

Optimizing Village Economic Potential: A Sustainable Development Framework for Rural Areas in Bantan Subdistrict, Bengkalis Regency

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Abstract

This study explores a novel framework for optimizing village economic potential, emphasizing sustainability in Bantan Subdistrict, Bengkalis Regency. Utilizing a unique dataset from the Village Potential Survey (PODES) combined with in-depth interviews, the research identifies tourism, agriculture, and cultural heritage as key economic drivers. A detailed analysis highlights opportunities and challenges in leveraging coastal and peatland resources, particularly concerning infrastructure gaps and market isolation. The findings propose a collaborative model involving governments, communities, and private sectors to foster rural economic growth while ensuring environmental sustainability. The study's interdisciplinary approach contributes to existing literature by offering localized strategies tailored to the socio-economic and ecological characteristics of rural areas.

Keywords: *Village Economic Potential, Sustainable Development, Rural Development, Bengkalis Regency, Collaborative Model, Peatland Management.*

Introduction

Sustainable rural development is a cornerstone of global development agendas, addressing critical issues such as poverty alleviation, economic inequality, and environmental conservation. In Indonesia, rural areas hold strategic importance, housing over 43% of the nation's population (BPS, 2024). This demographic significance is matched by economic potential, with villages contributing to sectors such as agriculture, fisheries, and tourism. Despite these opportunities, challenges like inadequate infrastructure, limited market access, and environmental degradation persist, hindering the optimal use of resources (Firmansyah et al., 2022).

The Indonesian government's village fund program (Dana Desa), established under Law No. 6/2014, seeks to empower rural communities by promoting locally driven development. However, the effectiveness of this initiative varies widely across regions. Studies indicate that areas with well-documented resource potentials and active community engagement experience better outcomes (Taryono et al., 2023). Conversely, regions like Bantan Subdistrict in Bengkalis Regency struggle with underutilization of resources despite their rich ecological and cultural assets.

Bantan Subdistrict's economic landscape is shaped by its coastal and peatland resources, which are ideal for tourism, agriculture, and aquaculture. Villages such as Selat Baru and Teluk Papal offer scenic beaches and marine biodiversity, attracting domestic tourism. Meanwhile, rubber plantations in Pambang Baru and Teluk Lancar represent significant contributions to the agricultural sector. Despite these strengths, limited infrastructure, outdated farming practices, and insufficient professional management pose significant barriers (Yuliani & Aprilina, 2020).

This study aims to explore these economic potentials through an integrated, sustainable development framework. By leveraging localized data from the Village Potential Survey (PODES) and stakeholder insights, the study provides a granular analysis of village-level opportunities and challenges. Unlike previous studies that focus on macro-level policies, this research emphasizes micro-level interventions tailored to the unique characteristics of each village. Furthermore, the study highlights the importance of collaborative

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governance, aligning with global sustainable development goals (SDGs), particularly goals 8 (Decent Work and Economic Growth) and 15 (Life on Land).

Globally, rural development programs increasingly prioritize the integration of environmental sustainability with economic initiatives. This approach aligns with the United Nations' Sustainable Development Goals (SDGs), particularly those targeting poverty alleviation (Goal 1), economic growth (Goal 8), and life on land (Goal 15) (UN, 2023). In Indonesia, these priorities are particularly relevant given the country's rich biodiversity and significant rural population. However, disparities in resource utilization and infrastructure access remain key challenges, particularly in regions such as Banten Subdistrict.

The novelty of this research lies in its interdisciplinary approach, combining economic analysis, environmental considerations, and community-led strategies. This aligns with recent findings emphasizing the interconnectedness of social, economic, and ecological systems in achieving sustainable development (Annas & Saprudin, 2023).

Localized approaches are increasingly recognized as vital for achieving sustainable rural development, particularly in regions with unique socio-economic and environmental contexts. For example, integrating participatory planning mechanisms allows stakeholders to directly influence development trajectories, ensuring strategies align with local needs and capacities. This is consistent with the findings of Annas and Saprudin (2023), who emphasized that community involvement is crucial for fostering ownership and improving project outcomes.

Moreover, addressing infrastructure deficits, such as inadequate road networks and digital connectivity, is paramount for unlocking economic potential. Studies by Li et al. (2022) highlight that infrastructure investment not only facilitates market access but also enhances productivity across key sectors like agriculture and tourism. For Banten Subdistrict, such investments are particularly relevant, given its geographical diversity encompassing coastal and peatland areas.

