Human Resource Development Model to Support Sustainable Agribusiness Management in Barito Kuala Regency

Model Pengembangan SDM untuk Mendukung Manajemen Pembangunan Agribisnis Berkelanjutan di Kabupaten Barito Kuala

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ABSTRACT

This study aims to formulate a human resource development (HRD) model that supports sustainable agribusiness management in Barito Kuala Regency. A descriptive–qualitative approach was employed using secondary data obtained from official publications, regional policy documents, and previous studies. The findings indicate that the success of sustainable agribusiness is strongly influenced by the quality of human resources who are adaptive to local ecological, social, and economic conditions. A three-layer development model is proposed, consisting of: (1) locally tailored training aligned with agroecological characteristics; (2) strengthening community-based institutions such as farmer groups, cooperatives, and village-owned enterprises (BUMDes); and (3) integrating HRD initiatives with financing schemes and market access systems. This model positions human resources not merely as training recipients but as active agents in agribusiness development. The study provides several policy recommendations for local governments, including: establishing village-based Agribusiness Training Centers; developing contextual training curricula that reflect Barito Kuala's agroecological landscape; fostering multi-actor partnerships involving government agencies, BUMDes, cooperatives, universities, NGOs, and the private sector; providing incentive schemes for training participants; and promoting digitalized learning through online modules, webinars, and virtual mentoring.

Keywords: Human resource development, local institutions, sustainable agribusiness.

ABSTRAK

Penelitian ini bertujuan untuk merumuskan model pengembangan sumber daya manusia (SDM) yang mendukung pengelolaan agribisnis berkelanjutan di Kabupaten Barito Kuala. Pendekatan deskriptif-kualitatif digunakan dengan memanfaatkan data sekunder yang diperoleh dari publikasi resmi, dokumen kebijakan daerah, dan penelitian sebelumnya. Hasil penelitian menunjukkan bahwa keberhasilan agribisnis berkelanjutan sangat dipengaruhi oleh kualitas sumber daya manusia yang adaptif terhadap kondisi ekologis, sosial, dan ekonomi lokal. Model pengembangan tiga lapis diusulkan, yang terdiri dari: (1) pelatihan yang disesuaikan dengan karakteristik agroekologis lokal; (2) penguatan lembaga berbasis masyarakat seperti kelompok tani, koperasi, dan usaha milik desa (BUMDes); dan (3) integrasi inisiatif SDM dengan skema pembiayaan dan sistem akses pasar. Model ini menempatkan sumber daya manusia tidak hanya sebagai penerima pelatihan tetapi sebagai agen aktif dalam pengembangan agribisnis. Penelitian ini memberikan beberapa rekomendasi kebijakan untuk pemerintah daerah, antara lain: mendirikan Pusat Pelatihan Agribisnis berbasis desa; mengembangkan kurikulum pelatihan kontekstual yang mencerminkan lanskap agroekologis Barito Kuala; Mendorong kemitraan multi-aktor yang melibatkan lembaga pemerintah, BUMDes, koperasi, universitas, LSM, dan sektor swasta; menyediakan skema insentif bagi peserta pelatihan; dan mempromosikan pembelajaran digital melalui modul daring, webinar, dan pendampingan virtual.

Kata kunci: Agribisnis berkelanjutan, barito kuala, kelembagaan lokal, pelatihan berbasis lokal, pengembangan SDM.

INTRODUCTION

Barito Kuala Regency, as one of the food barns in South Kalimantan, has enormous agribusiness potential. The existence of vast agricultural land, particularly tidal and swampy land, provides strategic opportunities for the development of agricultural, fishery and plantation commodities. However, this potential has not been fully optimised in a sustainable manner. One of the main causes is the limited quality of human resources capable of managing agribusiness with a modern and locally-based governance approach. Sustainable agribusiness development requires synergy between natural resource management, technology, institutions, and competent and adaptive human resources. In the context of Barito Kuala, the transformation of the agribusiness sector often faces obstacles due to the low capacity of farmers, agribusiness MSMEs, and local officials in adopting managerial and innovative approaches. This is exacerbated by the lack of continuous training and limited access to vocational education in modern agriculture.

The main problem that arises is the lack of a structured and contextual human resource development model to support sustainable agribusiness management. Development that is still sectoral in nature and lacks integration with human capacity building has led to fragmentation in the planning and implementation of agribusiness programmes. In addition, regional development planning still does not prioritise human resource strengthening as a key strategy in local resource-based economic development. Another strategic issue is the mismatch between the competencies of the local workforce and the increasingly complex needs of the agribusiness sector, especially in the face of agricultural digitalisation and dynamic market demands. Low technological literacy, managerial skills, and weak partnership networks are obstacles to promoting the efficiency, productivity, and competitiveness of local agribusiness products in national and global markets.

Several previous studies have shown that sustainable agribusiness development is largely determined by the capacity and quality of human resources across various value chains. Research (Ayesha *et al*., 2024) shows that both farmer group empowerment and agribusiness training programmes have a significant positive impact on farmer productivity and income, with group empowerment having a more dominant influence. This means that investment in training and mentoring, combined with local institutions, increases the efficiency of farming businesses. Training based on local needs improves farmers' technical and business capacities, creating institutional innovations such as the implementation of bookkeeping and transparency in farmer cooperatives. The results: increased income, crop yields, and inclusion of marginalised farmers (Sulistiono & Biru, 2020). In Amanah *et al*. (2021) in Indonesia, the triple-helix partnership model (government, private sector, farmers) involving lead farmers and cocoa doctors has been proven to improve technical knowledge, marketing skills and entrepreneurship. This training and coaching has had a significant impact on both productivity and output quality, analogous to the emphasis on investment in human resources. Agribusiness human resource capacity, including financial, digital and managerial literacy, is a key driver of technology adoption, business diversification and inclusive and sustainable agribusiness growth (Gadanakis, 2024). Adequate education and training significantly enhance agricultural innovation by improving the quality of human capital. Organisations that support employee education tend to produce higher innovative output (Mwadzingeni *et al*., 2025).

