

## Institutional Barriers and Policy Opportunities for Heirloom Rice in Sabah: A Preliminary Analysis

Faridah Suffian<sup>1\*</sup>, Haijon Gunggut<sup>2</sup>, Hendry Joseph<sup>3</sup>, Firdausi Suffian<sup>4</sup>

<sup>1</sup> Faculty of Administrative Science & Policy Studies Universiti Teknologi MARA (UiTM)

<sup>2</sup> Faculty of Administrative Science & Policy Studies Universiti Teknologi MARA (UiTM)

<sup>3</sup> Faculty of Plantation and Agrotechnology Universiti Teknologi MARA (UiTM)

<sup>4</sup> Faculty of Administrative Science & Policy Studies Universiti Teknologi MARA (UiTM)

Corresponding Author: [faridahsuffian282@gmail.com](mailto:faridahsuffian282@gmail.com)

### Abstract

*The problem to be addressed in this article is linked to the limitations that hinder the sustainability and growth of heirloom rice within Sabah's policy framework. As heirloom rice considered as a crop of high cultural and ecological value however, it remains underrepresented in the state's agricultural context. Current agricultural policies prioritize high-yield commercial rice, thereby marginalizing heirloom varieties that lack formal support for financial, genetic, or market development. The objective of this paper is to analyse and discuss the institutional barriers that hinder the sustainability and growth of heirloom rice in Sabah. Using a qualitative approach grounded in institutional theory, data were collected through purposive sampling of key informants with expert knowledge and experience in the sector. Thematic analysis revealed four major barriers: (1) policy frameworks and institutional neglect that sideline heirloom rice, (2) limited prioritization within state agricultural agendas (3) weak market demand and fragmented value chains, and (4) structural barriers to farmer support, including infrastructure, incentives, and generational continuity. The study highlights the need for realigned institutional priorities, enhanced collaboration, and targeted support structures to integrate heirloom rice into Sabah's agricultural framework. Policy reforms and dedicated support can foster sustainability, cultural preservation, and agricultural resilience within Sabah's food systems.*

**Keywords:** Heirloom Rice, Sabah Agriculture, Food Security, Institutions, Prioritisation

## INTRODUCTION

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Malaysia's agricultural policies have long prioritized achieving national food security, particularly through self-sufficiency in rice production. However, this centralized approach, often overlooks the diverse agroecological and cultural contexts of East Malaysia, specifically Sabah and Sarawak. Sabah, with its unique agricultural heritage, is home to over hundreds heirloom rice varieties, many of which remain underutilized and undocumented (KRI, 2022). These traditional varieties offer potential for addressing regional food security challenges but face significant barriers, including limited institutional support, informal supply chains, and insufficient research and development (R&D). The issue of heirloom rice cultivation in Sabah has received limited attention from prior scholars, especially in relation to its marginalization within Malaysia's centralized agricultural policy framework. While there is existing research on Malaysia's agricultural development and the promotion of

high-yield commercial rice, studies rarely address the specific institutional, policy, and coordination barriers faced by heirloom rice in East Malaysia. There is a lack of in-depth analysis on how historical path dependence, federal-state policy dynamics, and implementation gaps under the National Agrofood Policy 2.0 (2021–2030) impact heirloom rice sustainability. This gap leaves unanswered questions about the systemic challenges and policy opportunities for integrating heirloom rice into Sabah’s agricultural strategy, an area this study seeks to address.

A review of the existing literature highlights the complex interplay between federal agricultural priorities, regional disparities, and the socio-cultural significance of heirloom rice. Key sources include the work of North (1990) on institutional theory, Suffian et al. (2022) on Sabah’s food security policies, and KRI (2022) on Malaysia’s rice sector dynamics. These studies underscore the need for a regionally inclusive approach to agricultural policy that aligns national objectives with local priorities. Secondary data were collected from various sources, including government policy documents, reports, academic publications, and institutional records. Additionally, insights from informal discussions with stakeholders, such as farmers and policymakers, were incorporated as supplementary information to enrich the understanding of institutional dynamics. Thematic analysis was applied to identify patterns and themes, guided by Institutional Theory.

