo Lues, the farmer group is a traditional education provider that preserves knowledge about buffalo farming.

The cultural values underlying the orientation of the livestock business in the two regions are also different. In Gayo Lues, buffalo is seen as an economic asset and has symbolic value in traditional ceremonies and social rituals. However, the value of the buffalo as a symbol has recently been degraded. This affects how farmers care for and manage their livestock, where each buffalo has its own value in the owner's family. In contrast, in HSS and HSU, the value of buffalo is more oriented to economic functions as a source of income, especially to meet the needs of the meat market outside the region, so buffalo care tends to be more focused on productivity.

In addition, government policies in both regions reflect differences in the quantity and quality of support for the development of buffalo farming businesses. In Gayo Lues, policies must still be optimally oriented towards preserving sustainable livestock practices by balancing economic and cultural aspects, including providing technical support to develop peruweren practices. On the other hand, HSS and HSU policies focus on increasing the productivity of swamp buffalo for domestic and regional markets but often do not consider the environmental impact of intensive exploitation of swampland. The study on the ecological impact of using swamp land as a pasture needs to be carried out more solemnly.

Overall, this study's results show that institutional differences and cultural orientations in buffalo farming in Gayo Lues and HSS-HSU create different support models for each actor involved. A more integrated policy approach that considers the local social and environmental context in these two regions is needed to encourage more sustainable development.

In simple terms, the matrix containing the similarities and differences in the business system and institutions supporting the buffalo farming system in the two regions can be seen in the following matrix:

Table 1: A matrix of differences and similarities between buffalo production systems in Gayo and Kalimantan

Aspects	Gayo Lues (Aceh)	HSS-HSU (South Kalimantan)
Farm System	Peruweren system (traditional)	Kalang/Hadang system (swamp buffalo farming)
Cultural Values	High cultural and symbolic value, integrated with traditional rituals	Primarily economic value
Supporting Institutions	- Government agencies - Local community groups - Farmer cooperatives	- Government agencies - Microfinance institutions - Farmer cooperatives - Universities and research institutions
Management Style	Semi-wild to semi-intensive, with strong community involvement	Semi-intensive with a focus on swampland utilization
Environmental Approach	Balanced integration of economic and cultural aspects with environmental conservation	Less emphasis on environmental impact; facing challenges with swamp ecosystem degradation
Community Role	Strong community involvement through gotong-royong (communal work)	More individualistic approach with technical support from the government
Market Orientation	Balanced between cultural preservation and economic benefits	Primarily focused on meat market demands
Government Policy Focus	Preservation of sustainable farming practices while maintaining cultural aspects	Productivity improvement for domestic/ regional market demands

Table 1 provides a comparison of buffalo farming systems in Gayo Lues (Aceh) and HSS-HSU (South Kalimantan) in a number of important dimensions. Gayo Lues deforms the conventional Peruweren system according to which the buffaloes are characterized by great cultural and symbolic importance, which is being incorporated into the community practices, and which is backed by the governmental agencies, local community organizations, and farmer cooperatives. On the contrary, HSS-HSU uses the Kalang/Hadang system, which is dedicated to swamp buffalo breeding with much focus on economic value, which is backed by a wider network of government agencies, microfinance institutions, farmer cooperatives, and universities. The management regime at Gayo Lues is semi-wild to semi-intensive where the community is very active whereas HSS-HSU is semi-intensive with focus on swampland. In Gayo Lues, people combine conservation of the cultural heritage and conservation of the environment, and HSS-HSU encounters the problem of the swamp ecosystem destruction. In Gayo Lues, communal work (gotong-royong) has led to community involvement, whereas in HSS-HSU, it is rather individualistic with government technical support. Gayo Lues is trying to find a balance between cultural preservation and economic gain, whereas HSS-HSU is trying to satisfy the needs of the meat market. The policies of the government in Gayo Lues are aimed at the preservation of sustainability and cultural values whereas the policies in HSS-HSU are oriented to the expansion of the productivity in the domestic and regional markets. This table will indicate the disparities of the farming methods, institutional support and policy approach in the two regions.