In the context of Kalimantan, a participatory approach to developing the capacity of farmers on peatlands and swamplands can improve the sustainability of agricultural

practices. There is a need to integrate local technology, community empowerment, and inclusive public policies in order to build an agribusiness system that is adaptive to climate change and global challenges. Using a participatory approach, the study Sanudin *et al.* (2023) highlighting the importance of collaboration between local governments, extension workers, communities, and environmental agencies for sustainable peatland management. Extension workers play a vital role as liaisons between public policy and local farming practices. The success of the transition from conventional agriculture to environmentally friendly practices depends heavily on participatory transformational leadership that involves farmers, communities, and both adaptation and local technology (Yulianti *et al.*, 2020). Agroforestry models in peatland restoration require the active involvement of smallholders and adaptation to peatland ecological conditions. Study Applegate *et al.* (2022) emphasising that socio-economic integration and local technology can support ecosystem stability and community empowerment.

Table 1. Supporting Indicators for the Human Resource Development Model for Sustainable Agribusiness in Barito Kuala Regency (2016–2024)

Indicator & Year	Value / Trend	Source & Year of Publication
GRDP for the agriculture, forestry and fisheries sector	26.48% of total GRDP (2022)	MediPublik & BPS Barito Kuala
Total GRDP growth	3.91% (2023); projected at 4.46% (2024)	MediPublik
GRDP by business sector (constant prices)	- 2020: data begins - 2024: upward trend	BPS GRDP Publication 2020–2024
Tidal rice fields	~91,893 ha; productivity <4 tonnes/ha	Workshop & BPDAS (2007 potential 6–8 tonnes/ha)
Agricultural household population	Complete data from the 2023 Agricultural Census	BPS Census 2023
Crop harvest & production	Detailed data available for 2023–2024	BPS 2023 Census Phase II
Lumbung Pangan Berkah (BAZNAS) Programme	Initial 33 ha → 100 ha, +82 farmers under guidance	BAZNAS 2022–2023
Productivity of assisted farmers	From 1,700 kg → 2,496 kg/1.3 ha	BAZNAS Evaluation
Multi-stakeholder collaboration	BAZNAS, local government, Ministry of Villages, Ministry of Agriculture, BPP	BAZNAS report
Agricultural infrastructure investment	Rp 8.5 million allocated for agricultural machinery, etc.	LentraKalimantan

Sources: BPS, BPDAS, Baznas, Lentrakalimantan

The agribusiness sector remains the backbone of the Barito Kuala Regency economy, as reflected in the contribution of the agriculture, forestry and fisheries sectors, which reached 26.48 percent of the total GRDP in 2022. This figure confirms the dominance of the primary sector in the regional economic structure and highlights the important role of human resources in supporting the sustainability of this sector. The region's economic growth, which was recorded at 3.91 percent in 2023 and is projected to rise to 4.46 percent in 2024, shows a positive trend. However, this growth will be more meaningful if it is supported by an increase in human resource capacity, especially among

farmers and agribusiness actors, thus requiring a human resource development model that is capable of addressing the structural and technical challenges in this sector as a whole.

Previous research has also shown that successful agribusiness management models implemented in other regions generally place human resources as a key element of transformation. Competency-based training models, improved digital literacy, and collaboration between the government, universities, and the private sector are proven effective approaches in supporting a sustainable agribusiness ecosystem. Interactive online training related to agricultural technology and digital agribusiness management encourages the younger generation to adopt e-commerce, financial applications, and IoT technology in farming, which is in line with digital literacy and competency-based entrepreneurial skills (Sugito *et al*., 2025). Appropriate training methods and materials significantly improve the knowledge, skills, and attitudes of young people in organic farming practices, demonstrating the effectiveness of competency-based training (Iriani Putri *et al*., 2023). Digital literacy for trainers enhances the effectiveness of training in line with the need to improve agribusiness human resources through the digitisation of training (Fharaz *et al*., 2022).

However, most of these models are still generic and have not been adapted to the characteristics of regions such as Barito Kuala, which has unique ecological, socio-cultural, and traditional agricultural systems. Therefore, a specific, adaptive, and contextual human resource development model is needed to support agribusiness development management in this region. Collaboration between the government, universities, and farmers can improve group organisation, access to technology, and business management. The model also emphasises strengthening digital literacy and competency-based training to support the sustainability of local agribusiness (Fharaz *et al*., 2022). Competency-based training and local institutional empowerment are important to support farmers' adaptation to environmental change. Although the context is different, the principles of integrated human resource development can also be applied in agribusiness (Sulistiono & Biru, 2020). Digital literacy among agribusiness human resources is key to improving decision-making and ecosystem collaboration between farmers, government and the private sector (Soares *et al*., 2023).

The gap between knowledge and practice in human resource development policies at the national level and local realities is also a major concern. Top-down training models often fail to address the real needs of farming communities and local agribusiness actors. Therefore, this research is crucial in designing human resource development models that are based on local needs, long-term oriented, and grounded in the principles of sustainable development. Direct collaboration between farmers and researchers helps to create local innovations and agroecological models that are relevant to the local context. Researchers emphasise the importance of co-production of knowledge among farmers and scientists, with bottom-up models that are far more adaptive than conventional top-down approaches (Pagliarino *et al*., 2020). Equal dialogue between farmers, government, academics and companies. This model has proven to be more effective than a top-down approach because it involves farmers from the outset of technology design. The successful adoption of technology in the field demonstrates the need for long-term, contextual collaboration (Astar *et al*., 2025). Research results often fail to be implemented because they do not take into account the field context and local social dynamics. The author recommends the use of collaborative and participatory methodologies so that practices are not merely theoretical but can actually be adapted by local farmers (Siebrecht, 2020).

Thus, this study aims to develop and propose a human resource development model that is relevant to the potential and challenges of agribusiness in Barito Kuala Regency. This model is expected to be not only conceptual but also applicable to support the planning and implementation of sustainable and inclusive agribusiness-based regional development. The following research questions are used to answer these objectives :

1. What is the current state of agribusiness human resource capacity in Barito Kuala Regency, particularly in terms of technological literacy, managerial skills, and understanding of modern agribusiness?
2. What factors hinder the development of agribusiness human resources in supporting sustainable agribusiness management?
3. What kind of human resource development model is relevant, structured, and contextual to improve the competence of farmers, agribusiness MSME actors, and local government officials?
4. What is the role of institutional collaboration (government, extension workers, community, private sector) in improving agribusiness human resource capacity in tidal and swamp/peatland areas?

