

STRATEGIC ANALYSIS OF SOCIAL MODEL WITH THE PENTAHHELIX APPROACH TO SUSTAINABLE AGRICULTURAL DEVELOPMENT IN PULANG PISAU REGENCY (CASE STUDY IN BELANTI SIAM VILLAGE)

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ABSTRACT

This study analyzes social capital strategies with the Pentahelix approach to sustainable agricultural development. There is a gap between collaborative policies and top-down implementation. This research method uses a descriptive qualitative approach that analyzes the problem using Social Capital Theory (Networks, Trust, and Norms) which is compared with the Pentahelix Model Theory (Academics, Business, Community, Government, and Media). This study illustrates that the effectiveness of the Pentahelix Model depends on the strength of Social Capital Theory at the community level. The results of the research analysis in Belanti Siam Village illustrate the dependence on government assistance from Farmer Groups, the inconsistency of the level of trust between farmer group members, farmer group administrators, the government, and the private sector regarding the development of the agricultural sector. So with this condition, it illustrates the unbalanced condition of the pentahelix model. The importance of a paradigm shift from an instructive approach to an approach to development that focuses on strengthening Social Capital as the main foundation for effective collaborative governance.

Keywords: Social Model; Pentahelix; Sustainable Agricultural Development; Policy Analysis

INTRODUCTION

Sustainable agriculture serves as a fundamental pillar for both economic development and food security. This is particularly vital in Pulang Pisau Regency, Central Kalimantan, an area with notable strategic agricultural potential. One of its villages, Belanti Siam, has even been designated a national food estate, supplying rice to various regions across Kalimantan.

To realize sustainable agricultural development in this region, active engagement from multiple stakeholders is essential, as village development cannot be achieved by a single actor alone. The pentahelix model provides a framework for this multi-stakeholder collaboration, bringing together five key elements: government, academia, business, community, and media. These sectors work in synergy, coordinating efforts and committing to developing local potential—while also respecting and integrating local wisdom and resources as core values of sustainable growth.

However, the implementation of sustainable agriculture programs in Belanti Siam faces significant on-the-ground challenges. The government-initiated food estate program—aimed at transforming Central Kalimantan into a major food production hub—has encountered numerous obstacles. Official data shows that rice production in the province has declined since the program's inception, dropping from approximately 457,000 tons in 2020 to 344,000 tons in 2022. An audit by the Audit Board of Indonesia (BPK) revealed key issues: the food estate project in Pulang Pisau lacked valid data and information as the basis for planning and did not align with the core principles of sustainable food agriculture.

Additionally, the planning process failed to incorporate local knowledge. As a result, local farmers were compelled to use seed varieties unsuited to the land conditions and received inadequate training on managing the prepared farmland. These conditions highlight that, without a robust model of social collaboration, large-scale agricultural initiatives are vulnerable to failure and risk repeating the mistakes of the past.

These facts underscore the urgent need for a strategic assessment using the pentahelix approach to ensure the success of sustainable agricultural development in Belanti Siam. Strengthening multi-stakeholder collaboration is crucial, so that the drive to increase food production does not compromise environmental sustainability or the welfare of local farmers. This is especially important given that Central Kalimantan was once the site of a failed large-scale food project—the Mega Rice Project in the 1990s—which left behind degraded peatlands that remain highly prone to annual fires.

To prevent similar failures, all five elements—government, academia, business sector, local communities, and media—must actively participate in crafting innovative and sustainable agricultural solutions. The pentahelix model is considered essential for enhancing both food self-sufficiency and long-term food

security. Through a strategic analysis of this social collaboration framework, the present study aims to offer concrete recommendations to harmonize stakeholder roles in advancing sustainable agriculture in Pulang Pisau.

The socio-economic and environmental conditions in Pulang Pisau Regency form a critical foundation that can determine the success or failure of development interventions. Statistical data reveals significant structural challenges. In 2023, the Human Development Index (HDI) of Pulang Pisau stood at 71.43, which is below both the Central Kalimantan provincial average (72.53) and the national average (74.39). This relatively low HDI reflects limitations in key dimensions such as quality of life, education attainment, and public health. These constraints directly impact the human resource capacity, especially among local farmers, to absorb, adapt, and manage complex innovations and modern agricultural technologies often introduced through programs like the Food Estate.