## LITERATURE REVIEW

### *Sabah’s Heirloom Rice Varieties*

Sabah’s contribution to national rice production is relatively modest, with Peninsular Malaysia accounting for 90.1% of output with paddy production concentrated particularly in the northern states of Kedah, Penang, Perak, and Kelantan, which collectively produce 60% of domestic rice. While Sarawak contributes 5.6% and Sabah only 4.2% (KRI, 2022). In Sabah, the total paddy cultivation area has declined from 42,496 hectares in 2010 to 37,323 hectares in 2022, although production has remained stable at approximately 110,000 to 140,000 metric tonnes (Mt), reflecting yield improvements despite reduced planting areas (MAFI, 2022). Sabah is home to over hundred heirloom rice cultivars, valued for their unique genetic traits and adaptability to local conditions (KRI, 2022). Heirloom rice refers to native rice varieties

that are unique to Sabah and Sarawak. These rice types cultivated and passed down through generations in East Malaysia, characterized by their distinctive colours, flavours, and fragrances. Examples of heirloom rice from the region include Bajong, Biris, Adan, and Tadong, each often associated with specific localities. These varieties are grown as either wetland paddy or dryland paddy (padi bukit), depending on the agroecological conditions of their respective regions. These varieties, grown primarily using traditional methods, include white, black, red, and brown rice (Neoh & Lum, 2018). However, only a fraction of these cultivars has been formally documented (Sarena, Abdul Hamid & Gobilik, 2022), highlighting the urgent need for systematic research to preserve this valuable resource.

Heirloom rice varieties offer significant nutritional benefits, particularly in their unpolished, brown form, which retains higher levels of essential minerals such as iron (Frei & Becker, 2003). These qualities make them valuable for breeding programs aimed at enhancing grain quality. Despite their potential, heirloom rice remains underutilized in commercial markets and policy frameworks. Beyond their nutritional and genetic value, heirloom rice varieties carry deep cultural significance for Sabah's rural communities. Rice cultivation has long been intertwined with local traditions, beliefs, and economic systems. Historically, rice was cultivated on a small scale using traditional methods, primarily for subsistence, especially in Sabah's mountainous regions (Hashmi & Tianlin, 2016). These practices, while rooted in sustainability, reflect the broader socio-economic realities of rural communities, where rice serves as both a food staple and a cultural symbol.

Despite its cultural and nutritional importance, rice production in Sabah meets only 20%–30% of the state's demand (The Star, 2025). This production gap is widening due to rapid population growth, projected by Department of Statistics to reach 5.27 million by 2040. This demographic shift places increasing pressure on local rice systems to balance food security needs with the preservation of traditional practices. It also underscores the urgency of supporting heirloom rice cultivation as a strategy to enhance regional food security while preserving cultural heritage. Sustaining the cultivation of heirloom rice is essential not only for safeguarding Sabah's agricultural heritage but also for addressing pressing food and nutrition security challenges. While heirloom rice is characterized by lower yields and is cultivated by relatively few communities, its unique qualities and cultural significance offer significant potential for development (IDS, 2024). Harnessing these strengths requires a strategic integration of

traditional and modern agricultural practices, emphasizing both productivity and sustainability. Such efforts must prioritize local needs while preserving the cultural values that make heirloom rice a vital component of Sabah's agricultural identity.

### *Food Security, State Institutions and Sabah's Agricultural Policy*

The World Food Summit in 1996, convened by the United Nations Food and Agriculture Organization (FAO), defined food security as being achieved “*when all people, at all times, have physical and economic access to sufficient, safe, and nutritious food that meets their dietary needs and food preferences for an active and healthy life*” (FAO, 1996). This definition serves as the foundation for food security policy frameworks worldwide, emphasizing four principal dimensions: availability, accessibility, utilization, and stability (FAO, 2008). These dimensions are interrelated and interdependent, highlighting the complexity of achieving food security and the necessity for integrated strategies that address these aspects holistically (Fatimah, 2023).

The vulnerabilities within global agri-food supply chains were starkly exposed during the COVID-19 pandemic in 2020. Major rice-exporting countries such as India, Vietnam, and Thailand imposed export bans, disrupting supply chains and reducing rice availability in importing countries (Garnett et al., 2020). These disruptions strained not only food availability but also the operations of rice exporters. While global fertilizer and food prices have since declined, they remain elevated compared to pre-pandemic levels, further pressuring food security systems (IFPRI, 2022; FAO et al., 2023). These challenges have prompted nations to emphasize domestic production and enhance local resilience to mitigate future shocks.

In Malaysia, food security strategies have historically emphasized self-sufficiency, particularly in rice production. However, an overreliance on self-sufficiency and import dependency risks fostering inefficiencies and undermining resilience to disruptions. A more comprehensive and holistic approach to food security must extend beyond production metrics to incorporate dimensions such as accessibility, utilization, stability, sustainability, and agency (Wong et al., 2024). The concept of ‘agency’ in food systems, as defined by the High-Level Panel of Experts (HLPE, 2020), refers to the power of individuals and communities to make autonomous decisions about food production, dietary choices, and the governance of food systems. Clapp et al.