LITERATURE REVIEW

Human resource development explains that people are strategic assets in economic and social development, especially in the knowledge- and skill-based agribusiness sector. Human resource development encompasses the processes of training planning, skills enhancement, and strengthening individual motivation to achieve optimal performance. In the context of regions such as Barito Kuala, this theory is relevant for understanding that the success of agribusiness is not only determined by capital and technology, but also by the quality of the people who run the system. In the context of regions such as Barito Kuala, this theory is relevant for understanding that the success of agribusiness is not only determined by capital and technology, but also by the quality of the people who run the system. The quality of human capital, including individual abilities, motivation, leadership, and the effectiveness of work groups, has a significant impact on strengthening horticultural agribusiness institutions in South Sulawesi. This means that human resource development is a strategic asset for the transformation of agribusiness institutions (Akbar *et al*., 2023). Agricultural human resources must be able to anticipate digital and global changes. The main focus is on improving skills, digital literacy, and competency-based training and partnerships, all of which show that human resources are a strategic asset for modern agribusiness (Satria *et al*., 2025). The sustainability of the agricultural sector is closely linked to the quality of human resources. The government has invested billions of rupiah in training, certification, and assistance for farmers, resulting in a 35% increase in productivity and a dramatic increase in technology adoption. Human resources are positioned as the main force behind the development of a knowledge- and skills-based agribusiness sector (Astar *et al*., 2025).

It is important to involve local communities in the development process so that the programmes implemented truly address real needs. In this context, local human resource development is an integral part of a participatory development strategy. In Barito Kuala, where the agrarian community has strong local cultures and practices, this approach has become the basis for developing a contextual and sustainable human resource development model. Intensive socialisation and assistance that actively involves the local community has succeeded in increasing the adoption of organic farming technology. This model is adaptive to local culture and practices, enabling sustainable changes in farmer

behaviour (Astar *et al.*, 2025). Participation in community institutions and access to information greatly influence agribusiness competence. Community-based learning processes significantly strengthen farmers' skills (Komariyati *et al.*, 2022). Community participation and local technology transfer contribute to food security and agribusiness sustainability. The involvement of local communities has proven crucial in shaping adaptive agribusiness practices (Sulandjari *et al.*, 2023). Community social capital and active citizen participation support village development, reduce poverty, and strengthen local resource management. This reflects the importance of empowering agrarian communities in the context of local development (Ramadhan *et al.*, 2023). Farmers' social capital has been shown to improve sustainable agricultural practices and community welfare. Active community participation bridges the gap between policy and local implementation (Komariyati *et al.*, 2022).

Sustainable agribusiness is a system of agricultural production, processing, and distribution that maintains a balance between economic, environmental, and social aspects. The development of the agribusiness sector should not damage local ecosystems, but rather strengthen the economic resilience of communities by utilising resources wisely. In the context of human resource development, this means that training and education must be oriented towards strengthening sustainability values. Knowledge-based entrepreneurial literacy in agribusiness MSMEs not only improves economic performance but also strengthens social awareness and environmental responsibility. By adopting the Triple Bottom Line approach, this study emphasises that the development of human capital that understands sustainability values is a key factor in creating an agribusiness business model that is ethical, productive, and adaptive to long-term environmental and social challenges (Akbar *et al.*, 2023). Human resource development is not only about technical skills but also about shaping values and behaviours that support responsible and transparent agribusiness governance. Thus, training that emphasises socio-ecological aspects is a crucial foundation in promoting a transition towards holistic sustainable agribusiness Alvarez-Ochoa *et al.* (2024) The quality of human resources with a sustainable outlook is a strategic asset in maintaining the socio-economic resilience of agrarian communities (Akbar *et al.*, 2023). Human resource development with environmentally and socially conscious leadership is key to inclusive and sustainable system innovation (Ndidiamaka *et al.*, 2025).

The importance of vocational training specifically designed for the needs of the agricultural and agribusiness sectors. Vocational education enables local communities to access technical and managerial skills, enabling them to respond to market challenges and climate change. Experience in various countries shows that community-based training programmes are more effective than generic mass training approaches. A study (Jomegi *et al.*, 2024) A study (Jomegi *et al.*, 2024) emphasises the need to develop a climate-smart agriculture (CSA)-based agricultural vocational curriculum. The curriculum and training are designed to strengthen farmers' adaptation to climate change by focusing on the technical and organisational skills of instructors and vocational institutions. This demonstrates the importance of vocational training that is specifically tailored to the needs of the agricultural sector in the face of modern climate challenges. Community-based training and agricultural vocational schools contribute significantly to promoting climate-smart agriculture practices, such as precision agriculture, agroforestry, and soil conservation. This training increases productivity, reduces environmental impact, and builds farmers' resilience to extreme weather (Sulistiono & Biru, 2020). There is a need for vocational curricula that are relevant to local challenges and industry needs. Targeted

vocational training produces graduates who are ready to work and able to adapt to changes in the market and agricultural technology (Haryanta *et al*., 2025). Agribusiness vocational education needs to be designed to support SDG goals. Vocational education that integrates economic, environmental, and social values is more effective in building resilient local human resources, especially in the case of sustainable agricultural product processing (Ndidiamaka *et al*., 2025).

The importance of natural resource management that involves local communities as key actors. In this case, local human resources must be positioned as managers, not merely objects of development. This concept is highly applicable in Barito Kuala, where local wisdom and traditional knowledge can be synergised with modern scientific approaches in agribusiness. Natural resource management through the empowerment of local communities with a training and customary institutional strengthening approach is more inclusive and equitable. In conclusion, the active involvement of the community as managers, rather than mere objects, is the foundation of sustainable and equitable governance (Siregar, 2025). The integration of customary law and local knowledge of agricultural practices makes the agricultural system more resilient to social and ecological changes. Traditional knowledge is synergised with modern scientific approaches to maintain diversity and food security (Kurnia *et al*., 2022). Community involvement in decision-making, implementation, and preservation of agricultural practices increases the efficiency of natural resource management. Local traditions form the main basis for participatory governance that produces tangible socio-economic benefits (Akbar *et al*., 2022). Local knowledge in the management of non-timber forest products (NTFPs) strengthens sustainability and economic value for communities based on local traditions (Lestari & Winarno, 2023).

