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Rethinking Plasma Partnerships: Toward an Adaptive Institutional Governance Model for Sustainable Oil Palm Development

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Abstract: Sustainable plasma partnerships integrate smallholders into commercial plantation systems to promote inclusive oil palm development. Institutional issues include fragmented governance, land tenure uncertainty, unequal bargaining power, and insufficient stakeholder coordination, which limit these partnerships' efficacy. Most studies of plasma partnerships focus on contractual, commercial, or certification perspectives, with little emphasis on institutional governance processes and long-term performance. This study examines institutional governance mechanisms affecting plasma partnership implementation in South Papua, Indonesia, and develops an AIGM for sustainable palm oil production. A qualitative case study was conducted utilising data from 25 key interviewees from government agencies, plantation businesses, cooperatives, plasma farmers, indigenous groups, and civil society organisations. Thematic analysis was used to analyse semi-structured interviews, field observations, and document analysis. Three governance mechanisms—coordination, collaboration, and institutional learning—determine the effectiveness of plasma partnerships. These techniques improve openness, stakeholder trust, equitable benefit-sharing, accountability, and conflict resolution, helping institutions adapt to complex socio-ecological and governance issues. The study proposes the AIGM, which views sustainable plasma partnerships as the result of Institutional Challenges, Adaptive Institutional Governance, Effective Plasma Partnerships, and Sustainable Oil Palm Development. The model integrates adaptive governance and collaborative institutional learning into a single analytical framework to extend Institutional Governance Theory. The AIGM provides a transportable governance framework for developing sustainable plasma partnerships and insights for institutional governance and plantation policy in emerging economies with comparable governance challenges.

Keywords: Adaptive Institutional Governance Model (AIGM); Plasma Partnerships; Institutional Governance; Sustainable Palm Oil Development; Collaborative Governance; South Papua.

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1. Introduction

Palm oil plantations have become a strategic sector in the global economy, contributing significantly to vegetable oil supply, rural development, job creation, and economic growth in various tropical countries [1]. However, this industrial expansion has

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also created increasingly complex challenges, including deforestation, biodiversity loss, greenhouse gas emissions, land tenure conflicts, and growing pressure on indigenous peoples and local communities that depend on forest resources [13]. In recent decades, the international debate has focused not on whether palm oil plantations should continue to be developed, but on how to build a governance system that balances economic growth with environmental protection and social justice. Various global initiatives, such as the implementation of Environmental, Social, and Governance (ESG) principles, zero-deforestation commitments, sustainability certification, and strengthening supply chain governance, demonstrate that the success of plantation development is increasingly determined by the quality of institutions and governance mechanisms rather than solely by increased productivity [2]. As the world's largest palm oil producer, Indonesia plays a strategic role in realizing sustainable plantation development [3]. This position is increasingly important as demand for palm oil rises to support the national biodiesel program, including the implementation of the B50 program, as well as to meet demand for cooking oil, industrial raw materials, and food security [4]. To address these challenges, the government is developing a nucleus-plasma partnership model to integrate smallholder farmers into modern plantation production systems [5].

Implementing plasma partnerships still faces obstacles such as uncertain land rights, weak institutional coordination, inequitable benefit distribution, low farmer bargaining power and limited oversight mechanisms [6]. These conditions indicate that the success of plasma partnerships depends not only on economic factors but also on the effectiveness of institutional governance linking government, companies, cooperatives, communities, and traditional institutions [7]. These characteristics are further complicated in South Papua Province, a region with significant potential for oil palm development while also containing high-conservation-value forest areas and a robust customary rights system [8]. Unlike the oil palm centers of Sumatra and Kalimantan, plantation development in South Papua occurs within an institutional context that involves interactions among formal regulations, customary institutions, local governments, plantation companies, cooperatives, and indigenous communities [11]. This complexity demands governance mechanisms that can balance economic interests, environmental protection, and respect for indigenous peoples' rights [9]. Therefore, the success of plasma partnerships in South Papua depends not only on regulatory compliance but also on institutions' ability to build coordination, trust, and adaptive collaboration mechanisms. Studies on plasma partnerships have been dominated by discussions of productivity, farmer welfare, benefit sharing, corporate social responsibility, and sustainability certification [10]. While these perspectives have enriched understanding of the economic and social benefits of plasma partnerships, they have not fully explained how institutional governance mechanisms shape implementation effectiveness [12].