(2022) emphasize the transition from passive food consumption to active participation, wherein individuals and groups engage in democratic decision-making and shared governance of food systems. This empowered role, often described as “food citizenship” (Fernandez-Wulff, 2018; Vivero-Pol, 2017), highlights the importance of agency in fostering inclusive and resilient food systems.

Striking a balance between self-reliance and self-sufficiency is essential for Malaysia’s food security. While national production targets remain important, they should not overshadow efforts to enhance household accessibility, nutritional outcomes, and systemic resilience. Achieving this balance requires shifting the focus from purely national objectives to fostering individual and community-level participation in food system governance. Institutions play a pivotal role in economic development, serving as the foundation for policy configuration, coordination, and implementation. They comprise both formal rules (laws, regulations) and informal norms (values, conventions) that collectively set the “rules of the game” (North, 1990). These frameworks’ structure interactions, prioritize resources, and govern decision-making processes. While resource allocation, technological investment, and human capital are proximate causes of policy success, the fundamental drivers lie in institutional frameworks that shape how decisions are made and coordinated (Acemoglu & Robinson, 2008). Institutions determine the success or failure of policies by influencing how policymakers deliberate, prioritize, and allocate resources. As Suffian et al. (2022) emphasize, political events, history, and norms embedded within institutions can either enable or constrain effective policy execution.

Institutions are not homogeneous; they vary based on historical trajectories, political processes, and embedded conventions, making their role highly context specific. For instance, food security policies may be undermined by informal power relations or patronage systems. Uneven power dynamics, such as political elites exerting influence over state bureaucracies, can distort institutional roles, leading to incoherent policies and misaligned priorities (Suffian, 2019). This interplay between formal and informal elements highlights the importance of context in understanding policy outcomes. In agriculture, institutional frameworks shape decisions regarding resource allocation and policy priorities, ultimately determining how agricultural systems are developed and sustained.

Malaysia's agricultural policies exemplify this dynamic, reflecting a combination of colonial legacies, post-independence nation-building objectives, and ethnic politics. Institutions inherit historical rules and norms, which influence current policy configurations. Path dependence and historical legacies play a critical role in shaping institutional capacities and priorities. As a key concept in historical institutionalism, path dependence emphasizes critical junctures, who often serve as the starting points for path-dependent processes (Capoccia & Kelemen, 2007). Reforming institutions requires a deep understanding of these historical trajectories to identify and address entrenched barriers to change.

Food policies are linked to institutions, as government policies play a crucial role in creating an environment that empowers farmers to enhance their technical capacity (e.g., skills, experience, expertise) and access essential capital (e.g., investments in machinery, equipment, technologies), enabling them to achieve higher levels of productivity. Malaysia was essentially an agriculture-based economy when it gained independence, but the shift of priorities to manufacturing led to a decline in productivity on the farm. To fully unlock this potential, targeted policy reforms and institutional support are essential, providing a sustainable pathway for regional agricultural development (Wong et al., 2024).

Malaysia's agricultural policies demonstrate entrenched path dependence, characterized by a strong emphasis on commercial agriculture and self-sufficiency in staple crops such as rice. National policies primarily support Malay rice farmers in Peninsular Malaysia, aligning with the New Economic Policy (NEP), which aimed to uplift the rural Malay majority (Jomo, 2004). However, this focus has marginalized other agricultural stakeholders, particularly shifting cultivators and indigenous farmers in East Malaysia, such as the Dusun in Sabah, who lack the political and economic influence to shape national policies (Hill, 2013, as cited in Gimbad, 2020). Historically, rice policies in Malaysia were rooted in colonial and post-colonial efforts to settle hill and riverine communities through wet paddy agriculture, often framed as state-building initiatives (Malaysia, 1956). Wet rice cultivation was promoted as a strategy for poverty alleviation and socio-economic reorganization among indigenous populations. In contrast, hill rice agriculture was actively discouraged due to its perceived inefficiency and lower economic viability compared to wet rice systems. The cyclical land clearing and fallowing associated with hill rice farming, intended to restore soil fertility, were criticized for their perceived environmental degradation (Hill, 2013, cited in Gimbad,

2020). Additionally, hill rice cultivation yields were significantly lower than those of wet rice (Malaysia, 1976, p. 168).