The success of agribusiness in a region depends on social innovation, namely the community's ability to create new solutions to existing problems. Human resource development in this context is not only about technical skills, but also includes improving adaptive, collaborative, and social leadership capacities. By fostering human resources with an innovative spirit, local agribusinesses can develop independently and sustainably. Community-based social innovation through cross-sector collaboration, digital technology integration, and capacity building has successfully transformed agricultural areas into independent agrotourism destinations. Local economic resilience has increased because community actors are not merely implementers but active innovators in the village economic system (Mushonnif *et al*., 2025). Communities can collectively develop new and sustainable solutions, rather than relying solely on individual technical practices (Budiman & Chandra, 2023). Systemic support for the social innovation process, from idea to adoption. Data indicates that empowered farmers or communities are better equipped to implement innovations tailored to local conditions and climate challenges.

The relationship between food security and human resource quality. Farmers and local agribusiness actors play a central role in maintaining food production stability in the region. Therefore, development programmes aimed at achieving food security must explicitly include human resource development components based on local needs. Social capital such as community knowledge, mutual trust, and local networks play a major role in maintaining food availability and access at the household level. By strengthening human resource capacity through the utilisation of community social capital, food security becomes more resilient and inclusive (Yusriadi, 2025). Knowledge transfer and the adoption of local technologies by farmers through community participation play an important role in food security and agribusiness sustainability. Human resource

development based on local needs is an effective strategy in ensuring food availability and improving community welfare (Sulandjari *et al.*, 2023).

Digitalisation brings new challenges and opportunities in agribusiness development. Digital skills are now part of the basic competencies that agricultural human resources must possess, ranging from the use of smart agricultural applications to digital supply chain management systems. In the context of Barito Kuala, improving digital literacy among farmers and agricultural businesses is an important element in the modern human resource development model. High digital literacy significantly increases the adoption of environmentally friendly agricultural technologies such as water-efficient irrigation, pest control, and environmentally friendly fertilisers. Farmers with better digital literacy tend to take calculated risks, expand their digital networks, and be responsive to the promotion of green agriculture technologies (Liu *et al.*, 2025). Farmers' digital literacy has a positive effect on their e-marketing capabilities. Digital education has proven to be a foundation in strengthening market access for agricultural products through online platforms (Fharaz *et al.*, 2022). Digital literacy, which includes digital information, digital security, social and creative literacy, strengthens farmers' ability to adopt low-carbon agricultural technologies such as efficient irrigation and pest control. Digital literacy is an important link between risk and low-carbon agricultural technology decisions (Yuan *et al.*, 2025). Digitalisation is changing the role of agricultural extension workers to become digital facilitators: content creators, influencers, and even big data analysts. Extension workers are the driving force behind digital transformation in building modern agricultural human resource capabilities (Sugihono *et al.*, 2022). Digital literacy, which is enhanced through community training and peer learning support, encourages the adoption of precision agricultural technologies such as IoT sensors and automation tools (Baharin *et al.*, 2025).

Local training institutions, universities, and government agencies must build strategic partnerships in human resource development. This multi-stakeholder approach enables the formation of a sustainable and dynamic learning ecosystem. In Barito Kuala, strengthening local institutions such as farmer groups, village-owned enterprises, and cooperatives is an integral part of inclusive human resource development. The role of local institutions such as farmer groups, cooperatives, and BUMDes in horticultural agribusiness development. It was found that collaboration between educational institutions (universities), local governments, and local communities is an important strategy in strengthening institutional capacity and creating a sustainable and inclusive agribusiness ecosystem (Akbar *et al.*, 2022). Strengthening the institutional capacity of farmer groups through partnerships with universities and the government enhances knowledge transfer, organisational capacity, and marketing capacity. The multi-actor approach results in a dynamic and sustainable learning ecosystem (Shaliza *et al.*, 2025). The role of extension workers as facilitators in fostering partnerships between farmers, businesses, and the government strengthens farmers' ability to access information, technology, and markets. This multi-stakeholder approach is effective in strengthening farmers' bargaining power and agribusiness sustainability (Mahfud *et al.*, 2024). This model combines aspects of education, local economy, geographical characteristics, and community culture as a whole. This study will utilise this approach to develop a human resource development model in Barito Kuala, taking into account the interaction between agribusiness potential, development challenges, and specific local human resource needs.

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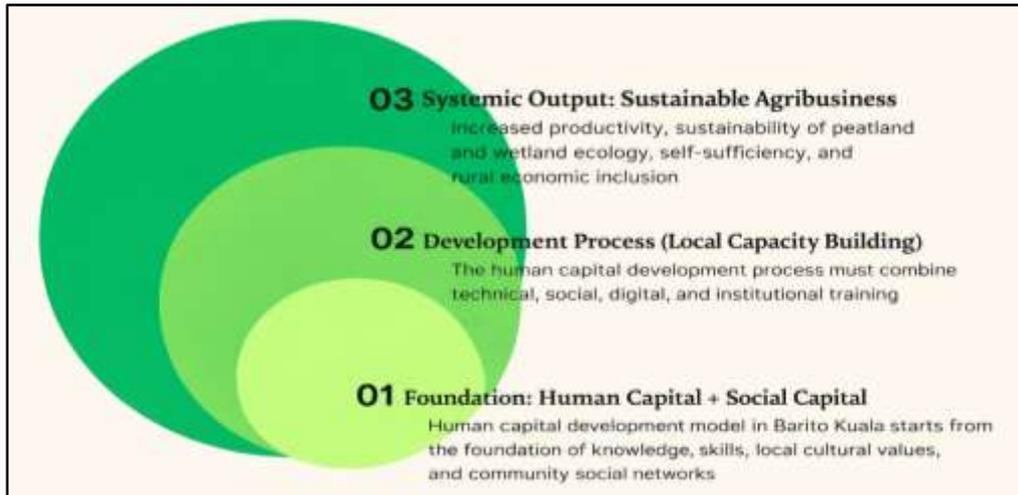Vol. 17 No. 1,
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Figure 1. Conceptual Model of Research

RESEARCH OF METHOD

This study employs a qualitative descriptive approach based on secondary data analysis. The purpose of this approach is to gain an in-depth understanding of the conditions, challenges, and potential for human resource development in the context of sustainable agribusiness in Barito Kuala Regency, without conducting direct primary data collection. Thus, the researcher relied on relevant, reliable, and up-to-date documentary sources. Qualitative methods are considered relevant for exploring human aspects, agricultural culture, and agribusiness practices in depth without having to collect primary data directly (Soares *et al*., 2023).

