

Strategic Management of Settlement Infrastructure in a Border Village: A Case Study of Marga Mulya Village

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Abstract: The development of settlement infrastructure in border areas faces complex challenges including budget constraints, low accessibility, and unfavorable geographic conditions and Marga Mulya Village in Muara Kaman Subdistrict, Kutai Kartanegara Regency, exemplifies a rural border community striving to systematically address these issues. This study aims to identify strategic management practices in planning and managing basic infrastructure in the village, using a descriptive qualitative approach with data triangulation through document analysis, field observations, and focus group discussions (FGDs). Results indicate that neighborhood roads and drainage are top priorities, receiving the highest budget allocations in line with the community's needs for connectivity and flood control. Visualizations of budget data and thematic maps show that a spatial approach has been used to identify priority zones for infrastructure interventions, and a phased multiyear strategy has been implemented to overcome the village's fiscal constraints. These findings underscore the importance of integrating spatial data with the village's fiscal policies to support efficient, adaptive, and participatory infrastructure development. The study recommends replicating this locally tailored strategic planning model in other border villages as a solution for infrastructure development.

Keywords: Settlement Infrastructure; Spatial Planning; Strategic Management



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1. Introduction

Settlement infrastructure development is one of the main pillars for improving the quality of life for communities, especially in rural and border areas (Bappenas, 2020; Kuncoro, 2012). Villages, as the smallest administrative unit in Indonesia, play a strategic role in implementing sustainable and inclusive infrastructure development (UNDP, 2022). However, many villages still face limitations in planning and managing basic infrastructure such as neighborhood roads, drainage, clean water, and sanitation (Sitorus et al., 2019; Hutabarat et al., 2020). Remote geographic conditions, limited institutional capacity, and a lack of spatial data are often the primary obstacles (Sarosa & Nugroho, 2021; Badan Informasi Geospasial, 2022). In this context, a strategic management approach is a relevant alternative solution to address infrastructure development challenges in an efficient, participatory, and data-driven manner (Sulistio, 2018).

Marga Mulya Village, located in Muara Kaman Subdistrict of Kutai Kartanegara Regency, is a concrete example of a border village that is actively developing its settlement infrastructure. According to the Final

Report of the Settlement Area Master Plan (Directorate General of Human Settlements, 2023), this village faces various infrastructure challenges such as low accessibility and susceptibility to local flooding. In the strategic development context, it is important to examine how a village like Marga Mulya manages budgetary and human resource constraints through careful spatial planning and collaboration among village officials, the community, and external parties (Rahmawati & Iskandar, 2020; Nugraha & Andika, 2022). This study highlights the dynamics of settlement infrastructure development planning in the village, aiming to provide insights into an adaptive and contextual strategic management model for rural border areas.

through a descriptive qualitative approach, this research examines the policy framework, budget allocations, and technical interventions undertaken by the Marga Mulya Village government in formulating basic infrastructure development plans. The study combines quantitative data from village budget documents and master plans with qualitative data from field observations and focus group discussions (World Bank, 2021; Hudalah & Firman, 2016). By focusing on the relationship between spatial needs and strategic planning, this research aims to identify best practices in settlement infrastructure management in border areas that can be replicated in similar contexts (Oktaviani & Suryono, 2020; Ministry of Villages, Development of Disadvantaged Regions, and Transmigration, 2021).

2. Materials and Methods

The Materials and Methods should be described with sufficient details to allow others to replicate and build on the published results. Please note that the publication of your manuscript implicates that you must make all materials, data, computer code, and protocols associated with the publication available to readers. Please disclose at the submission stage any restrictions on the availability of materials or information. New methods and protocols should be described in detail while well-established methods can be briefly described and appropriately cited.

2.1. Study Location

This research was conducted in two border villages, namely Marga Mulya Village (Muara Kaman Subdistrict, Kutai Kartanegara Regency, East Kalimantan Province) and Wanasari Village. Both villages were selected because they are designated as priority areas for basic infrastructure development based on the settlement area master plan document.