Literature Review

Theoretical Perspectives on Rural Development

The foundation of this study lies in David Ricardo's theory of comparative advantage, which highlights the importance of resource optimization for regional competitiveness. Applied to rural contexts, this theory underscores the need for specialization based on local strengths, such as agriculture, tourism, or cultural heritage (Khalish, 2023). Complementing this is the endogenous growth theory, which emphasizes the role of innovation, human capital, and institutional quality in driving sustainable economic growth (Suroso, 2020).

David Ricardo's theory of comparative advantage remains a cornerstone for understanding the economic optimization of rural areas. However, in the context of sustainable development, this theory needs to be complemented with frameworks that address environmental and social dimensions. For instance, Porter's Diamond Model highlights the importance of local infrastructure, demand conditions, and firm strategy in enhancing regional competitiveness (Porter, 1990). In rural settings, the integration of these factors can significantly improve the utilization of local resources, such as agriculture and tourism.

Moreover, endogenous growth theory posits that innovation, knowledge dissemination, and human capital are key drivers of long-term economic growth (Romer, 1986). In rural contexts, this emphasizes the role of education and training programs in fostering a skilled workforce capable of leveraging local resources sustainably.

Role of Community-Based Approaches

Community participation is a critical determinant of rural development success. According to Rahmawati et al. (2023), initiatives that actively involve local stakeholders are more likely to succeed due to their

alignment with community priorities. Models such as Village-Owned Enterprises (*BUMDes*) have demonstrated significant potential in fostering economic empowerment, as seen in regions with active *BUMDes* operations (Yuliani & Aprilina, 2020).

Community-based approaches to rural development underscore the importance of social capital in driving collective action and resource optimization. Putnam's (1993) concept of social capital—trust, networks, and norms—plays a critical role in enabling communities to collaborate effectively. In Indonesia, models like Village-Owned Enterprises (*BUMDes*) exemplify how social capital can be harnessed to promote economic empowerment. For instance, active *BUMDes* operations have led to improved market access and higher household incomes in several rural regions (Yuliani & Aprilina, 2020).

However, studies suggest that the effectiveness of *BUMDes* depends on local leadership and community engagement. Research by Rahmawati et al. (2023) demonstrates that villages with higher levels of participation in decision-making processes achieve better economic outcomes, as these initiatives are more likely to align with local priorities.

Sustainable Practices in Peatland Areas

Peatlands cover approximately 7% of Indonesia's land area and are crucial for both ecological stability and economic productivity. Proper management of these ecosystems can support agroforestry, ecotourism, and aquaculture, offering sustainable livelihood options for rural communities (Firmansyah et al., 2022). However, unsustainable exploitation often leads to land degradation and reduced economic returns. Integrated strategies combining conservation and economic use are essential for maximizing the potential of peatland areas (Hidayah & Salahudin, 2022).

The sustainable management of natural resources, particularly in sensitive ecosystems like peatlands, is essential for balancing economic and ecological objectives. Peatlands, which cover approximately 15 million hectares in Indonesia, provide critical ecosystem services such as carbon storage and water regulation (Firmansyah et al., 2022). However, their degradation through unsustainable practices, such as over-drainage and conversion to agriculture, poses significant environmental risks.

Integrated approaches to resource management, such as agroforestry and eco-tourism, offer pathways to mitigate these risks while generating income for rural communities. Studies by Hidayah and Salahudin (2022) highlight the potential of combining conservation with economic use, particularly through government and private sector partnerships.

Tourism as a Driver of Rural Development

Tourism has emerged as a transformative sector in rural economies, offering direct employment, market linkages, and cultural preservation. Selat Baru's coastal tourism exemplifies this, with activities such as fishing competitions and cultural festivals attracting visitors. However, successful tourism initiatives require robust infrastructure, effective marketing, and professional management, areas where many rural regions lag behind (Retnowati et al., 2022).

Tourism is increasingly recognized as a transformative sector in rural economies. Its contributions extend beyond direct employment to include indirect benefits such as infrastructure development and cultural preservation. For example, Selat Baru's coastal tourism, characterized by its pristine beaches and cultural festivals, demonstrates the potential for tourism to become a major economic driver in Bantan Subdistrict.