The object of this study is human resource development in the agribusiness sector operating in the Barito Kuala Regency. The scope of analysis covers aspects of education, training, skills, institutional support, and the relationship between human resources and agribusiness sustainability. This study also examines the relationship between regional development policies and institutional structures with human resource development strategies.

All data used in this study is secondary data, obtained from various online sources and official publications. The main sources include documents from the Barito Kuala Regency Central Statistics Agency (BPS), the South Kalimantan Agriculture and Food Security Agency, the 2021–2026 Barito Kuala Regency Medium-Term Development Plan (RPJMD), as well as reports from the Ministry of Agriculture, the Ministry of Villages, PDT, and Transmigration, and online academic publications. In addition, additional information was obtained from local government websites, reliable news portals, and open-access scientific journals.

Data collection techniques were carried out through a process of documentation and digital literature review (desk study). The researchers used source selection criteria based on (1) the credibility of the publishing agency, (2) publication year within the last 10 years, (3) relevance of content to the topic of human resource development and sustainable agribusiness, and (4) public accessibility for scientific validation purposes. This process was carried out systematically by recording key data using a data extraction sheet.

This study utilises several operational variables described in the literature. The human resource development variable includes indicators of education level, vocational training, access to technology, and business management. The sustainable agribusiness

variable is defined as an agribusiness system that is economically efficient, environmentally friendly, and socially inclusive. The supporting institutional variable includes the role of local government, farmer groups, and training institutions in supporting human resource capacity building.

The collected data was analysed using content analysis and comparative analysis methods. Content analysis was used to extract key information from documents, while comparative analysis was conducted to compare HR development policies and practices in Barito Kuala with other regions or national benchmarks. The researchers also used inductive-qualitative methods in compiling a synthesis and summarising locally relevant human resource development models. Content analysis of Life Cycle Assessment (LCA) literature was used to generate evidence-based agricultural policy recommendations. This method successfully extracted key themes (e.g., consequences of agricultural production scenarios) systematically from international documents (Gava *et al.*, 2020). To maintain validity and credibility, the researchers only used data from official sources or academic publications that had undergone a review process. Validation was carried out by comparing several different sources on the same topic to obtain an objective and consistent picture. By using a secondary data triangulation approach, the analysis produced maintained scientific integrity even though it did not involve primary data. The importance of triangulation in qualitative case studies. Triangulation is conducted in three modes: convergence, complementarity, and divergence, to enhance the validity of findings from various sources or methods. This article serves as a strong methodological reference to ensure that research results remain credible even when based solely on secondary data (Soares *et al.*, 2023).

The final stage in this methodology is the development of a conceptual model for human resource development based on a synthesis of the secondary data that has been analysed. The model is developed by identifying key components that support human resource capacity building in sustainable agribusiness management, and linking them to the regional development policy framework and relevant theoretical approaches. At this stage, the model is also validated through a model verification and model corroboration process, which involves matching the model components with cross-study findings, ensuring alignment with human capital, capacity building, and sustainable agribusiness theories, and comparing the model structure with national and international best practices. The final result of this process is a document-based model that can be used as a basis for policy formulation or programme intervention at the local level.

RESULTS AND DISCUSSION

Barito Kuala Regency is known as one of the main agricultural areas in South Kalimantan. Based on data from the Barito Kuala Regency Central Statistics Agency in 2023, more than 60 percent of the population works in the agriculture, plantation and fisheries sectors. However, the productivity of the agribusiness sector in this region has not shown significant improvement in the last five years, indicating structural problems, particularly those related to the quality of human resources. The 2021–2026 Barito Kuala Regency Medium-Term Development Plan (RPJMD) states that one of the main challenges for regional development is the low capacity of the local workforce to manage the potential of the natural resource-based economy. This can be seen from indicators such as the low participation of farmers in technology-based training, the lack of local innovation, and limited access to vocational education institutions that support modern agriculture. Active participation of farmers in extension activities significantly increases

the sustainability of agribusiness. Researchers emphasise the importance of technology-based training that is adaptive to local needs, an aspect that is often not covered by formal programmes or regional policies (Anwarudin & Dayat, 2019). Farmer training and technology adoption have a strong influence on crop yields. This shows that human capacity, especially through technology training, is a determinant of local agribusiness productivity (Rusmayadi *et al*., 2024). Increased agricultural productivity only occurs when institutions such as cooperatives are utilised in training and technology strategies. This demonstrates the importance of institutional relationships and local training in strengthening agricultural human resources.