Figure 1. Study Area

Figure 1. shows the study location, illustrating the spatial layout of Marga Mulya Village and its surroundings. The village's main road network and settlement areas are visible, providing context for the infrastructure development discussed in this study. Such a map is useful for spatially contextualizing the priority areas for infrastructure intervention.

2.2. Research Methods

The study employed a descriptive qualitative approach, utilizing document analysis, field observations, and focused group discussions (FGDs). Document analysis was carried out on the Final Report of the Settlement Infrastructure Master Plan, annual work plans, and development budget data for Marga Mulya and Wanasari Villages. Field observations were conducted to verify the on-ground physical conditions against existing spatial plans and to document unresolved infrastructure issues. Focus group discussions were held with village officials, community leaders, and the technical planning team to gain insights into the prioritization process, community participation in development planning meetings, and constraints in implementing infrastructure programs.

The collected data were analyzed thematically and correlated with quantitative visualizations (budget distribution graphs) to reveal each village's infrastructure policy orientation. The alignment between budget data, institutional structures, and community participation was used as the basis to evaluate the success of strategic infrastructure management implementation, as well as to formulate a recommended model based on local data.

2.3. Calculation Formula

The following formula was used to calculate the relative budget allocation for each infrastructure type:

$$RA(i) = \left(\frac{A_{total}}{A_i} \right) \times 100\%$$

Where:

RA(i) = Ratio of the i-th infrastructure allocation (%)

A_i = Budget of the i-th infrastructure (Rp)

A_{total} = Total infrastructure budget (Rp)

3. Results

This section may be divided by subheadings. It should provide a concise and precise description of the experimental results, their interpretation, as well as the experimental conclusions that can be drawn.

Analysis of the Final Report of the Settlement Infrastructure Master Plan for Marga Mulya Village shows that this village experiences various basic infrastructure problems, particularly in neighborhood road accessibility, drainage systems, sanitation, and clean water supply. The “slum index” indicators reflect a high level of physical infrastructure degradation, especially in the road and drainage sectors.

3.1. Infrastructure Priorities

Budget allocation data and priority analyses indicate five main infrastructure sectors that are the focus of development:

Table 1. Infrastructure Budget Allocation per Sector (Marga Mulya Village)

No.	Infrastructure Type	Allocation (Rp)	Percentage of Total (%)
1.	Neighborhood Roads	Rp 1,200,000,000	40.0%
2.	Drainage	Rp 800,000,000	26.7%
3.	Clean Water	Rp 500,000,000	16.7%
4.	Sanitation	Rp 300,000,000	10.0%
5.	Street Lighting	Rp 200,000,000	6.6%
Total		Rp 3,000,000,000	100%

Source: Final Report of the Settlement Infrastructure Master Plan of Marga Mulya Village (2023)

The bar chart provides a tangible illustration of the budget distribution across infrastructure sectors and serves as a tool for medium-term strategic planning. It shows that the village's fiscal policy clearly prioritizes neighborhood roads and drainage as the main sectors, with allocations of Rp 1.2 billion and Rp 800 million, respectively. The use of this visualization is not merely for presentation; it functions as an

evidence-based decision-making instrument. In the context of strategic management, such visual information helps to identify which sectors consume the largest share of the budget and which may require greater attention in the next annual planning cycle.

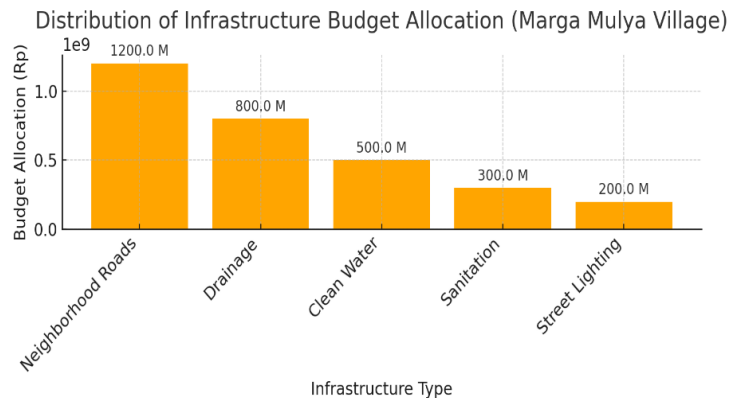


Figure 2. Infrastructure Budget Allocation per Sector (Marga Mulya Village)