The COVID-19 pandemic highlighted the fragility of Sabah's food security, exposing vulnerabilities in the rice supply chain. Concerns over potential disruptions in rice imports reignited discussions about the importance of strengthening local rice production to reduce dependency on external sources. In response to these vulnerabilities, Sabah made a pivotal decision in 2022 to reestablish a dedicated governing body for paddy cultivation, resulting in the creation of the Sabah Paddy and Rice Board (SPRB). This institutional shift represents a significant step, signalling the state's renewed commitment to addressing the challenges of paddy cultivation and improving food security. The reestablishment of the SPRB in 2024 marks a critical juncture for Sabah's agricultural sector. This institutional reform has the potential to challenge historical path dependencies that have long prioritized commercial agriculture over specialty crops such as heirloom rice. Decisions made during this period will significantly influence the trajectory of Sabah's rice industry, determining whether it remains on its historical path or shifts toward a more inclusive, regionally tailored approach.

## METHODOLOGY

This study employed a qualitative approach utilizing document analysis to explore the impacts of institutional limitations and evolving arrangements on the agricultural sector, with a specific focus on heirloom rice production in Sabah. Secondary data were collected from various sources, including government policy documents, reports, academic publications, and institutional records. Additionally, insights from informal discussions with stakeholders, such as farmers and policymakers, were incorporated as supplementary information to enrich the understanding of institutional dynamics. Thematic analysis was applied to identify patterns and themes, guided by institutional theory.

## FINDINGS AND DISCUSSION

### *Policy Framework and Institutional Constraints*

Federal priorities for food security, driven by self-sufficiency goals, strongly influence Malaysia's agricultural policies. These policies prioritize high-yield rice varieties to reduce import dependency and enhance national food security. However, this approach often overlooks the relatively small contribution of Sabah's rice sector to the national supply chain. As a result, the focus on high-yield rice production marginalizes other opportunities, such as promoting specialty rice varieties unique to Sabah and Sarawak, NAP 2.0 (2021–2030) explicitly recognizes the potential of specialty rice varieties in Sabah and Sarawak (Kementerian Pertanian Keterjaminan Makanan, 2021). The policy emphasizes their superior qualities, such as taste, texture, and aroma, and highlights their growing demand in high-value markets. This recognition provides a framework for exploring the economic opportunities and challenges in developing the specialty rice industry in these regions. However, Malaysia's centralized governance structure often limits state-level flexibility. While state governments, such as Sabah's, have some autonomy in theory, their actions are constrained by federal guidelines, bureaucratic oversight, and national policy objectives. Federal institutions design policies based on national goals, such as self-sufficiency, which may not align with the diverse ecological, economic, or cultural realities of individual states.

Sabah faces significant constraints in shaping agricultural policies that address its unique needs. Federal funding and institutional frameworks often dictate state-level priorities, leaving limited resources for initiatives that support indigenous farming communities. To secure federal funding, state governments must often align their strategies with federal objectives, even when these objectives fail to fully address the state's distinct challenges and opportunities. This study adopts Institutional Theory as its primary framework because it provides a robust foundation for exploring how formal rules, informal norms, and governance structures shape agricultural policy outcomes. Its relevance lies in understanding how institutional arrangements both at the federal and state levels affect the prioritization, support, and sustainability of specialty crops such as heirloom rice in Sabah. Within this broader framework, Neo-Institutional Theory, as outlined by North (1990), is incorporated to offer a complementary lens. While Institutional Theory explains the structural and rule-based dimensions of policy

formation, Neo-Institutional Theory adds explanatory depth by accounting for historical precedents, structural constraints, and political motivations that influence institutional behaviour over time. This approach is particularly useful in the Sabah context, where agricultural policy continues to be shaped by historical path dependence, centralized decision-making, and entrenched policy priorities that favour high-yield commercial rice. By integrating Neo-Institutional Theory, the analysis can better explain how past policy decisions and institutional inertia perpetuate the marginalization of heirloom rice, despite its acknowledged cultural and ecological value.

These policies, in turn, have direct implications for food security and cultural preservation. For example, the Sabah Agricultural Policies (SAP1, SAP2 and SAP3) aimed to achieve 60% SSL in rice production. However, this target remains unmet, with local rice production achieving only 22% SSL due to slow growth and inconsistent policy implementation. Although NAP 2.0 acknowledges the potential of specialty rice as a high-value crop, funding, research and development (R&D), and market promotion for heirloom rice remain limited. Document analysis revealed that subsidies and technical programs are primarily directed toward commercialized wet rice cultivation, with limited consideration for the unique agroecological conditions and cultural significance of heirloom rice in Sabah. Federal agricultural policies continue to prioritize staple crops like rice for their broader impact on national food security, further entrenching path dependence. Despite having theoretical autonomy over land and agricultural decisions, state policies in Sabah also favour commercial agriculture, reinforcing this historical trajectory.