From an economic standpoint, although the poverty rate in 2023 was relatively low at 4.49%, the Gini Ratio – which measures income inequality – was 0.323, indicating a moderate level of disparity. This suggests that the benefits of development may not be evenly distributed, and pockets of economic vulnerability still persist within the community.

The most critical challenges, however, lie in the environmental dimension. A large portion of agricultural land in Pulang Pisau is located within peatland ecosystems, which are uniquely fragile and demanding. These lands are naturally low in fertility, acidic, and require highly precise water management. Mismanagement of water systems in peatlands not only reduces agricultural productivity but also triggers land subsidence and the release of large volumes of greenhouse gases, thereby exacerbating climate change. Applying intensive farming models – commonly used on the alluvial plains of Java – without substantial adaptation to the peatland context represents a significant ecological risk.

Failing to recognize and address these structural vulnerabilities – both in terms of human capacity and environmental fragility – could result in the Food Estate program disproportionately benefiting a handful of elites or large contractors, while local farmers become further marginalized and the environment deteriorates even further.

In response to the complexity of development challenges, the Pulang Pisau Regency Government has formally adopted a narrative of collaborative

development. Strategic planning documents such as the Regional Medium-Term Development Plan (RPJMD) for the 2018–2023 period explicitly emphasize the importance of “synergy,” “partnership,” and “collaboration” among diverse stakeholders. This narrative is closely aligned with the Pentahelix framework, a model that promotes synergistic interaction among five key actors: government, academia, the business sector, community, and media.

The inclusion of this paradigm in official policy documents signals a conceptual awareness among planning elites regarding the need for multi-stakeholder approaches to achieve complex development goals. However, the presence of this vision on paper also creates a critical benchmark for evaluating real-world implementation. It raises a fundamental question: Has this collaborative vision been effectively translated into functional institutional mechanisms, supportive budget allocations, and day-to-day operational practices? Or does it remain a rhetorical ideal—embedded in planning documents but disconnected from the actual logic driving implementation?

This concern becomes even more pressing given the coexistence of the Pentahelix logic, which emphasizes horizontal partnerships, with the Food Estate National Strategic Project (PSN) logic, which tends to operate under a command-and-control approach. When these two frameworks run in parallel, the risk of conflict and disconnection in practice becomes increasingly evident.

The culmination of this contextual analysis reveals a sharp and fundamental gap in the development landscape. This gap lies between the policy vision, which idealizes sustainable agricultural development through a synergistic and collaborative Pentahelix model, and the on-the-ground reality, which presents a starkly different picture. The current reality is characterized by the top-down, directive implementation of the Food Estate program, limited socio-economic capacity of local communities, unique environmental challenges posed by peatland ecosystems that require specialized handling, and emerging evidence of fragmentation among Pentahelix actors in terms of roles and functions.

This fragmentation is particularly evident in several components. First, within the community helix, local farmer groups (Poktan) and farmer group associations (Gapoktan) exhibit a high dependency on government assistance and lack institutional independence. Many of these groups are not functioning as effective platforms for collective learning and advocacy, but rather as administrative channels for receiving aid.

Second, within the business helix, private investment in Pulang Pisau's agricultural sector is predominantly oriented toward high-value plantation commodities such as oil palm, rather than food crops, which are the central focus of the Food Estate initiative. This indicates a misalignment between governmental objectives and prevailing market incentives.

DISCUSSION

Social capital is a central concept for understanding a community's capacity to act collectively. Beyond its simplified interpretation as mere "mutual cooperation," the theory offers a powerful analytical lens. Robert Putnam defines social capital as the features of social organization such as networks, norms, and trust that facilitate coordination and cooperation for mutual benefit. In contrast, Pierre Bourdieu views it as a resource embedded within networks of relationships that individuals or groups can mobilize to achieve their objectives. James Coleman complements these perspectives by conceptualizing social capital as an aspect of social structure that serves as a resource enabling actors to take action.

In the context of agricultural development, social capital can be operationalized into three interrelated dimensions:

1. Networks: This refers to the density and quality of social relationships. These networks can be categorized into three key types:
 - a. Bonding social capital, which encompasses close ties within a homogeneous group—for example, among members of a single farmer group association (Gapoktan);
 - b. Bridging social capital, referring to connections across different groups, such as between different farmer associations or between farming groups and other community groups; and
 - c. Linking social capital, which denotes vertical relationships between the community and institutions that hold power and resources, such as between a Gapoktan and the local agricultural office or financial institutions.
2. Trust: This acts as the social glue that enables cooperation. Trust involves the level of confidence among farmers, between farmers and group leaders, and, critically, between farming communities and external actors such as

agricultural extension workers, local governments, and business partners.