Table 2. Analysis of Issues and Strategies for Human Resources and Agribusiness in the 2021–2026 Barito Kuala Medium-Term Development Plan

Strategic Issues	Strategic Objectives/Programmes	Linkages with Human Resource Development & Agribusiness	Source Documents
Low quality of human resources in the agricultural sector	Improving the capacity and skills of agricultural human resources	Requires technical and managerial training; illustration of local training needs relevant to regional programmes	PERBUP No. 18 of 2022 concerning the 2023–2026 Regional Medium-Term Development Plan
Institutional fragmentation across sectors	Realising synergy between SKPDs related to agribusiness	Coordination between agriculture, community empowerment, and education to strengthen human resources and local institutions	PERBUP No. 18 of 2022 and amendment No. 14 of 2025
Village institutional independence is not yet optimal	Strengthening village-owned enterprises, farmer groups, and community institutions	Village-owned enterprises and local institutions as facilitators of training, business incubation, and local-based agribusiness networks	PERBUP No. 25 of 2022 concerning the PD Strategic Plan
Human resource readiness for community-based development	Creating local human resources as subjects of agribusiness development	Requires a training model based on local conditions and active communities building their agribusiness systems	PERBUP Number 23 of 2023 (amendment to the Strategic Plan)

Source: peraturan.bpk.go.id

A report from the South Kalimantan Provincial Agriculture Office in 2022 also highlighted that most farmers in Barito Kuala have not fully utilised the agribusiness approach. Most are still oriented towards conventional production and lack managerial skills and good market access. These limitations are closely related to low business literacy and weak structured human resource training support. Small farmers in various regions of Indonesia have not optimally utilised AgTech due to structural factors such as digital literacy and access to technology. This describes a similar situation in Barito Kuala, where farmers' technological and managerial institutions are still weak (Satria *et al*., 2025). Farmers' agribusiness competencies (including managerial and market access) are still inadequate, and technology-based training is urgently needed to boost productivity and sustainability (Komariyati *et al*., 2022).

Table 3. Summary of Key Findings from the 2022 South Kalimantan Provincial Agriculture Office Report

Key Findings	Implications for Human Resource Development & Agribusiness	Sources
The rice harvest area in South Kalimantan in 2022 reached approximately 214.9 thousand hectares with a production of 819.4 thousand tonnes of paddy (484.8 thousand tonnes of rice), a sharp decline compared to 2021.	This highlights the need for agronomic training based on local ecology (tidal irrigation) and land productivity management.	BPS Kalsel– Rice Harvest Area and Production 2022
The Farmer's Exchange Rate (NTP) and Agricultural Business Exchange Rate (NTUP) indicators for the plantation and livestock sub-sectors have remained above 100 for the past three years. Main commodities: oil palm (443,802 hectares, production of 1,168,372 tonnes of CPO) and rubber (270,511 hectares, production of 188,362 tonnes)	This means that there is potential for learning about plantation agribusiness management that can be used as a model for training and institutional development for local farmers.	Diskominfo Kalsel: Disbunnak Coordination Meeting Report (2024)

Source: BPS dan Diskominfo Kalsel

The Indonesian Ministry of Agriculture, in its 2020-2024 National Strategy for Agricultural Human Resource Development, states that regions such as Barito Kuala need to strengthen their human resource capacity through programmes tailored to local conditions. A top-down approach from the centre is considered ineffective if it is not accompanied by the participation and involvement of local institutions, such as farmer groups and cooperatives, in the planning of training programmes. Farmer groups with strong institutional systems (good leadership, transparency, regular meetings, business orientation) are far more effective in implementing sustainable agribusiness innovations than groups without strong institutions (Hilmiati, 2020). Farmer participation in cooperatives significantly increases the supply of collective productive services by 14%. This confirms that the involvement of local institutions in training programmes and technical services is more effective than a top-down approach (Zhang *et al*., 2024). Active farmer participation is greatly influenced by the strengthening of farmer organisations and community-based empowerment processes, not just top-down interventions (Astar *et al*., 2025). Farmer groups and cooperatives, when supported by institutional partnerships (including technical training), enhance rural economic competitiveness and the effectiveness of local development programmes (Hidayat *et al*., 2023).

Table 4. Analysis of the Indonesian Ministry of Agriculture's Strategic Plan for 2020–2024 (Focus on Human Resources)

Strategic Issues	Strategic Objectives/Targets	Implications for Human Resource Development & Agribusiness	Source Documents
Agricultural human resources are not yet professional, independent,	The realisation of professional, independent, competitive, and entrepreneurial agricultural human	This forms the basis for the development of competency-based vocational training in technical, managerial, and entrepreneurial skills tailored to local needs	Ministry of Agriculture Strategic Plan 2020–2024 (Decree of the Minister of

Strategic Issues	Strategic Objectives/Targets	Implications for Human Resource Development & Agribusiness	Source Documents
and entrepreneurial	resources		Agriculture No. 259/Kpts/RC.020 /M/05/2020)
Human resources and agricultural institutions are not yet optimal	Improving the quality of human resources and national agricultural institutions	Encouraging the strengthening of institutions such as extension services, BPP, local training, and farmer organisations as implementers of agribusiness human resources	BBPP Batu Strategic Plan 2020–2024 (BPPSDMP)
Agricultural innovation and technology have not been fully utilised	Utilisation of agricultural innovation and technology; improvement of infrastructure and facilities	Emphasis on the need for appropriate technology training and demonstration plot assistance that includes commodity-based incubation models	Ministry of Agriculture Strategic Plan 2020–2024 (Decree of the Minister of Agriculture)
Bureaucratic reform and low institutional capacity	Realisation of an effective, efficient, and excellent service-oriented	Ministry of Agriculture bureaucracy Promoting inter-agency synergy and service simplification to support the training ecosystem and multi-stakeholder partnerships in the regions	BKP Strategic Plan 2020–2024

Source: PPID, Rentra Kementan dan badanpangan.go.id

An analysis of the Ministry of Villages, Development of Disadvantaged Regions and Transmigration's Strategic Plan for 2020-2024 highlights the importance of building synergy between sectors in human resource development in villages. For the Barito Kuala region, strengthening the institutional capacity of villages and Village-Owned Enterprises (BUMDes) is an important opportunity to encourage independent and sustainable human resource training and assistance, particularly in the management of agribusiness based on local commodities such as rice, coconut and freshwater fish. Strengthening BUMDes institutions based on local marine potential (seaweed) can increase the economic capacity of rural communities through production, post-harvest, processing, and marketing. BUMDes are effective as independent local learning ecosystems if they are managed with solid institutions and synergised with institutional support from the government and academia (Saleh *et al*., 2023). BUMDes managerial capacity training involving FGDs, technical training, and results evaluation can significantly improve managers' knowledge, organisational capacity, and institutional systems. This model is in line with the idea of synergy between village and government institutions in the context of agribusiness human resource development in Barito Kuala (Alkadafi *et al*., 2023). A BUMDes development strategy based on community social capital, combined with training and institutional support to promote village economic sustainability. This empowerment model is relevant to support local agribusinesses such as rice, coconut, and freshwater fish in Barito Kuala (Dewantara *et al*., 2024).