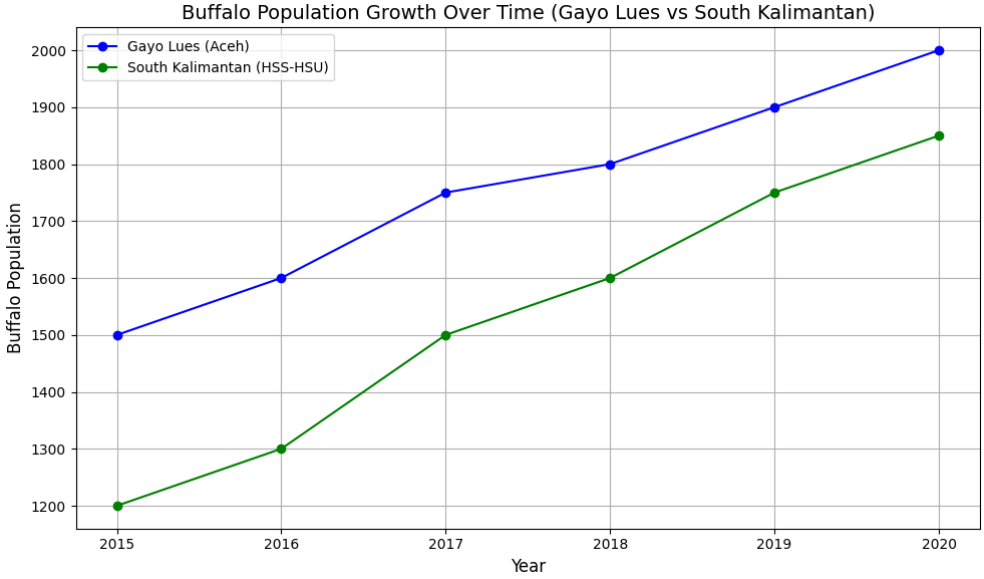


Fig. 2: Buffalo Population Growth Over Time in Gayo Lues (Aceh) and South Kalimantan (HSS-HSU)

Fig. 2 shows the time-dependent population change of the buffalo in Gayo Lues (Aceh) and South Kalimantan (HSS-HSU). The information depicts the fact that the two areas had steady growth of buffalos with Gayo Lues recording a slower yet steady growth, probably due to the combination of traditional farming methods with contemporary methods. South Kalimantan, in contrast, had a rather stiffer increase in population, which represents the more market-oriented strategy in the Kalang/Hadang system. This graph supports the importance of the institutional support and agriculture in determining the sustainability and productivity of buffalo farming in these areas.

Buffalo farming system of Gayo Lues (Aceh) and HSS-HSU (South Kalimantan) are two variants of the livestock management where each of them is determined by the own geographical, cultural, and institutional context. This discussion shows that there are certain major distinctions and consequences on sustainable development. Using the already existing data and information, there are at least some variations in the buffalo farming system in the two regions. Some of the basic differences are:

1. Integration of Culture as Compared to Economic Emphasis

The introduction of buffalo agricultural culture is the most highlighting difference. In Gayo Lues, the peruweren system has found strong roots in the Gayo cultural history as the buffaloes are not only economically important in traditional events but also symbolic. This cultural assimilation has caused agriculture practices to be more sustainable, as people have seen buffalo as an economic asset as well as a part of their history. On the other hand, the HSS-HSU barrier system is focused on economic benefits with the focus on meat production to meet the demand. This is an economic-oriented approach that has posed challenges to the survival of the environment, although potentially more profitable in the short-term.

2. Institutional Structure

The biggest difference is with the introduction of buffalo farming culture. Peruweren system is highly incorporated in Gayo cultural tradition in Gayo Lues, as the buffaloes have an economic and symbolic meaning in the traditional ceremonies. This cultural fusion has resulted in more sustainable agricultural production methods because communities have been able to view buffalo as an economic resource as well as a part of their culture. On the other hand, the HSS-HSU barrier system focuses on economic benefits and therefore it is concerned with meat production to meet market demand. This profit-making approach, though it could be much more profitable in the short-term, has posed a challenge to the sustainability of the environment.

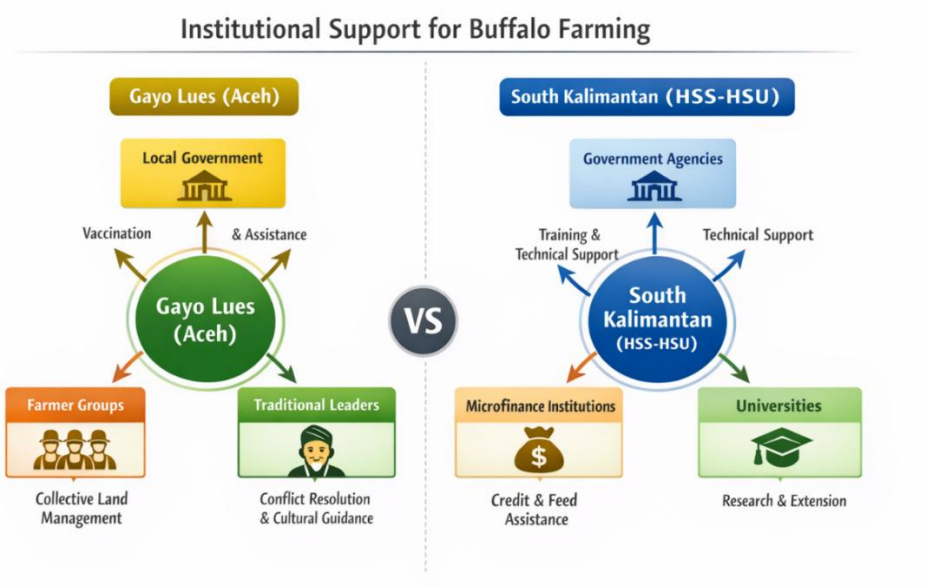


Fig. 3: Institutional Support for Buffalo Farming in Gayo Lues (Aceh) vs South Kalimantan (HSS-HSU)