3. Norms: These are the unwritten rules that govern behavior within a community. In the agricultural context, the most relevant norms include reciprocity norms (mutual aid or gotong royong) and compliance with collective agreements, such as shared planting schedules or contributions to group savings.

Many development programs operate under the assumption that forming administrative groups (such as Gapoktan) will automatically generate social capital. However, this theoretical framework reverses that logic: the success of an intervention or local institution largely depends on the existing level of social capital, or on how deliberately and systematically it is built. Without a strong foundation of trust and social norms, farmer groups risk becoming mere "rubber-stamp organizations" existing only to receive assistance, yet fragile and incapable of meaningful collective action.

The Pentahelix model has been widely adopted as an ideal framework for fostering innovation and development through collaborative governance. This model identifies five stakeholder groups whose roles are complementary and synergistic, forming a dynamic development ecosystem. In the context of sustainable agriculture in Pulang Pisau, the ideal roles of each helix can be defined as follows:

- 1) Academics (A): Serve as sources of innovation, applied research, and the development of adaptive technologies – particularly for peatland ecosystems. They also play a key role in enhancing human resource capacity through training and technical assistance.
- 2) Business (B): Act as the economic engine, providing investment capital, developing efficient supply chains, and most importantly, functioning as offtakers – absorbing agricultural products through fair and beneficial schemes for farmers.
- 3) Community (C): Represent the primary subjects of development, not mere objects. Communities possess local indigenous knowledge, are the main implementers of agricultural practices, act as agents of social control, and are the direct beneficiaries of development outcomes.
- 4) Government (G): Functions as the regulator, creating enabling policies, a facilitator that connects stakeholders, a provider of essential infrastructure

(e.g., irrigation systems, farm roads) and public services (such as agricultural extension), and a guarantor of stability and legal certainty.

- 5) Media (M): Acts as an accelerator of information dissemination, a shaper of positive public opinion on sustainable agriculture, and— critically—as a platform for oversight and accountability, particularly in monitoring government performance.

It is important to understand that the Pentahelix model is not merely a checklist of actors to be "involved" in ceremonial meetings. Rather, it represents a living ecosystem, where each helix performs a specific, interdependent function. The absence, dysfunction, or weakness of one helix will directly compromise the overall performance of the system.

For example, without a functioning Business helix to act as an offtaker, innovations produced by Academia may hold little commercial value for farmers. Similarly, without a critical and independent Media helix, the Government helix may operate without public accountability.

Table 2.1: Matrix of Indicators for Social Model Analysis, Pentahelix, and Sustainable Agriculture

Main Concept Dimension

Quantitative/Qualitative Indicators

Data Sources / Measurement Methods

Network (Bonding)

Frequency of Gapoktan meetings; Level of active member participation;
Existence of joint activities beyond government programs.

In-depth interviews (Gapoktan leaders & members), observation.

Social Capital (Community)

Network (Bridging)

Trust (Internal & External)

Number and quality of collaborations between Gapoktan; Engagement with village/traditional institutions.

~~Perceived level of trust among members; Trust in group leaders; Trust in extension workers, government, and private actors (Likert scale/qualitative).~~

Interviews, village document analysis.

Household surveys, in- depth interviews.

Norms

Existence and adherence to group rules (statutes/bylaws); Participation in mutual aid (gotong royong); Mechanisms for resolving internal conflicts.

Interviews, conflict case studies.

Pentahelix Functions

Government (G)

Farmers' perception of extension service effectiveness; Timeliness and targeting of aid programs; Quality of supporting infrastructure (e.g., irrigation).

Interviews, surveys, agricultural department documents.

Business (B)

Availability of formal offtakers; Fairness of price/contract schemes;

Interviews (farmers, agribusiness actors),

Main Concept	Dimension	Quantitative/Qualitative Indicators	Data Sources / Measurement Methods
		Dependence on middlemen.	supply chain analysis.
	Academia (A)	Presence and impact of university research/ community service programs; Adoption of research-based innovations by farmers.	Interviews, university documents.
	Media (M)	Frequency and substance of agricultural news coverage in the village; Availability of accessible information for farmers.	Media content analysis, interviews.
	Economic	Net income per hectare per season; Farm profitability; Dependency on subsidies/aid; Access to formal credit.	Farmer household surveys, farm business analysis.
Sustainability of Agriculture	Environmental	Use of chemical vs. organic fertilizers/pesticides; Water management practices on peatlands; Farmers' perception of changes in soil/water quality.	Interviews, field observation, secondary data (if available).