3.2. Spatial and Thematic Analysis

Spatial and thematic analysis of Marga Mulya Village indicates that the area's physical and social characteristics greatly influence the pattern of infrastructure needs. Based on an overlay of thematic maps from the master plan document, it was found that the RT 03 and RT 04 neighborhoods are areas with high susceptibility to water inundation due to poor drainage systems and low topographic slope. In a strategic management approach, such spatial information is crucial to support decision-making that is responsive to field conditions. Furthermore, the zone-based thematic approach provides a foundation for formulating technical designs that are oriented toward sustainability.

The success of strategic infrastructure management in border villages is determined not only by the amount of budget allocated, but also by how well the planning data align with the reality of community needs. In Marga Mulya Village, the integration of budget allocation data with field observation results shows a high degree of alignment, especially in the prioritization of neighborhood roads and drainage systems. However, the village's fiscal limitations remain a primary obstacle to implementing all strategic plans simultaneously. Therefore, a phased, multiyear strategy is required to accommodate these limitations by staging interventions based on levels of urgency and impact.

4. Discussion

The findings of this study indicate that implementing strategic infrastructure management in border areas like Marga Mulya Village requires synergy between an analysis of the community's real needs and the village's fiscal capacity to respond to those needs in a planned and gradual manner. The clear direction of budget allocations is a tangible reflection of a planning process that has considered participatory aspects, sustainability, and spatially-based priorities. The strategy of prioritizing neighborhood road development as the main sector is evidence that the need for connectivity remains a fundamental element in advancing a rural area and connecting it with other regions. The importance of integrating spatial data with field observations also underlines that development planning cannot be separated from an evidence-based approach. Accordingly, thematic maps and area survey results become vital instruments in supporting the accuracy of development policies. Sensitivity to flood-prone zones, as highlighted in the master plan document, is also a key factor in technical designs that are oriented toward environmental resilience.

Additionally, the phased policy implemented by the Marga Mulya Village government serves as an example of adaptive strategic management practice, accommodating budget limitations through staged development priorities. This strategy supports the vision of sustainable village infrastructure development and strengthens governance capacity to respond to community needs. Community participation in each planning stage is a main strength that underpins the successful implementation of the strategy, ensuring that infrastructure management is not solely the domain of the village government but rather a collaborative collective responsibility. Thus, the strategic management approach in Marga Mulya Village can be used as

a model for managing settlement infrastructure in other border areas with similar geographic, demographic, and fiscal characteristics.

5. Conclusions

This study concludes that the strategic management of settlement infrastructure in Marga Mulya Village requires an integrative, adaptive, and evidence-based approach. Development priorities directed toward the neighborhood road and drainage sectors reflect the primary needs of rural border communities for accessibility and environmental risk mitigation. By utilizing structured budget data, thematic area maps, and field observations, the village has been able to identify priority zones as efficient targets for development interventions.

The phased, multiyear strategy employed by the village government is an adaptive measure in managing fiscal limitations, while also strengthening the sustainability of development implementation. The application of a spatial-thematic approach in planning has proven effective in improving the precision of resource allocation, especially when combined with local community participation. This demonstrates that infrastructure development is not only about physical provision, but also about reinforcing governance and local empowerment.

Overall, this study provides an overview of best practices in managing settlement infrastructure development in a border village that can serve as a reference for other villages with similar characteristics. The integration of spatial data, fiscal policy, and community participation is the key to achieving inclusive, efficient, and sustainable village development.

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