The relationship among government, companies, cooperatives, and communities remains only partially understood, leaving the dynamics of coordination, collaboration, and institutional learning incompletely captured [14]. Therefore, an analytical framework that integrates institutional governance mechanisms is needed to explain the effectiveness of plasma partnerships, particularly in regions with unique institutional characteristics and customary rights systems, such as South Papua Province. Based on these research gaps, this study aims to explain the institutional governance mechanisms that influence the effectiveness of plasma partnerships and develop the Adaptive Institutional Governance Model (AIGM) as an adaptive governance model for sustainable oil palm plantation development in South Papua Province. This study makes three principal contributions [15]. First, it develops the Adaptive Institutional Governance Model (AIGM) as a novel analytical framework that integrates institutional governance, adaptive governance, and multi-stakeholder collaboration to explain the effectiveness of plasma partnerships. Second, it provides empirical evidence on the institutional governance mechanisms underlying plasma partnerships in South Papua, where governance dynamics are shaped by distinctive institutional characteristics and customary land tenure systems [17]. Third, it offers policy recommendations for strengthening more adaptive, inclusive, and sustainable plasma partnerships through enhanced institutional coordination, collaboration, and institutional learning [16].

2. Literature Review and Analytical Framework

2.1. Plasma Partnership as a Governance Mechanism

Plasma partnerships were initially introduced as a policy instrument to enhance smallholder inclusion by integrating farmers into commercial palm oil production systems. More recently, they have evolved beyond contractual arrangements between plantation companies and farmers to become governance mechanisms involving multiple stakeholders with diverse interests, responsibilities, and resources. Within this framework, governments establish regulatory and oversight functions, plantation companies provide investment, technology, and market access, and cooperatives facilitate institutional coordination [13]. At the same time, plasma farmers and indigenous communities play central roles in production and resource management. From a governance perspective, the effectiveness of plasma partnerships depends not only on technical performance or economic returns but also on the quality of institutional interactions among stakeholders. Effective coordination, transparency, equitable benefit-sharing, secure land tenure, and accessible conflict resolution mechanisms are widely recognized as essential conditions for sustainable partnership outcomes. Consequently, plasma partnerships should be understood as governance systems that connect public policy, business organizations, cooperatives, and local institutions through collaborative institutional

arrangements. This perspective provides the conceptual foundation for examining how governance mechanisms influence the effectiveness and sustainability of plasma partnerships in South Papua [6].

2.2. Institutional Governance for Sustainable Partnerships

Institutional governance emphasizes that policy effectiveness depends not only on formal regulations but also on the interaction between formal and informal institutions that shape collective action. Formal institutions—including laws, contracts, and regulatory frameworks—provide the legal basis for implementing partnerships, while informal institutions, such as trust, social norms, customary practices, and collaborative relationships, shape how policies are interpreted and implemented. In plasma partnerships, these institutional dimensions shape decision-making, resource allocation, and conflict resolution among stakeholders [11].

Within sustainable plantation development, institutional governance extends beyond regulatory compliance by strengthening coordination, accountability, and stakeholder trust across government agencies, plantation companies, cooperatives, and local communities. Effective governance therefore depends on institutions' capacity to reduce transaction costs, manage competing interests, and facilitate collective action [6]. This perspective is particularly relevant in South Papua, where customary land tenure and indigenous institutions play a central role in shaping partnership implementation. Consequently, institutional governance provides an appropriate analytical foundation for understanding how governance mechanisms influence the effectiveness and long-term sustainability of plasma partnerships.