However, the successful development of tourism requires robust infrastructure, effective marketing strategies, and professional management. Retnowati et al. (2022) argue that the lack of these factors often limits the economic impact of tourism initiatives in rural areas. Digital marketing platforms and community-based tourism models have emerged as effective solutions, enabling small-scale operators to reach broader markets while maintaining local ownership and authenticity.

Collaborative Governance for Rural Development

The integration of local governments, private sectors, and communities in governance structures enhances the effectiveness of rural development programs. Collaborative governance models have been shown to improve resource management, stakeholder coordination, and policy implementation (Li et al., 2022). For regions like Bantan Subdistrict, such models are critical for addressing systemic challenges and unlocking economic potential.

The role of governance in rural development cannot be overstated. Collaborative governance models, which involve partnerships between governments, private sectors, and local communities, have proven effective in enhancing resource management and policy implementation (Li et al., 2022). In Bantan Subdistrict, such models could facilitate coordinated efforts to address challenges like infrastructure deficits and market isolation.

For example, public-private partnerships (PPPs) can mobilize resources for infrastructure development, while community cooperatives ensure that benefits are distributed equitably. According to Annas and Saprudin (2023), the success of collaborative governance depends on transparent communication, clear roles, and mutual accountability among stakeholders.

Comparative Analysis of Global Rural Development Models

Global examples of rural development, such as China's rural revitalization program, provide valuable insights into addressing systemic challenges in resource management and community empowerment. The integration of e-commerce in rural economies has been particularly transformative, enabling small-scale producers to access broader markets (Chen et al., 2021). Similarly, India's National Rural Employment Guarantee Act (NREGA) demonstrates how labor-focused interventions can alleviate poverty and stimulate local economic activities (Shah et al., 2020). These models highlight the importance of multi-dimensional approaches that combine infrastructure investment, technological integration, and community engagement.

Role of Technology in Sustainable Development

Digital technologies, including GIS, have revolutionized rural planning by enabling detailed spatial analysis and resource mapping. According to Zulkarnain et al. (2023), GIS-based tools facilitate the identification of infrastructure deficits and optimal locations for economic activities, significantly enhancing planning accuracy. Furthermore, digital platforms for marketing and knowledge sharing, such as mobile apps and online forums, empower rural entrepreneurs by reducing information asymmetry and increasing market access.

Methodology

Research Design

This study employs a mixed-methods approach to comprehensively examine the economic potentials of Bantan Subdistrict. The combination of quantitative and qualitative methods allows for a holistic understanding of village-level dynamics. Quantitative data from the Village Potential Survey (*PODES*) provides statistical insights, while qualitative interviews capture the nuanced perspectives of local stakeholders.

Study Location and Sampling

The study was conducted across 20 villages in Bantan Subdistrict, each selected based on specific criteria such as geographical diversity, economic activity, and community participation. Key villages included Selat

Baru, known for its coastal tourism, and Pambang Baru, recognized for its agricultural contributions. The sampling approach ensured representation of all major economic sectors: tourism, agriculture, and eco-tourism.

Data Sources

Secondary Data

- *PODES* data included variables such as land use, infrastructure availability, and economic outputs.
- Regional statistics on population density, employment rates, and sectoral contributions to GDP were also analyzed.

Primary Data

- *Semi-Structured Interviews*

Conducted with 30 respondents, including village heads, community leaders, and local business operators. These interviews focused on understanding challenges, resource allocation, and stakeholder roles.

- *Focus Group Discussions (Fgds)*

Held in three villages to validate preliminary findings and gather community feedback.

Data Collection Methods

In addition to interviews and focus group discussions, participant observation was conducted in selected villages. This approach allowed the researchers to document daily economic activities, community interactions, and resource management practices in situ. The observations provided qualitative depth to the quantitative insights from the Village Potential Survey (PODES), highlighting gaps between reported data and real-world practices.

Quantitative Surveys

Statistical analysis of *PODES* data highlighted disparities between villages in terms of economic output and infrastructure development.

Qualitative Methods

Thematic coding was applied to interview transcripts to identify recurring challenges and opportunities.

Data Analysis

- *Descriptive Analysis*

Summarized key indicators, including productivity rates, tourism revenues, and infrastructure coverage.