Table 5. Summary of Human Resource Strategy & Village Empowerment in the 2020–2024 Strategic Plan of the Ministry of Villages, Development of Disadvantaged Regions and Transmigration

Strategic Issues	Core Strategies/Programmes	Implications for Human Resource Development and Village Agribusiness	Source Documents
Enhancing human resource capacity and empowering rural communities	Improving the quality of rural human resources through competency training, technical assistance, and entrepreneurship programmes	Requires locally-based vocational training, village-owned enterprises (BUMDes) as incubation centres, and rural market networks Ministry of Villages, Development of Disadvantaged	Permendesa PDTT No. 17/2020 : Renstra Kemendesa-PDTT 2020–2024
Strengthening village institutions and empowering the local economy	Revitalising village-owned enterprises, farmer groups, and village institutions as implementers of village economic development programmes	Establishing village-owned enterprises as training institutions and technology demonstration plots, supporting the local agribusiness ecosystem	Permendesa PDTT No. 17/2020
Synergy between ministries/institutions and synchronisation of funding sources	Coordination of programmes, budgets and data between the Ministry of Villages, Development of Disadvantaged Regions and Transmigration, the Ministry of Agriculture, the Ministry of Finance, local governments and development partners	Facilitation of the integration of technical support, financing and markets into a single ecosystem for inclusive and self-reliant village development	Permendesa PDTT No. 17/2020
Monitoring, evaluation, and data collection on village development	Development of village SDG-based data and monitoring systems, including the performance of village-owned enterprises (BUMDes) and human resource programmes	Promoting data accuracy as a basis for evaluating the success of training and village agribusiness development	Permendesa PDTT No. 17/2020

Source : peraturan.bpk.go.id

Findings from several online scientific publications, such as the Agriekonomika journal and the Journal of Agricultural Human Resource Development, state that demand-driven training models are far more effective in improving the competence of farmers than non-specific mass training. In the context of Barito Kuala, this means that training programmes must take into account the characteristics of the swamp ecosystem, tidal irrigation, and the social structure of the community. Demand-driven training always begins with the direct identification of participants' needs, involves farmers in the design of the learning process, and includes post-training evaluation. This model has proven to be far more effective than a mass approach because it involves participants from the outset, making it more relevant and oriented towards local solutions (Sulistiono & Biru,

2020). Training organised by cooperatives and based on farmer demand encourages the adoption of sustainable technology and cultivation practices. Its effectiveness is higher than generic top-down training (Liu *et al.*, 2022). Demand-driven intensive training, including field visits and community-based practical training, can significantly increase productivity compared to general mass training (Sennuga *et al.*, 2022).

An analysis of Bappenas documents on SDGs in the agricultural sector also shows that the success of sustainable agribusiness is largely determined by the quality of human resources in terms of adaptation to climate change and the use of environmentally friendly technologies. Therefore, in addition to technical competencies, human resource training in Barito Kuala needs to emphasise environmental awareness, production input efficiency, and product diversification. The integration of agroforestry into local agricultural systems increases food security and the economic resilience of smallholder farmers to climate change. The quality of human resources who understand agroforestry technology and environmentally friendly practices is very important for the success of sustainable agribusiness systems (Sudomo *et al.*, 2023). The understanding and adaptive strategies of farmers, especially women, play a major role in maintaining household food security in the face of extreme weather conditions. This highlights the need for training programmes that improve the adaptive capacity and environmental literacy of local human resources (Yunindyawati *et al.*, 2025). The active involvement of farmers in community dialogue strengthens their adaptive capacity to climate change and environmental awareness, which supports efficient and sustainable production practices (Abdullah *et al.*, 2023). The implementation of labour-saving technologies, human resource management knowledge, inclusive governance, and the role of an adaptable workforce are key components for achieving the SDGs in the agricultural sector. Soft skills such as knowledge/change management and sustainability literacy are essential (Ndidiamaka *et al.*, 2025). The importance of climate-smart farming-based agricultural human resource training and disaster preparedness are important steps in improving production input efficiency and local community food security (Silaswara *et al.*, 2024).

One of the obstacles noted in various policy documents is the lack of integration between training programmes, extension services, and access to capital. For example, training programmes conducted by the Department of Agriculture are often not synchronised with institutional strengthening programmes from the Department of Community and Village Empowerment. This has led to fragmentation in the overall development of human resource capacity. The institutional structure of agricultural extension in Indonesia is often not integrated with other institutions such as capital and local customary institutions. It was found that around 60% of extension workers had never collaborated with financial institutions or other institutions for integrated services. This indicates fragmentation in human resource strengthening services in the field (Alwi *et al.*, 2025). The lack of continuity between sectors, including training programmes and institutional assistance, is a major obstacle to the national food system. The lack of coordination between ministries has resulted in overlapping and unsupportive policies (Sutrisno *et al.*, 2020). Programme implementation often fails because it uses a sectoral (ego-sectoral) approach, which causes fragmentation in policy implementation at the regional level. Synergy between sectors is key to the success of human resource development interventions. Fragmentation among relevant government agencies (agriculture, forestry, planning) has resulted in disjointed policies and difficulties in implementing agricultural development and human resource training programmes (Alwi *et al.*, 2025). Agricultural extension is often not aligned with programmes on access to

capital and village institutions. This highlights the need for cross-agency coordination to ensure that human resource capacity transfer is comprehensive and effective.