2.3. Adaptive Governance in Complex Social-Ecological Systems

Institutional governance provides an essential foundation for implementing plasma partnerships; however, it cannot explain how institutions respond to dynamic socio-ecological changes [13]. Fluctuations in global commodity markets, evolving regulations, land tenure conflicts, rising sustainability standards, and growing recognition of indigenous rights require governance systems that can adapt to changing conditions rather than rely solely on regulatory compliance. Adaptive governance addresses this challenge by emphasizing institutional learning, cross-sectoral coordination, stakeholder collaboration, and policy flexibility as key mechanisms for managing complex social-ecological systems. Rather than viewing governance as a static institutional arrangement, adaptive governance considers it a continuous process through which institutions learn, adjust, and innovate in response to emerging environmental, economic, and social challenges. This perspective is particularly relevant in South Papua, where plantation development intersects with customary land tenure, indigenous institutions, and high-conservation-value landscapes [1]. In such contexts, the effectiveness of plasma partnerships depends not only on formal regulations but also on the institutional capacity to foster collaboration, continuous learning, and adaptive decision-making. Consequently, adaptive governance offers an appropriate analytical lens for understanding how institutional mechanisms support sustainable plasma partnerships amid institutional complexity and environmental change.

2.4. Analytical Framework

Based on the synthesis of these three perspectives, this study views the success of plasma partnerships as the result of interactions among partnership governance mechanisms, institutional effectiveness, and institutional adaptive capacity in responding to social, economic, and environmental changes [5]. Therefore, this study uses three integrated analytical dimensions, namely Plasma Partnership Governance, Institutional Governance, and Adaptive Governance, to explain how coordination between actors, land rights security, transparency, institutional learning, and multi-stakeholder collaboration shape the effectiveness of plasma partnerships in supporting sustainable oil palm plantation development in South Papua Province. These three dimensions serve as the analytical basis for interpreting the research findings and also form the basis for developing the adaptive institutional governance model proposed in this study [9]. Figure 1 illustrates the analytical framework developed in this study, which conceptualizes sustainable plasma partnerships as the outcome of an adaptive institutional governance process [1].

The framework assumes that institutional challenges, including weak coordination, regulatory uncertainty, unequal bargaining power, and limited stakeholder participation, constitute the primary barriers to effective plasma partnership implementation. To address these challenges, Adaptive Institutional Governance is positioned as the central governance mechanism, emphasizing three interrelated dimensions: coordination, collaboration, and institutional learning. These governance processes are expected to strengthen plasma partnership effectiveness by improving transparency, trust, accountability, and collective decision-making among stakeholders. Ultimately, more effective plasma partnerships are expected to support sustainable palm oil development by simultaneously enhancing economic viability, social inclusion, and environmental sustainability. Based on this framework, the subsequent section explains the research methodology employed to examine how these governance mechanisms operate within plasma partnerships in South Papua [13].

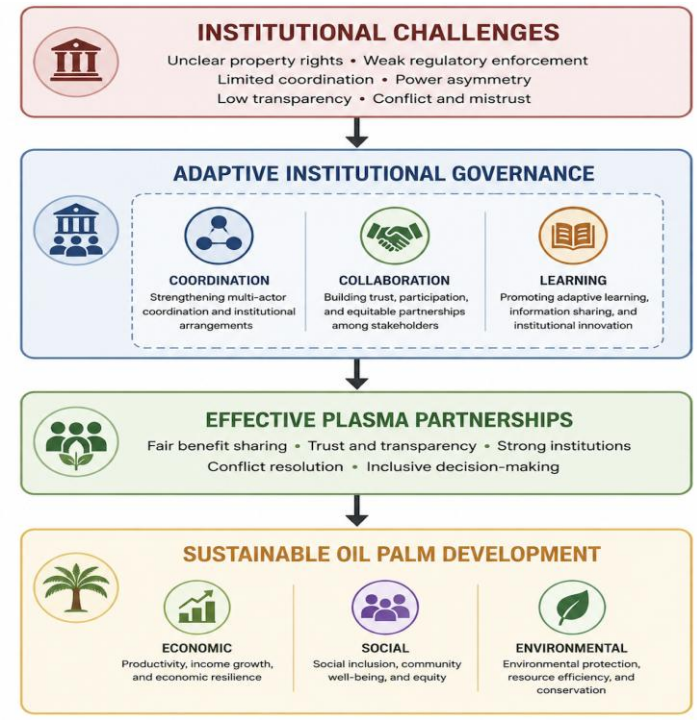


Figure 1: Analytical framework of adaptive institutional governance for sustainable plasma partnerships