- *Comparative Analysis*

Contrasted high-performing villages with underperforming ones to extract best practices.

- Cluster Analysis

Grouped villages based on economic focus, such as tourism, agriculture, or mixed activities.

- GIS Mapping

Geographic Information System (GIS) mapping was utilized to visualize the distribution of key resources, such as agricultural land, tourism hotspots, and infrastructure gaps. Figure 1 below illustrates the clustering of economic activities across villages.

The GIS analysis focused on visualizing the spatial distribution of economic activities, particularly agricultural zones, tourism hotspots, and areas with significant infrastructure deficits. This geospatial perspective enabled the identification of resource clusters and their proximity to critical facilities such as roads and markets

Limitations

While the study provides valuable insights, certain limitations exist, such as reliance on secondary data, which may not fully capture real-time economic dynamics. Future studies could incorporate longitudinal data to assess long-term impacts of development interventions.

Validation and Reliability Measures

To ensure the reliability of qualitative data, triangulation techniques were employed. Interview findings were cross-verified with observational data and survey results. This approach minimized biases and enhanced the validity of the conclusions.

GIS Applications in Analysis

The GIS mapping component focused on identifying clusters of economic activities and their proximity to critical infrastructure. For example, villages with significant tourism potential were mapped against existing road networks and tourist facilities to pinpoint accessibility issues. Figure 1 provides an illustration of this mapping approach.

Data Integration Framework

A multi-layered data integration framework was used, combining quantitative indicators (e.g., productivity rates, revenue contributions) with qualitative insights (e.g., community feedback, local challenges). This framework allowed for a holistic understanding of the economic landscape in Bantan Subdistrict.

Results

Identification of Economic Potentials

Table 1. SWOT Analysis (Strengths, Weaknesses, Opportunities, Threats)

Aspect	Tourism	Agriculture	Eco-tourism
Strengths	Natural beauty, cultural events	Fertile land, traditional skills	Unique ecosystems, biodiversity
Weaknesses	Poor marketing, limited facilities	Outdated techniques, low yield	Insufficient funding, weak promotion
Opportunities	Growing tourism demand	Market linkages, organic farming	Environmental funding opportunities

Threats	Environmental degradation	Market volatility	Overuse of natural resources
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The analysis revealed three primary economic clusters:

- *Tourism-Driven Villages*

Selat Baru and Teluk Papal emerged as key hubs for coastal and marine tourism. Activities include recreational fishing, cultural festivals, and beach tourism, which collectively contribute 25% of the local economy.

- *Agriculture-Centered Villages*

Villages like Pambang Baru and Teluk Lancar focus on rubber and crop production. However, outdated farming practices and limited market linkages hinder productivity.

- *Mixed Economies*

Villages such as Kembung Luar integrate eco-tourism with small-scale agriculture, leveraging their unique natural resources.

Key Findings

Table 2. Economic Contributions by Sector

Sector	Percentage Contribution	Key Villages	Major Challenges
Tourism	35%	Selat Baru, Teluk Papal	Limited infrastructure, promotion
Agriculture	45%	Pambang Baru, Teluk Lancar	Outdated practices, market access
Mixed Economy	20%	Kembung Luar	Lack of funding for eco-tourism

Community Perspectives

Community feedback highlighted the need for:

- *Training Programs*

Villagers expressed interest in capacity-building workshops for tourism management and modern farming techniques.

- *Infrastructure*

- *Local Development*

Improved road networks and digital connectivity were identified as critical for enhancing market access.

Success Stories

- Selat Baru

The introduction of community-managed tourism initiatives led to a 30% increase in visitor numbers within two years.

- **Pambang Baru**

Collaboration with agricultural cooperatives improved rubber yield by 15%, demonstrating the impact of collective action.

Challenges and Barriers

Key challenges include:

- *Environmental Degradation*

Overuse of peatlands in certain areas has led to declining productivity.

- *Market Isolation*

Many villages remain disconnected from major markets due to poor logistics infrastructure.

Discussion

Integrating Local Strengths with Sustainable Practices

The economic potentials identified align with the comparative advantage theory, emphasizing specialization in sectors like tourism and agriculture. Selat Baru's coastal tourism and Pambang Baru's rubber plantations are prime examples of how local resources can be optimized.