From an institutional perspective, data from the Ministry of Home Affairs (Kemendagri) and the Ministry of Villages indicate that only around 20 percent of Village-Owned Enterprises (BUMDes) in South Kalimantan operate in the agribusiness sector. This suggests that a large portion of local economic institutional potential has not yet been optimally mobilized to support training, mentoring, or business incubation for agribusiness human resources. In fact, BUMDes could be strategically positioned as local training centers or demonstration plots (demplots) for simple technologies at the village level. The institutional structure of agricultural extension services in Indonesia is often separated from other institutions, such as community empowerment agencies and financing institutions. Approximately 60 percent of agricultural extension workers have never collaborated with financial institutions or local economic organizations, indicating significant fragmentation in the integration of human resource capacity-building programs (Dewi *et al.*, 2024). Moreover, a sectoral approach in agricultural policymaking has led to overlapping training and extension programs at the village level. Institutional fragmentation between agricultural agencies, village institutions, and community empowerment departments results in unsynchronized policies, which in turn undermines the effectiveness of training programs and access to capital support for farmers (Adi *et al.*, 2025).

Based on the review of the literature and relevant policies, an urgent need can be identified to develop a human resource development (HRD) model that is not solely oriented toward technical training, but also encompasses institutional capacity building and the strengthening of local partnership networks. This model should be grounded in a collaborative approach involving local governments, farmer groups, educational institutions, and the private sector. An ideal model derived from these secondary findings is a three-layer model: (1) training based on local needs, (2) strengthening local institutions as training implementers, and (3) integration with financing systems and market access. This model not only produces competent agricultural human resources, but also fosters a supportive agribusiness ecosystem that enhances long-term sustainability. The importance of collaboration among governments, universities, research institutions, farmers, and the private sector in agribusiness innovation is strongly emphasized. Such an approach builds a robust and integrated learning network, consistent with models of training based on local needs and local institutional strengthening (Ocampo *et al.*, 2022).
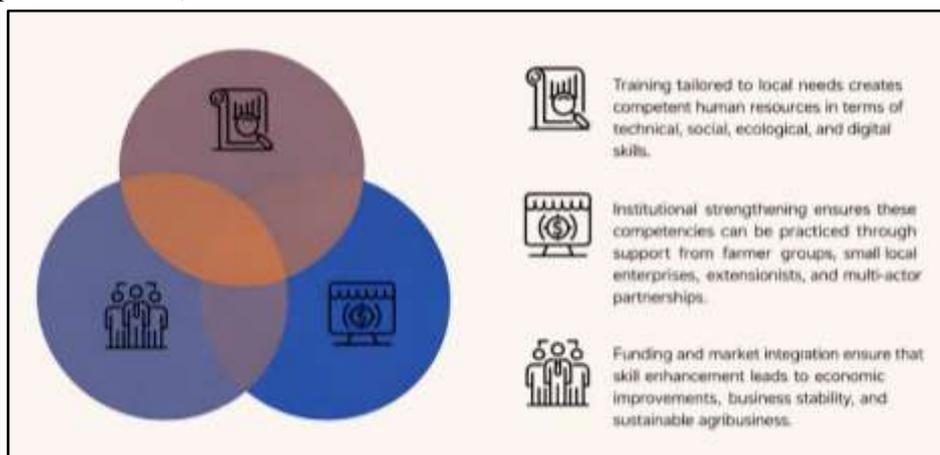
Figure 2. Human Resource Development Model

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The local needs–based training model involves aligning training materials with ecological conditions (such as wetlands and tidal lands), social characteristics (collective work culture), and economic factors (locally leading commodities). Meanwhile, institutional strengthening can be carried out through mentoring of farmer groups, revitalizing the role of Village-Owned Enterprises (BUMDes), and collaboration with vocational higher education institutions. The integration of financing systems and market access is essential to ensure that training programs generate not only knowledge, but also tangible economic impacts. In this context, human resources are no longer positioned merely as objects of training, but rather as active subjects of development who shape, manage, and develop their own agribusiness systems. This approach is consistent with the principles of community-based development and human capital development, which place local communities as the main agents of change. The quality of human capital particularly in terms of leadership, coordination, and group work effectiveness contributes significantly to strengthening agribusiness institutions within farmer groups. Human resources in this framework are not limited to technical training, but function as the driving force of institutional development and agribusiness transformation (Akbar *et al*., 2023).

In general, the analysis shows that Barito Kuala Regency has great potential for sustainable agribusiness development if local human resources are properly empowered. Abundant natural resources need to be supported by trained human resources who are adaptive to change and capable of building inter-institutional networks to support an efficient and inclusive supply chain. This discussion emphasises that agricultural development cannot be separated from human development. Investment in human resources in the form of targeted training, strengthening local institutions, and integration with public policy will be key to the transformation of agribusiness in Barito Kuala towards a competitive and sustainable system.

CONCLUSION

Human resource development is key to strengthening sustainable agribusiness management in Barito Kuala Regency. The main challenges faced include low farmer participation in technology-based training, weak managerial capacity, and limited access to vocational education and agribusiness financing. The review also shows that existing HRD programmes are not yet fully integrated across sectors and are still operating on a limited scale. The low level of synergy between training institutions, technical agencies, and local institutions such as farmer groups or village-owned enterprises (BUMDes) is a major obstacle to sustainable HRD capacity building. Therefore, a contextual, integrated, and responsive approach to human resource development is needed to address the dynamics of local agribusiness. The human resource development model proposed in this study consists of three main components, namely: (1) training based on local needs and agroecological characteristics of the region, (2) strengthening local institutions as programme implementers and learning centres, and (3) integration with agribusiness financing and market access policies. This model is expected to improve the technical and managerial competencies of agribusiness actors while strengthening the socio-economic sustainability of rural communities.

The local government of Barito Kuala Regency needs to formulate targeted and integrated human resource development policies in the regional medium-term

development plan (RPJMD), particularly those targeting the agriculture and agribusiness sectors.

This study provides a conceptual contribution to the development of an HR model based on a document-based approach and relevant policy analysis. By utilising secondary data, this study offers a framework and alternative solutions for regions that have limitations in collecting primary data but still require a strong and applicable model basis for policy-making. However, there are several limitations to this study. First, because it does not use primary data, the analysis cannot directly capture the perceptions, needs, or empirical experiences of agribusiness actors. Second, the model developed is still conceptual and has not been tested operationally in the field. Third, the limited availability of recent and specific data on agricultural human resources at the village level poses a challenge in developing more detailed indicators. Therefore, further research using a mixed-method approach and direct testing of the model's implementation in the target area is highly recommended.

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