3. Research Methodology

3.1. Research Design

This study employed a qualitative case study design to explore the institutional governance mechanisms underlying the implementation of plasma partnership schemes for sustainable oil palm development in South Papua, Indonesia. A qualitative approach was appropriate because the research sought to understand interactions, perceptions, and governance processes among multiple stakeholders rather than statistically measure causal relationships. The case study design enabled an in-depth examination of the institutional dynamics shaping collaboration among government agencies, plantation companies, cooperatives, indigenous communities, and plasma smallholders in their real-life context. The study was guided by the Adaptive Institutional Governance Framework, which conceptualizes sustainable plasma partnerships as the outcome of effective institutional coordination, collaborative governance, and adaptive learning. Rather than focusing solely on contractual relationships between companies and farmers, this framework emphasizes governance mechanisms that facilitate collective action, institutional adaptation, and sustainable resource management. Consequently, the research adopted an interpretive perspective to understand how governance practices influence the effectiveness of plasma partnerships in promoting economic, social, and environmental sustainability.

3.2. Study Area

The research was conducted in Merauke Regency, South Papua Province, Indonesia, an emerging oil palm development region characterized by rapid plantation expansion and diverse institutional arrangements. The region was purposively selected because it represents a strategic area where government policies, customary land tenure systems, plantation investment, and community participation intersect in shaping plasma partnership implementation. Unlike many established oil palm regions in western Indonesia, South Papua has distinctive governance characteristics due to the strong influence of indigenous institutions (ulayat rights), newly established provincial governance, and high-ecological-value landscapes. These characteristics make South Papua an appropriate case for examining how institutional governance affects the sustainability of plasma partnership schemes.

3.3. Informants

Informants were selected through purposive sampling, followed by snowball sampling to identify additional stakeholders with substantial knowledge of plasma partnership governance. The selection criteria included direct involvement in policy

formulation, partnership implementation, cooperative management, plantation operations, and community representation. A total of 25 key informants participated in this study, representing government institutions, plantation companies, cooperatives, plasma farmers, indigenous communities, and civil society organizations. Provincial and local government officials (4 informants) provided perspectives on policy formulation, implementation, and supervision (Table 1).

Table 1: Composition of informants

Informant Category	Institution	Number of Informants
Provincial Government	South Papua Plantation Office	2
Local Government	Merauke Regency Plantation Office	2
Plantation Companies	Plantation Managers	4
Plasma Cooperatives	Cooperative Board Members	4
Plasma Farmers	Smallholder Farmers	9
Indigenous Communities	Customary Leaders	2
Civil Society	Academics and NGO Representatives	2
Total		25

Plantation company managers (4 informants) explained partnership implementation and estate management, while cooperative board members (4 informants) described cooperative governance and benefit distribution. Plasma farmers (9 informants) shared their experiences regarding partnership practices and institutional challenges. Indigenous leaders (2 informants) contributed insights into customary land governance and community participation, whereas academics and NGO representatives (2 informants) provided independent views on institutional accountability and partnership sustainability. The diversity of informants enabled the triangulation of multiple perspectives, strengthening the credibility of the findings on institutional governance and plasma partnership implementation.

3.4. Data Collection

Data were collected between January and April 2026 using semi-structured interviews, field observations, and document analysis. Semi-structured interviews served as the primary data source, exploring institutional coordination, stakeholder participation, benefit-sharing mechanisms, conflict resolution, policy implementation, and adaptive governance in plasma partnerships. Field observations at plantation sites, plasma settlements, cooperative offices, and government institutions examined how partnerships were implemented and how stakeholders interacted. Document analysis included relevant regulations, government reports, partnership agreements, cooperative records, and company documents to provide context for institutional governance. Integrating these data sources enabled methodological triangulation, enhancing the credibility and comprehensiveness of the research findings.

3.5. Data Analysis

Data were analyzed using Thematic Analysis following the six-step procedure proposed by Braun and Clarke [2]. This approach was chosen because it allows researchers to identify, organize, and interpret recurring patterns within qualitative data while remaining flexible to emerging themes. Data were analyzed using thematic analysis following six stages: familiarization with the data, initial coding, theme development, theme refinement, theme definition, and interpretation. Interview transcripts, field notes, and documentary evidence were analyzed iteratively to identify patterns related to institutional governance. The analysis was guided by three analytical dimensions derived from the literature: Plasma Partnership Governance, Institutional Governance, and Adaptive Governance. These dimensions provided the basis for interpreting governance mechanisms and explaining how institutional arrangements influence the effectiveness of plasma partnerships in South Papua.