In Gayo Lues (Aceh) and South Kalimantan (HSS-HSU), Fig. 3 shows the difference in institutional support of buffalo farming. It depicts every region by having a central circle that symbolizes the system of farming and the stakeholders such as the local governments, farmer groups, microfinance institutions and universities are shown in circles or surrounding the central circle. The arrows show their contribution towards major areas like the contribution in the field of vaccination, technical assistance, land management, and training. In Gayo Lues, local government, farmer

groups and traditional leaders are the ones that support it and aim at collective land management and preservation of cultures. The support network is comprised of government agencies, microfinance institutions, and universities in South Kalimantan with focus on technical support, training and credit assistance. This comparison brings out the various institutional roles and their contribution in the buffalo farming in the two regions.

3. Environmental Sustainability

There is a need to implement a different approach to environmental management. The principles of environmental conservation are incorporated in the Gayo Lues approach by nature that is a combination of cultural assimilation and management that is community based. The tradition of cooperation ensures that there is collective responsibility in management of resources. However, HSS-HSU faces significant challenges related to the environment caused by the massive use of swampland, which supports the need to implement more effective environmental regulations. Such differences imply that future developmental strategies will be forced to:

a. Agricultural policies need to take into account the cultural background.
b. Strike a balance between the economic goals and the environment.
c. Adopt management that has community-based management.
d. It should develop a combined technical and cultural agriculture support system.

In the comparison it is evident that effective buffalo farming system necessitates culture and environmental congruency and support by technical and financial means. The Gayo Lues idea educates about sustainable cattle management through cultural assimilation and community involvement which are less economically pricier.

Table 2: Environmental Impact of Buffalo Grazing in Both Regions

Region	Grazing System	Environmental Impact	Key Challenge
Gayo Lues	Peruweren system	Controlled grazing with minimal environmental degradation	Balancing modern practices with traditional values
HSS-HSU	Kalang/Hadang system	Overgrazing and swamp ecosystem degradation	Need for better land-use policies

Table 2 is a comparison of buffalo grazing effects on the environment in Gayo Lues (Aceh) and HSS-HSU (South Kalimantan). The Peruweren system of controlled grazing in Gayo Lues has ensured reduced environmental degradation whilst the most important challenge is how to balance the current trend of farming with traditional values. On the contrary, HSS-HSU Kalang/Hadang system is not without its problems of overgrazing and loss of swamp ecosystems, and there should be more policies of proper land-use to preserve the environment. This comparison will be helpful in highlighting the need to incorporate sustainable land management in both areas in order to overcome the environmental problems that buffalo farming presents.

Discussion

The reason why the smallholder buffalo farming companies in Indonesia, particularly in Gayo, Aceh, and South Kalimantan transformed as they did is because local governments play a critical role in promoting sustainable and productive agricultural activities. There should be a policy established by the local governments to allocate specific buffalo farming or herding areas. The solution is that farmers will have access to adequate and productive sites, and the environment will not be polluted, which will motivate the controlled use of land and decrease conflicts with other industries (Prihandini et al., 2023; Cid & Rivera, 2024). Such policies are required in order to enhance security of the animal feed which is highly relevant to the sustainability of the buffalo farming system.

Another relevant way of promoting smallholder farming is through incentives to buffalo farmers. Local governments can be assisted through financial support and resources to increase productivity and competitiveness and address the increasing demand of buffalo meat in the country. Putri et al., (2023) also this information is important since it indicates that the government facilitates agricultural productivity and food security.

Smallholder buffalo farmers require intervention on numerous fields and sectors. The connections between the environment, society and culture, economy and the health of livestock imply that the government agencies, academics and businesses should collaborate. This collaboration is required to address the health of livestock, the feed quality, and the grazing area (Atmoko et al., 2023). In other areas such as Gayo and South Kalimantan, where cultures hold dominance, a holistic approach is required to change the cultures to meet the modern demands (Pineda et al., 2021).

Involving multiple disciplines and sectors will support the implementation of specific and evidence-based change programs that respond to specific local needs. The idea of incorporating the knowledge of the indigenous people and sustainable practice in the buffalo farming could boost their ability to stay strong after being exposed to other activities

such as market variations and climate changes. Through the development of a collaboration environment, the stakeholders can work towards a sustainable future of buffalo farms in Indonesia to give it an assurance that the farms remain a source of livelihood to the residents.