### *Prioritization*

The prioritization of commercial agriculture over heirloom rice underscores Malaysia's centralized approach to agricultural development, which disproportionately benefits Peninsular Malaysia. Despite having autonomy over land and agricultural decisions, state-level policies closely align with federal priorities, focusing on self-sufficiency through commercial rice production while offering limited support for specialty crops like heirloom rice (IDS, 2024). These policies heavily emphasize staple crops, particularly high-yield rice varieties, due to their broader impact on national food security and their role in reducing import dependency. The disparity between policy acknowledgment and practical implementation is evident. Although NAP 2.0 highlights the economic potential and cultural value of specialty rice varieties, efforts to translate

these policies into actionable initiatives remain insufficient. Limited funding, weak institutional coordination, and inadequate support mechanisms continue to hinder the realization of these objectives (Suffian & Suffian, 2023).

This national focus is further entrenched by federal agricultural policies that prioritize self-sufficiency. The economic rationale for prioritizing commercial rice lies in its cost-efficiency. Large-scale commercial rice production is cheaper to grow, harvest, and distribute due to standardized methods and economies of scale, making it more affordable and accessible to the general population. This approach directly addresses national food security needs. In contrast, heirloom rice remains a niche, premium product with lower yield and longer harvest. Additionally, its minimal contribution to export revenue further diminishes its prioritization within Malaysia's agricultural policies. Concerns about hill paddy farming practices, such as slash-and-burn methods, also influence policy decisions (Daniel & Yap, 2020). These land-use practices present environmental challenges, which in turn limit institutional support for heirloom rice cultivation in upland areas. However, farmers argue that burning is a traditional technique to restore soil fertility, and its risks can be minimized if sustainable methods are used (IDS, 2024). These environmental concerns are compounded by structural challenges within agricultural policy frameworks. Limited budgets and political will often lead to prioritization of high-return, large-scale agricultural projects over niche initiatives like heirloom rice production. Advocacy for heirloom rice may lack influential political champions or grassroots movements to push it higher on the policy agenda.

## **Institutional Constraints on Heirloom Rice Development**

### *Limited Market Demand and Weak Value Chains*

Heirloom rice production in Sabah faces significant barriers in scaling and accessing premium markets due to informal and fragmented supply chains (KRI, 2022). Micro, Small, and Medium Enterprises (MSMEs), which often oversee the entire value chain from farming to marketing, are hindered by inadequate infrastructure for milling, distribution, and branding. These inefficiencies reduce the marketability of heirloom rice as a premium product, limiting its appeal to high-value markets and constraining opportunities for economic growth within the sector.

## *Structural Barriers to Farmer Support*

Farmers are provided with subsidies for fertilizers and pesticides to support their agricultural activities, however, dryland paddy farming does not receive subsidies for land preparation. While local institutional arrangements aim to address the unique needs of heirloom rice cultivation, they remain fragmented and under-resourced. Challenges such as prioritisation (Suffian & Suffian, 2023), limited market demand, weak value chains (KRI, 2022) and underpromotion (IDS, 2024), structural barriers to farmer support, demographic and documentation challenges, and weak federal-state collaboration (KAS, 2023). These factors collectively increase the vulnerability of heirloom rice varieties to genetic erosion and hinder their inclusion in formal market structures. Compounding these challenges are misperceptions about traditional farming practices. Concerns were raised that if the government openly supports hill paddy farming, it may inadvertently encourage unsustainable practices that harm the environment (IDS, 2024).

Policies and assistance schemes for paddy farmers, such as subsidies for ploughing, fertilizers, and pesticides, have remained largely unchanged since the implementation of the First Sabah Agriculture Policy (SAP1) (KAS, 2023). This stagnation underscores the lack of significant innovation or reform to address the evolving needs of farmers. Paddy cultivation demands substantial investments in inputs, labour, and infrastructure. Yet, compared to other crops or economic sectors, it offers minimal financial returns, making it a less attractive option for both farmers and policymakers. The widespread availability of affordable rice through supermarkets, facilitated by BERNAS's monopoly on rice importation, has further diminished the urgency to invest in local production. This accessibility not only satisfies consumer demand but also reduces the perceived importance of domestic paddy cultivation in state-level policy discussions. Consequently, local farmers face structural barriers that limit their ability to compete with imported rice, leaving the sector underfunded and marginalized.

Farmers face limited access to formal infrastructure, financial resources, and technical assistance, challenges that are further exacerbated within the heirloom rice sector. These barriers perpetuate inequalities, making it difficult for heirloom rice cultivation to compete with commercial rice systems. Additionally, the informal supply chain for heirloom rice in Sabah has emerged as a significant obstacle. Small-scale

farming groups, working in collaboration with NGOs and social enterprises, manage parts of the value chain from cultivation to marketing, yet face limited access to formal infrastructure for milling, storage, and distribution. This lack of resources constrains their ability to scale up production or access broader markets and distribution, constraining their ability to scale up production or access broader markets. Beyond these structural and financial barriers, constraints related to seed innovation and access further exacerbate the challenges faced by farmers in Sabah.