Social	Level of social conflict related to agricultural programs; Women's role in decision-making; Gapoktan's independence and bargaining power.	Interviews, observation, focus group discussions (FGDs).
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METODOLOGY

This chapter constitutes the empirical core of the report, where the analytical framework developed in Chapter 2 is applied to examine the realities of agricultural

development in Belanti Siam Village, located in Pulang Pisau Regency. This village was selected as the case study locus due to its central role in the implementation of the Food Estate program, making it an ideal setting to observe the interplay—and at times, tension—between large-scale top-down policy interventions and local socio-economic dynamics.

DISSCUSSION

Case Village Profile: The Arena Where Vision Meets Reality

Belanti Siam Village, located in Pandih Batu Subdistrict, represents the broader agricultural landscape of Pulang Pisau Regency. The area is predominantly composed of rice fields developed on peatland ecosystems, supported by technical irrigation systems that serve as the backbone of agricultural production.

Demographically, the village is home to a diverse population, consisting of both local residents and transmigrants (or their descendants), each bringing different backgrounds and agricultural traditions. The village's social structure is supported by formal institutions such as the Village Government and community-based organizations like farmer group associations (Gapoktan) and farmer groups (Poktan), which serve as the frontliners in implementing government agricultural programs.

As a primary location for the Food Estate program, Belanti Siam has

received intensive interventions, including the distribution of high-yield seed varieties, fertilizers, pesticides, and modern agricultural machinery. As such, the village has become a living laboratory, where the government's vision of agricultural modernization directly confronts the realities of farmers' capacities and the fragility of peatland ecosystems.

Analysis of Social Capital at the Village Level: A Fragile Foundation

In the Networks dimension particularly bonding social capital—farmer group associations (Gapoktan) and farmer groups (Poktan) do exist structurally, but their functional roles are often limited. Data show that many farmer groups do not operate optimally or independently. Group meetings are seldom held regularly or meaningfully as spaces for knowledge exchange or collective problem-solving. Activities tend to increase only when government assistance programs are being distributed. This pattern indicates that the groups primarily serve as administrative units for distributing inputs, rather than as cohesive social entities. High dependency on government programs has created a situation where bottom-up collective initiative is weak or absent.

In the Trust dimension, signs of erosion are evident both internally and externally. Internally, issues such as lack of transparency or fairness in the distribution of aid can trigger social jealousy and undermine trust among group members. Externally, farmers' trust in outside actors— including the government— is ambivalent. On one hand, they appreciate the assistance provided. On the other, past experiences involving unfulfilled promises or support misaligned with actual needs (e.g., seed varieties unsuitable for local conditions) have fostered skepticism. This deterioration of trust has weakened a crucial form of capital, leading farmers to adopt a passive stance, waiting for directives rather than engaging proactively in collaboration.

In the Norms dimension, traditional norms of reciprocity or mutual cooperation (gotong royong) still persist in certain social contexts. However, in the realm of modern agriculture, these norms are gradually diminishing. Government aid programs that often target individuals or households (e.g., per-hectare or per-family assistance) tend to encourage more individualistic orientations. Farmers become more focused on managing their own plots to meet personal targets, reducing the incentive for broader collective action, such as joint water management or integrated pest control.

These conditions suggest that the top-down intervention of the Food Estate

program despite its good intentions to boost production—has inadvertently contributed to the erosion of social capital. By positioning farmers primarily as passive recipients, the program has limited opportunities for the development of autonomy, trust, and cooperative norms. As a result, the "Community" helix in the Pentahelix model has become weakened, fragmented, and lacks meaningful bargaining power when engaging with other, more dominant actors.

Analysis of Pentahelix Interaction Dynamics in Belanti Siam

The mapping of actual interactions among the helices in Belanti Siam Village reveals a highly imbalanced or “uneven” model, far from the ideal synergy envisioned in the Pentahelix framework.

Government (G) - Community (C) Interaction:

This relationship is dominant but largely paternalistic and directive, rather than a genuine partnership. The government—through relevant agencies and agricultural extension officers (PPL)—acts as an instructor, aid distributor, and target setter. Communication tends to be one-way, top-down. Programs are often the implementation of central government policies, rather than responses to farmers' actual needs and jointly identified aspirations. Farmers are positioned as passive recipients expected to adopt pre-designed technological packages.