3.6. Trustworthiness of the Study

To enhance the trustworthiness of the findings, this study employed several validation strategies. Credibility was strengthened through data triangulation by comparing evidence from government officials, plantation companies, cooperative managers, plasma farmers, indigenous leaders, and civil society representatives. Methodological triangulation was achieved by integrating semi-structured interviews, field observations, and document analysis.

The team conducted member checking by sharing preliminary findings with selected participants to verify the accuracy of interpretations. In addition, peer debriefing with researchers in public administration and institutional governance helped refine thematic analysis and minimize researcher bias. An audit trail documenting the data collection, coding, and analytical processes was maintained to ensure transparency, dependability, and confirmability of the research findings.

4. Findings and Discussions

4.1. Institutional Challenges in Plasma Partnership Governance

The findings identify weak institutional coordination as the principal governance challenge affecting plasma partnership implementation in South Papua. Although national regulations require plantation companies to facilitate plasma development, implementation remains fragmented due to limited coordination among government agencies, plantation companies, cooperatives, and indigenous communities. The analysis indicates that weak coordination is reflected in several interrelated institutional problems:

- Fragmented planning among government agencies and partnership stakeholders
- Overlapping institutional roles and responsibilities, creating uncertainty in implementation
- Different interpretations of partnership obligations and benefit-sharing arrangements
- Weak monitoring and supervision, reducing policy effectiveness and accountability
- Limited institutional integration between formal governance systems and customary land tenure institutions.

These weaknesses reduce institutional coherence and hinder the effective implementation of plasma partnerships. Existing coordination mechanisms remain largely administrative and compliance-oriented rather than collaborative, limiting their capacity to support joint decision-making, collective problem-solving, and continuous institutional learning. As a result, delays in plasma development, unequal benefit-sharing, and unresolved governance issues persist because institutional responses remain fragmented across stakeholders. From an institutional governance perspective, these findings indicate that effective plasma partnerships depend not only on formal regulations but also on institutions' ability to coordinate stakeholders, build trust, and facilitate collaboration. In South Papua, governance challenges are further shaped by the interaction between formal administrative systems and customary land tenure institutions, making coordination an adaptive rather than purely administrative process. These findings provide the empirical basis for the proposed Adaptive Institutional Governance Model (AIGM), which positions institutional coordination as a dynamic governance mechanism that enhances institutional resilience and supports sustainable plasma partnerships.

4.2. Adaptive Institutional Governance Mechanisms

The findings indicate that the effectiveness of plasma partnerships in South Papua depends not solely on formal regulations but on governance mechanisms that enable stakeholders to coordinate, collaborate, and adapt to institutional change. Analysis of the empirical data identified three interrelated mechanisms that constitute Adaptive Institutional Governance: coordination, collaboration, and institutional learning. Together, these mechanisms strengthen institutional capacity and improve partnership effectiveness. Coordination serves as the institutional foundation for aligning the roles of government agencies, plantation companies, cooperatives, plasma farmers, and indigenous communities. Effective coordination strengthens policy consistency, transparency, and conflict resolution, while weak coordination leads to fragmented implementation, overlapping authority, and limited accountability. In South Papua, coordination also facilitates interaction between formal regulations and customary land tenure systems, thereby strengthening institutional legitimacy.

Collaboration improves partnership performance by promoting stakeholder participation, trust, and equitable benefit-sharing. The findings suggest that inclusive decision-making reduces conflict and strengthens institutional commitment, whereas unequal participation weakens the bargaining position of plasma farmers and indigenous communities. Effective collaboration therefore depends on integrating formal institutions with local governance and customary practices. Institutional learning enables governance systems to respond to evolving social, economic, and policy conditions through continuous evaluation, knowledge exchange, and capacity building. Consistent with adaptive governance principles, learning enhances institutional flexibility while reinforcing coordination and collaboration among stakeholders. Overall, these findings demonstrate that coordination, collaboration, and institutional learning operate as complementary governance mechanisms that transform fragmented institutional arrangements into more effective plasma partnerships. Their interaction provides the empirical basis for the Adaptive Institutional Governance Model (AIGM), which explains how adaptive governance strengthens sustainable palm oil development through improved institutional effectiveness.