Sabah prohibits the import of seeds from outside the state, to prevent disease introduction, further limiting options. However, the state use TR8 which is old, low yield, and has been in use for over a decade, and its genetic potential is no longer competitive with advanced seed varieties. Farmers express dissatisfaction with TR8, eroding trust in institutional support and policy frameworks. Even when farmers are willing to adopt more efficient varieties, they face significant barriers, including the unavailability of improved seeds, restrictions on seed imports, and inadequate institutional support. This combination of factors results in lower yields, reduced income, and financial challenges, further discouraging investment in paddy farming. From a national policy perspective, heirloom rice is often perceived as a luxury or cultural product rather than a critical component of food security. This perception reduces its importance in agricultural planning, pushing it to the sidelines of policy discussions and restricting its growth potential.

#### *Lack of Federal-State Collaboration and Interagency Coordination*

Coordination gaps between federal and state governments exacerbate inefficiencies in resource allocation and policy implementation. Federal funding mechanisms constrain Sabah's ability to exercise autonomy in shaping agricultural priorities. The centralized bureaucracy surrounding fertilizer subsidies involves multiple layers, including Ministry of Food Security (KPKM), Farmers' Organisation Authority (LPP), National Farmers Organization (NAFAS), and *Pertubuhan Peladang Kawasan* (PPK), before reaching farmers. Each layer introduces administrative inefficiencies, delaying the delivery of fertilizers to recipients. These delays often result in fertilizers arriving after the critical planting stage, significantly impacting crop growth and yield. Late application reduces fertilizer effectiveness, leading to lower productivity and missed harvest opportunities that directly affecting their income. Furthermore, delays in subsidy delivery erode farmers' trust in the system, discouraging reliance on

institutional support (Arshad et al., 2019). The centralized structure of subsidy distribution limits flexibility, preventing state-level institutions like Ministry of Agriculture, Food and Fisheries Industry (MAFFI) and the Department of Agriculture (DOA) from addressing local needs effectively. These systemic inefficiencies not only delay critical inputs like fertilizers but also undermine the implementation of broader agricultural initiatives, such as those aimed at supporting heirloom rice production and biodiversity conservation.

While NAP 2.0 acknowledges the potential of specialty rice in Sabah and Sarawak, this study found that efforts to implement these initiatives remain limited. A lack of coordination between federal and state governments hampers the ability to provide farmers with the necessary support. For instance, minimal research has been conducted on heirloom rice, particularly in areas such as genetic documentation and seed preservation. These gaps not only hinder biodiversity conservation but also limit the potential for heirloom rice to develop into a high-value agricultural product. Additionally, there is poor coordination between key agencies, including the Department of Irrigation and Drainage (DID), the Department of Agriculture (DOA), and the Integrated Agricultural Development Area (IADA), particularly in managing irrigation systems for paddy cultivation in Kota Belud (KAS, 2023). This lack of synchronization undermines the efficiency of water resource management, a critical factor in supporting sustainable paddy production.

### *Demographic and Documentation Challenges*

The aging farming population and the lack of formal genetic documentation pose significant threats to the long-term sustainability of heirloom rice cultivation in Sabah and Sarawak (IDS, 2023). While anecdotal claims suggest the existence of hundreds of distinct rice varieties in the region (KRI, 2022), only a small fraction of these cultivars have been officially characterized. This lack of documentation undermines efforts to conserve biodiversity and limits the potential to market heirloom rice as a premium product. The absence of systematic initiatives to catalogue and preserve the genetic diversity of traditional rice varieties exacerbates these challenges, leaving many strains at risk of being lost (Sarena, Abdul Hamid & Gobilik, 2022). Without targeted interventions, such as comprehensive genetic mapping or community-led seed preservation programs, the cultural and ecological value of heirloom rice may

erode (Neoh & Lum, 2018), further marginalizing its role in sustainable agriculture and food security.

### **Locked In: Path Dependence in Shaping of Policy Priorities**

The development trajectory of heirloom rice in Sabah reflects a clear case of historical path dependence, where past policy decisions continue to shape present agricultural priorities. Traditionally, paddy farming in the state has been largely subsistence-based, with indigenous communities valuing rice as both a cultural and spiritual staple rather than a commercial product. In many communities, rice is regarded as a sacred gift from God, a belief that discourages its commercialization. While some farmers now sell surplus harvests in local markets, heirloom rice remains a marginal crop within the broader agricultural system. Emerging social enterprises, such as Wagas De Asi and Beras Meridi have begun branding and marketing heirloom rice; however, large-scale investments still favour high-yield commercial varieties, in line with Malaysia's food security strategy and self-sufficiency targets.