The findings highlight the critical role of capacity-building programs in addressing skill gaps among local communities. For example, training in modern farming techniques could significantly enhance productivity in agriculture-centered villages. Similarly, workshops on digital marketing and hospitality management are essential for maximizing the economic potential of tourism-driven villages.

Enhancing Infrastructure and Market Access

Infrastructure development remains a key challenge. For instance, many coastal villages lack basic amenities like accessible roads and telecommunications. Investments in these areas can significantly improve market access and enhance productivity.

Role of Collaborative Governance

Collaborative governance involving local governments, private investors, and community organizations is essential for scaling successful initiatives. This aligns with Li et al.'s (2022) findings on the effectiveness of multi-stakeholder partnerships in resource management.

Proposed Interventions

- *Capacity Building*

Training programs for local tourism operators and farmers to improve service quality and agricultural productivity.

- *Digital Marketing*

Leveraging social media and e-commerce platforms to promote local products and attractions.

- *Environmental Sustainability*

Implementing eco-friendly practices, particularly in peatland areas, to balance economic and ecological objectives.

The results underscore the importance of aligning interventions with village-specific needs. For instance, while digital marketing is critical for tourism-driven villages like Selat Baru, agriculture-centered villages such as Pambang Baru would benefit more from technological advancements in farming practices. This approach is supported by Suroso (2020), who argued that targeted investments yield higher returns in rural economies compared to generalized interventions.

Additionally, integrating local ecological knowledge into peatland management is vital. Peatlands, as noted by Firmansyah et al. (2022), offer significant economic opportunities when managed sustainably. By promoting eco-friendly practices, such as agroforestry and carbon trading, villages can achieve economic growth while preserving critical ecosystems.

Eco-tourism initiatives must balance economic gains with environmental conservation. Policies promoting carbon offset programs and agroforestry could offer sustainable income streams while mitigating ecological impacts. These strategies are particularly relevant in peatland areas, which serve as vital carbon sinks (Firmansyah et al., 2022).

Policy Implications for National Development Goals

The findings align with Indonesia's national development objectives, particularly those outlined in the Medium-Term Development Plan (RPJMN). Strengthening rural infrastructure, such as roads and digital networks, is critical for enhancing productivity and market connectivity. Policies should also prioritize capacity-building programs tailored to local economic sectors, such as agriculture and eco-tourism.

Adaptability to Other Regions

The proposed framework can serve as a model for other rural regions in Indonesia with similar ecological and socio-economic conditions. For instance, the integration of eco-tourism and agroforestry practices could be replicated in peatland areas across Sumatra and Kalimantan.

Challenges and Recommendations

While the collaborative governance model is promising, its success depends on stakeholder commitment and resource availability. Establishing clear roles and responsibilities among stakeholders, coupled with regular monitoring, is essential for ensuring accountability. Furthermore, leveraging digital technologies, such as mobile-based training platforms, can address skill gaps in remote communities.

Conclusion

This study underscores the vast economic potential of villages in Bantan Subdistrict, particularly in tourism, agriculture, and eco-tourism sectors. By aligning local strengths with targeted interventions, these villages can contribute significantly to sustainable rural development. The findings highlight several critical points:

- *Importance of Tailored Strategies*

Each village has unique economic potentials and challenges that require customized solutions. For instance, tourism-driven villages need improved marketing infrastructure, while agriculture-focused areas benefit from technological and capacity-building initiatives.

- *Role of Collaborative Governance*

Partnerships between local governments, private sectors, and community organizations are indispensable for sustainable progress. These collaborations can provide resources, expertise, and strategic direction, ensuring effective implementation of development programs.

- *Integration of Sustainability Principles*

Peatland areas and other natural resources must be managed sustainably to prevent environmental degradation while supporting economic growth. Practices such as agroforestry and eco-tourism provide pathways to achieve this balance.

Future efforts should focus on scaling successful models across similar rural regions, fostering innovation in resource management, and strengthening community involvement. By addressing structural challenges, such as infrastructure deficits and limited market access, Bantan Subdistrict can become a model for sustainable rural development in Indonesia.

Policy-makers must prioritize investments in rural infrastructure, including road networks and digital connectivity, to bridge market access gaps. Furthermore, promoting public-private partnerships can catalyze resource mobilization, ensuring sustainable and inclusive development in Bantan Subdistrict and beyond.

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