4.3. Developing the Adaptive Institutional Governance Model (AIGM)

The findings indicate that the effectiveness of plasma partnerships in South Papua cannot be explained by contractual arrangements alone. Instead, partnership performance depends largely on the quality of institutional governance that enables stakeholders to coordinate, collaborate, and adapt to changing social, environmental, and policy conditions. Based on these findings, this study develops the Adaptive Institutional Governance Model (AIGM) as an integrated framework for strengthening sustainable plasma partnerships. Unlike previous studies that focus primarily on productivity, benefit-sharing, or

certification, the proposed model views plasma partnerships as a dynamic governance system operating across multiple institutional levels. As illustrated in Figure 2, the model consists of four interrelated components: Institutional Challenges, Adaptive Institutional Governance, Effective Plasma Partnerships, and Sustainable Oil Palm Development.

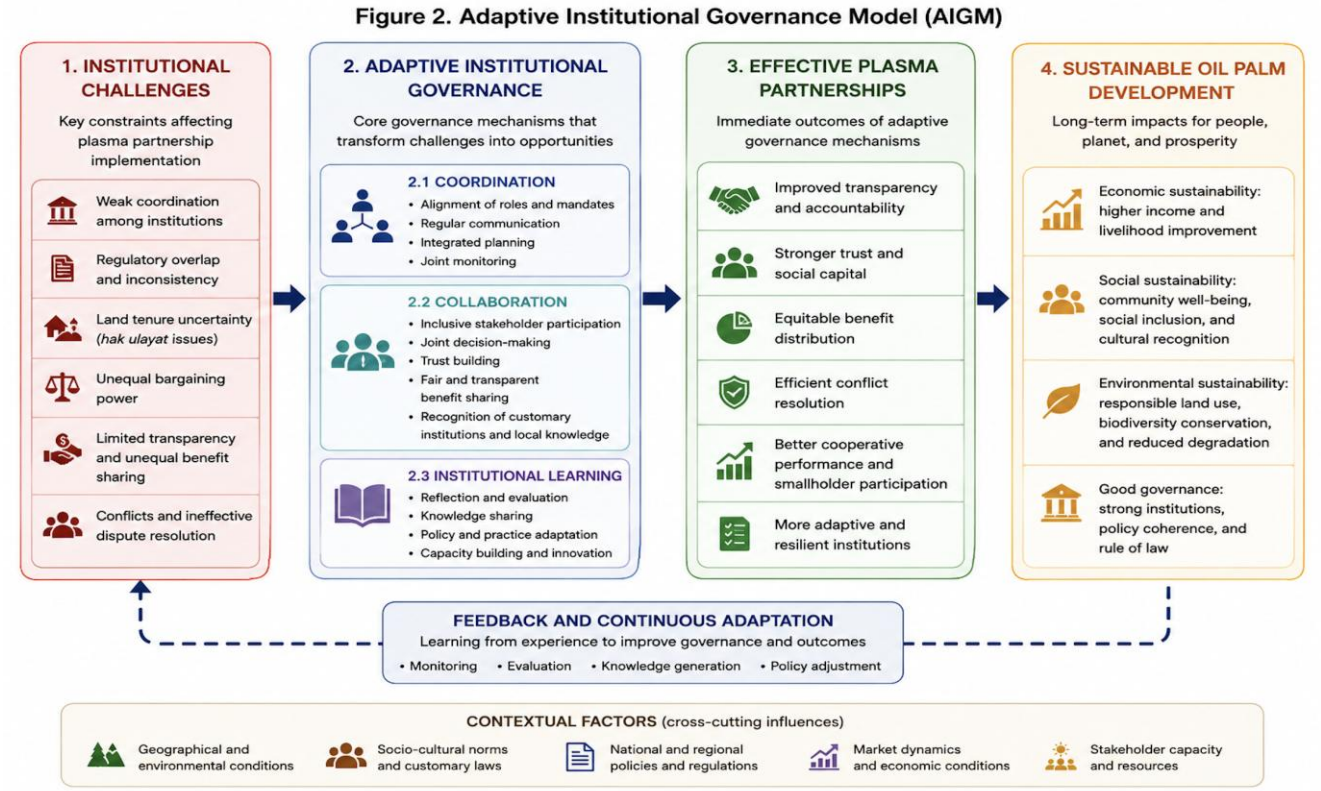


Figure 2: Adaptive institutional governance model (AIGM)