Policy priorities in Sabah have long deprioritized paddy cultivation. The closure of the Sabah Padi Board (SPB) in 1981 significantly reduced institutional support for the sector, leaving paddy-related matters under the Paddy Cultivation Development Division—a small unit within the Department of Agriculture (DOA). The DOA's focus on high-impact, export-oriented crops limits resources for paddy farming, which contributes minimally to the state's agricultural GDP. As Ang (2016) explains, path dependence creates self-reinforcing mechanisms that lock institutions into specific trajectories, making policy change difficult. In Sabah's case, this has reinforced the prioritization of high-yield wet rice varieties over heirloom rice, even when the latter offers potential cultural, ecological, and economic benefits.

Current barriers to heirloom rice development include informal supply chains, an aging farming population, and the absence of genetic documentation for many varieties. Federal policy frameworks emphasise the production of cheap, high-yield rice for food security, sidelining heirloom rice due to its niche market appeal and premium pricing. Although the National Agrofood Policy 2.0 (2021–2030) acknowledges the potential of specialty rice in East Malaysia, implementation remains weak. The recently reestablished Sabah Paddy and Rice Board (SPRB) indirectly covers heirloom rice

under its mandate, but its immediate focus is on improving Self-Sufficiency Levels (SSL) through commercial rice production.

Despite these challenges, heirloom rice preservation offers complementary benefits such as biodiversity conservation, rural development, and cultural tourism. Stronger federal-state coordination is essential to ensure strategic alignment, adequate funding, and transparency in implementation. However, Sabah's dependence on federal resources constrains its autonomy in agricultural policymaking, making decentralization difficult. Persistent informal supply chains further limit market expansion, as Small-scale farming groups, working in collaboration with NGOs and social enterprises, manage the entire value chain struggle with inadequate milling, distribution, and branding infrastructure.

To overcome these systemic barriers, policy interventions could include expanding conservation programs, formalizing supply chains, and investing in research and development (R&D) and seed banking to protect biodiversity. A more inclusive agricultural policy that balances food security objectives with sustainable development goals is needed. This could be achieved through a dual-track approach: meeting SSL targets with commercial rice while preserving heirloom rice as a cultural and ecological asset. The SPRB can play a pivotal role by establishing seed banks, documenting heirloom varieties, and offering targeted incentives such as subsidies, training, and market access. Collaboration between government agencies, academic institutions, and local communities can further enhance research, sustainability, and market opportunities, ensuring a resilient and diversified agricultural sector in Sabah.

### *The Role of Sabah Paddy and Rice Board (SPRB)*

The Sabah Padi Board (SPB) was established in 1967 under the Agricultural Produce Board Ordinance 1963 to develop paddy cultivation for local consumption. However, financial constraints and a lack of revenue-generating activities made it unsustainable, leading to its closure in 1981. Responsibilities were transferred to the Sabah Department of Agriculture (SDOA), but paddy cultivation received limited attention due to competing priorities. In 2022, Sabah decided to revitalize the sector by reestablishing SPB as the Sabah Paddy and Rice Board (SPRB), officially launched in 2024. SPRB now oversees the entire value chain, from cultivation to marketing and distribution, aiming to boost production, enhance food security, and improve efficiency.

Its key goals include increasing paddy output, ensuring a stable rice supply, and modernizing agricultural practices. SPRB focuses on consolidating fields, providing farmers with modern machinery, and expanding cultivation. By 2030, Sabah aims for 60% Self-Sufficiency Level (SSL) and 100% by 2040, reducing reliance on rice imports, currently at 78%. The 2024 SPRB Enactment replaces outdated legislation to support these efforts.

In 2025, RM 32.5 million (5.32% of the agricultural budget) are allocated to SPRB, with initiatives targeting six key districts: Kota Marudu, Kota Belud, Tuaran, Tambunan, Keningau, and Papar. Priority is given to K1 areas with established irrigation systems to improve yields. To enhance oversight, SPRB proposed specialized monitoring mechanisms, including state and district-level Paddy Planting Committees. These committees coordinate irrigation maintenance, plan infrastructure expansion, and ensure effective collaboration between federal and state agencies. Sabah's paddy sector faces challenges, including land conversion, high infrastructure costs, labour shortages, and limited mechanization. Currently, 7,000 hectares of fields are abandoned, and TR8, the main paddy variety, yields only 3 tons per hectare. Farmers seek higher-yield varieties like MR279, but SDOA restricts external seed entry to prevent disease. Despite these issues, SPRB remains committed to revitalization. Key objectives include increasing crop intensity to 1.75 by 2030, improving yields to 5 tons per hectare, expanding cultivation, boosting farmer incomes, and supporting industry players. However, financial constraints limit R&D in seed development, posing a challenge to achieving long-term self-sufficiency.