Business (B) - Community (C) Interaction:

The Business helix in the rice farming sector of Belanti Siam is weak or virtually absent. Farmers remain heavily reliant on informal supply chains, particularly middlemen, to sell their harvests. There is a notable lack of formal off-takers or large private companies offering clear, fair contract-based partnerships. This stands in stark contrast to other sectors in Pulang Pisau, such as oil palm, where private investment is far more substantial. This market failure leaves farmers with limited bargaining power and prevents them from obtaining optimal value from their labor.

Academia (A) - Community (C) Interaction:

The role of the Academic helix in Belanti Siam is minimal and unstructured. University involvement, when present, tends to be sporadic and short-term, often limited to student community service programs (KKN), which have little lasting impact. There is still a lack of long-term research initiatives that systematically collaborate with farmers to produce technological innovations truly

adapted to peatland conditions and local socio-economic realities.

Media (M):

The Media helix has also yet to reach its full potential. Media coverage largely focuses on ceremonial events, such as official visits or harvest celebrations, serving more as government publicity than public scrutiny. In-depth and critical reporting on the challenges faced by farmers, the environmental impact of intensification, or the shortcomings of agricultural programs remains rare. As a result, the media's role as a tool for social oversight and public accountability has been significantly blunted.

Evaluation of Agricultural Sustainability in Belanti Siam

With a fragile social model and imbalanced Pentahelix interactions, the outcomes of agricultural practices in Belanti Siam exhibit signs of illusory sustainability.

Economic Sustainability

On the surface, the Food Estate program may appear to have succeeded in increasing rice production volumes in the short term – a frequently touted claim. However, this success is highly fragile. Farmers have become heavily dependent on subsidies and input assistance (fertilizers, seeds, pesticides). Without such support, production costs become prohibitively high, rendering farming unprofitable. This dependency creates significant economic vulnerability; if the aid program is discontinued, the existing production system could collapse entirely.

Environmental Sustainability

The intensification of agriculture through high doses of chemical inputs (fertilizers and pesticides) in pursuit of production targets poses serious threats to the fragile peatland ecosystem. These practices risk damaging soil structure, contaminating water sources, and – over the long term – reducing the land's natural productivity. Inadequate water management further exacerbates the problem, accelerating land subsidence and increasing greenhouse gas emissions, thus contradicting global sustainable development goals.

Social Sustainability

The top-down and individualistic implementation model has the potential

to create social tensions and conflict. Competition for aid access, dissatisfaction with allocation, and the marginalization of farmers excluded from the program may undermine existing social cohesion. The weakened role and autonomy of Gapoktan as collective farmer institutions also marks a regression in terms of social sustainability.

Synthesis of the Discussion

The case analysis in Belanti Siam Village clearly illustrates a causal chain behind the failure to achieve genuine sustainable agriculture. The root problem does not lie in the lack of technology or financial capital, but rather in the failure of the social model and governance framework.

The causal chain can be unpacked as follows

First, the foundation of social capital within the community (Community helix) is weak, marked by low levels of trust, eroded norms of cooperation, and collective networks (Gapoktan) that function more as administrative units than as active, functional organizations. This situation is worsened by the top-down, directive nature of the Food Estate program, which creates dependency and further undermines autonomy and grassroots initiative.

Second, this fragile social capital prevents the Community helix from engaging equitably and productively with the other helices. Farmers lack bargaining power with government actors, fail to attract fair partnerships from the Business sector, and are not proactive in seeking innovation from Academia. As a result, the Pentahelix model becomes skewed and dominated entirely by the agenda and logic of the Government (G helix).

Third, this imbalanced governance model promotes and imposes agricultural practices (intensive technology packages) that are misaligned with the ecological conditions (peatland) and the unique social capacity of farmers in Belanti Siam.

The consequence is a flawed development model that produces unsustainable outcomes. While short-term production gains may be achieved, they come at a high cost: economic dependence, potential environmental degradation, and erosion of social cohesion.

Therefore, the key conclusion is that achieving sustainable agriculture in Pulang Pisau requires a paradigm shift. The solution is not to increase aid or technologies under the same model, but to fundamentally transform the approach—starting with the development and strengthening of social capital as

the primary foundation. Only then can a healthy and effective collaborative Pentahelix governance model be realized.

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