The Adaptive Institutional Governance Model (AIGM) comprises four interrelated components. The first, Institutional Challenges, represents governance constraints that hinder effective plasma partnerships. The findings identify weak coordination, inconsistent regulations, land tenure uncertainty, unequal bargaining power, limited transparency, and ineffective conflict resolution as key barriers. These interconnected challenges reduce trust, delay decision-making, and weaken institutional performance. The second component, Adaptive Institutional Governance, is this study's core contribution. It consists of three complementary mechanisms: coordination, collaboration, and institutional learning. Coordination improves stakeholder alignment and policy coherence; collaboration promotes inclusive decision-making, transparency, equitable benefit-sharing, and recognition of customary institutions; while institutional learning supports continuous adaptation through knowledge sharing, evaluation, and capacity building. Together, these mechanisms transform governance into an adaptive institutional process that can address complex socio-ecological challenges. The interaction of these mechanisms leads to Effective Plasma Partnerships, characterized by stronger stakeholder trust, greater transparency, fairer benefit-sharing, improved accountability, more effective conflict resolution, and stronger cooperative performance. These outcomes enhance smallholder participation and institutional resilience.

The final component, Sustainable Oil Palm Development, represents the long-term outcome of adaptive governance. Sustainability is achieved not only through productivity and regulatory compliance but also through governance arrangements that integrate economic, social, institutional, and environmental objectives. A continuous feedback loop enables institutional learning, policy adjustment, and stronger stakeholder relationships, reinforcing governance's adaptive nature over time. The proposed Adaptive Institutional Governance Model (AIGM) extends Institutional Governance Theory by integrating coordination, collaboration, and institutional learning into a unified governance framework. The model emphasizes adaptive governance as the foundation for strengthening institutional resilience and improving the effectiveness of plasma partnerships. In practice, AIGM guides governments, plantation companies, cooperatives, and indigenous communities to strengthen stakeholder coordination and collaborative decision-making. The findings also highlight the need for governance reforms that strengthen inter-agency coordination, cooperative capacity, recognition of customary land rights, and continuous institutional learning. Overall, AIGM positions plasma partnerships as an adaptive governance system supporting sustainable oil palm development in South Papua and other regions with similar institutional challenges.

5. Conclusion

This study demonstrates that the effectiveness of plasma partnerships depends primarily on institutional governance rather than contractual arrangements or production performance alone. The findings identify fragmented coordination, land tenure uncertainty, unequal bargaining power, limited transparency, and weak conflict resolution as the main institutional challenges affecting partnership implementation in South Papua. Addressing these challenges requires governance mechanisms that integrate coordination, collaboration, and institutional learning to strengthen stakeholder relationships and institutional resilience. This study's principal contribution is the Adaptive Institutional Governance Model (AIGM), which integrates four interrelated components: Institutional Challenges, Adaptive Institutional Governance, Effective Plasma Partnerships, and Sustainable Oil Palm Development. The model explains how governance mechanisms transform institutional constraints into more effective and sustainable partnership outcomes. By combining Institutional Governance Theory with Adaptive Governance, the study shifts the focus from static institutional structures to adaptive governance processes that can respond to complex socio-ecological conditions.

The model also offers practical guidance for governments, plantation companies, cooperatives, and indigenous communities by emphasizing stakeholder coordination, collaborative decision-making, recognition of customary land rights, and continuous institutional learning. This study is limited to the institutional context of plasma partnerships in South Papua, where governance is strongly shaped by customary land tenure and regional institutional characteristics. Therefore, the findings should be interpreted with consideration of the local context. Future research should validate the Adaptive Institutional Governance Model through comparative studies across different plantation regions and agricultural commodity sectors to examine its broader applicability and refine its governance mechanisms. Despite these limitations, the proposed model provides a useful institutional framework for strengthening plasma partnership governance and supporting sustainable oil palm development in Indonesia and other emerging economies facing similar institutional challenges.

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