## CONCLUSION AND RECOMMENDATIONS

The findings reveal that Sabah's heirloom rice sector faces systemic challenges such as limited market demand and weak value chains and underpromotion, structural barriers to farmer support, lack of federal-state collaboration, demographic and documentation challenges. Despite these barriers, the sector holds significant potential for contributing to food security, biodiversity conservation, and preserving cultural heritage. To fully unlock this potential, targeted policy reforms and institutional support are essential, providing a sustainable pathway for regional agricultural development. A key insight from this study is the deep-rooted institutional challenges facing Sabah's heirloom rice sector. While Sabah has the autonomy to shape its agricultural policies,

heirloom rice has remained largely absent from policy discussions and formal agricultural agenda. The state's agricultural focus has been on commercial rice production, aligning with national self-sufficiency goals, while heirloom rice, despite its cultural, ecological, and economic value has received little institutional recognition or targeted support.

The re-establishment of SPRB reflects a significant institutional shift, but its effectiveness remains uncertain. The collapse of the SPB (1967–1981) was due to financial unsustainability and limited institutional capacity, conditions that still threaten SPRB today. With only 5.32% of the 2025 agricultural budget (RM32.5 million), the Board faces a mismatch between its expansive mandate and the resources allocated. Unless it develops innovative financing, mechanisms and prioritises inclusivity, SPRB risks becoming another short-lived institution. This institutional fragility also has direct implications for crops such as heirloom rice, which remain excluded from mainstream support structures. Overall, this study has shown that heirloom rice, despite its cultural, ecological, and economic potential, remains marginalized within Sabah's agricultural strategy due to entrenched policy priorities, structural constraints, and limited institutional coordination. If effectively supported, heirloom rice could be transformed from a heritage commodity into a strategic asset that strengthens food security, diversifies rural livelihoods, and supports sustainable development. Achieving this will require policy realignment, target institutional support, and strengthen federal–state collaboration to address market, genetic, and farmer support challenges.

Heirloom rice is more than just a crop, it represents an opportunity for economic diversification, rural empowerment, and sustainability. Developed appropriately, it could form a high-value niche market, benefit smallholder farmers while preserving biodiversity and cultural identity. However, this requires a stable production base, which depends on institutional recognition, farmer support, and coordinated investment. Sabah must first reconfigure its agricultural priorities to include heirloom rice within formal policy frameworks, moving beyond symbolic acknowledgment towards genuine integration. To achieve this, Sabah's agricultural policies must explicitly incorporate heirloom rice as a priority crop. SPRB must take a stronger leadership role in identifying, documenting, and promoting heirloom rice varieties, rather than solely focusing on commercial rice. Without institutional recognition, heirloom rice will continue to be sidelined. Second, federal-state collaboration must improve to ensure adequate financial support while maintaining the flexibility for Sabah to design policies

that reflect its unique agricultural landscape. Federal funding should not be limited to commercial rice subsidies but should also support research, genetic preservation, and infrastructure for heirloom rice farming.

Finally, market development must be a priority, but only after a resilient production system is in place. Sabah needs a clear strategy to position heirloom rice as a premium, high-value product, both domestically and internationally. However, this can only succeed if farmers have the necessary institutional support, production stability, and resources to scale up sustainably. The future of heirloom rice in Sabah depends on proactive policy shifts. Without institutional recognition and targeted support, this valuable crop risks disappearing, not only from agriculture but also from Sabah's cultural identity. While this study provides an initial exploration of the institutional and policy barriers affecting heirloom rice in Sabah, several areas warrant deeper investigation. First, longitudinal policy studies are needed to assess how SPRB's interventions influence heirloom rice production, farmer livelihoods, and market integration over time. Second, comparative regional research could analyse similar initiatives in other parts of Malaysia or Southeast Asia to identify transferable best practices. Third, there is a need for value chain and market potential assessments, including branding strategies and the feasibility of geographical indication (GI) protection for Sabah's heirloom rice. Finally, socio-cultural impact studies should explore how policy interventions affect local identity, intergenerational farming knowledge, and youth participation in the sector. These future research directions would not only strengthen the evidence base but also support the development of a comprehensive and sustainable policy framework for heirloom rice in Sabah.

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