Among the strategic measures to be undertaken is that, a semi-intensive agricultural pattern should be initiated and it is a blend of the old and new farming methods. The method is a semi-intensive intervention that enhances the management of livestock health and productivity, given the raised access to supportive facilities, including semi-enclosed pens and additional feed production sites (Menghistu et al., 2021). In addition, improved capacity of farmers via regular training and technical assistance will increase their skills on how to manage more productive and market-driven livestock business (Strand et al., 2019).

The government and other institutions associated need to also improve the transportation infrastructure and markets to increase the access to distribution and sales centers by the farmers. Market access is important because it will help farmers to sell their produce effectively (Mokoena et al., 2023). Community buffalo farming opportunities and benefits should be actively popularized by the government and other stakeholders to attract the younger generation and train the community. The campaign should be focused on the economic and socio-cultural aspects, which include the income potential, environmental sustainability, and the role of buffalo as the food security source in the locals (Ngoshe et al., 2022).

The knowledge of the market potentiality and the long-term benefits of buffalo farming will capture the interest of the community and promote the sustainability of this farming activity, especially in the younger generations (Maltou & Bahta, 2019). Adoption of conventional practices and application of modern methods along with developing an enabling environment may result in a significant improvement of the resilience and productivity of buffalo farming in Indonesia (Verma et al., 2020). This holistic approach is addressing the challenges of direct agriculture and is in line with the overall goals of sustainable development and food security (Shahbaz et al., 2022).

The formation of Village-Owned Enterprises (BUMDes) or Joint Village-Owned Enterprises (BUMDesma) was also a good strategy to promote sustainability of the buffalo farming business. The shared capital and support of different stakeholders make this collective business model more structured in livestock management resulting in a greater access to vital resources like feed, medicines, and markets by farmers (Atmoko et al 2023). The resources can be combined and the bargaining power of farmers with buyers increases, which is essential in stabilizing the price of livestock products in the market (Adanacıoğlu et al., 2023).

Moreover, BUMDes or BUMDesma has the ability to maximize domestic resources and enhance village financial self-sufficiency. Such a model promotes the involvement of the community in livestock enterprises, the generation of jobs, and the rise in the income of households (Rochgiyanti et al 2023). Buffer farming activities managed by BUMDes or BUMDesma can be supported by government financing and strategic partnerships to develop a viable area economy, reduce the dependence on imported products, and increase the food security of the country (Abdel-Salam & Fahim, 2018).

Besides, the use of modern agricultural practices within these businesses could positively affect output and sustainability. Existence of training programs that focus on the best methods in animal management can significantly increase the efficiency and performance of buffalo farming activities. The younger generation can be lured to the buffalo farming industry by fostering the economic and social advantages of buffalo rearing, including revenue-generation capacity and environmental sustainability that will guarantee the survival and sustainability of buffalo farming business in Indonesia.

That is, the idea to create BUMDes and BUMDesma is a plan of reviving community buffalo farming, developing resilience and encouraging the practice of sustainable agricultural approaches that can be beneficial to the local economy and food security. As a reference to this discussion, the fig. 1 flow chart can be observed as the process of transforming the buffalo farming business.

Conclusion

The transformation of smallholder buffalo farming, especially in Gayo buffalo in Aceh and swamp buffalo in South Kalimantan, is the key to the development of the buffalo population and maintenance of the cultural values in these communities. The best alternative is introducing technical knowledge and skills in animal health management, feed efficiency, and semi-intensive practice where the farmers will be able to work effectively and at the same time preserve the traditional farming practices that enable the community to relate to their practices. The greatest opportunity is to form collective business organizations such as Village-Owned Enterprises (BUMDes) or Joint Village-Owned

Enterprises (BUMDesma) to acquire greater resources plus infrastructure along with power to bargain during product marketing. These organizations also encourage professional management, availability of money, and maximization of the product distribution that encourages the economic independence of the village. The development of the buffalo farming would not be successful unless the cultural values are preserved. The conflict between modernization and cultural conservation is bound to ensure sustainability of buffalo population and the connection between the community and the traditional farming practice, particularly the utilization of buffalo during the traditional ceremonies. Change in managing buffalo farming should be grounded not only on the economic aspect but also fulfillment of the local culture. This study indicates that buffalo production in smallholder farmers can be highly developed to increase revenue of the area. Management of BUMDes or BUMDesma combined increases the productivity of the local economy and cultural identity. In most cases, besides increasing technical capacity as well as upholding cultural values, sustainable buffalo population will be the reward of the role of BUMDes/BUMDesma. The community-based transformation policies are obligatory in achieving the economic and cultural sustainability to enhance economic development of the villages through the local wisdom.

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