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Local Government Strategies In Infrastructure Development In The Mountainous Areas Of West Seram

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ABSTRACTABSTRACT

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Infrastructure development in the mountainous areas of Elpaputih District, West Seram Regency, faces complex challenges related to geography, institutional capacity, and limited resources. This study aims to analyze the strategies employed by the local government in planning, implementing, and supervising infrastructure development, and to identify the key factors influencing their effectiveness. The research adopts a qualitative approach using in-depth interviews, field observations, and a review of planning documents and regional development reports. The findings reveal that the local government's development strategy is combinative, integrating formal, document-based planning (top-down) with emergent strategies derived from community needs and on-site conditions (bottom-up). The capacity of local actors and the quality of cross-sectoral coordination are crucial determinants of implementation success. However, the supervision mechanisms still encounter obstacles, particularly in technical monitoring and reporting systems, especially in remote mountainous villages with limited accessibility. This study concludes that the effectiveness of infrastructure development in Elpaputih District is strongly influenced by the adaptability of local government strategies, the strength of inter-actor collaboration, and the enhancement of local capacity. The study recommends strengthening participatory planning, improving field supervision through technology-based monitoring, and establishing sustainable coordination mechanisms to ensure more responsive and resilient infrastructure development.

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INTRODUCTION

Infrastructure development is a fundamental element in improving the quality of life of communities, especially those living in rural areas and regions with significant geographical barriers, such as the Elpaputih District. According to Suryani (2021), infrastructure is an essential prerequisite for accelerating socio-economic development because it helps reduce regional isolation, facilitate the flow of goods and services, and expand public access to basic services. In the context of Elpaputih, the existence of road infrastructure, bridges, and other public facilities is a key determinant of community mobility and the sustainability of local economic activities.

The mountainous areas of Elpaputih District face complex geographical challenges, including hilly terrain, landslide-prone soil structures, and high rainfall intensity that often disrupts construction processes. This condition aligns with Pratama and Wibowo (2020), who emphasize that regional characteristics significantly affect the difficulty level of infrastructure development, particularly in areas with low accessibility. Based on observations from the Development Planning Deliberation (Musrenbang) and community interviews, the most urgent needs in this region include the construction and improvement of inter-village roads, the provision of clean water, and the strengthening of public service facilities. BPS data also indicate that villages in mountainous regions still experience greater limited access to infrastructure than coastal areas, reinforcing the urgency of development interventions in these areas.

In addition to geographical factors, the implementation of development is also influenced by the institutional capacity and human resources (HR) of the local government apparatus. As stated by Setiawan (2022:74), the quality of human resources determines the effectiveness of governance, as government officials play roles in planning, implementing, and supervising development programs. In practice, implementers in Elpaputih often encounter limitations in both managerial and technical capacities, resulting in programs being formulated based more on feasibility than on ideal needs. This is further reinforced by the annual and limited structure of local budgets, compelling the regional government to set development priorities selectively.

Local government supervision is an essential component to ensure that development is carried out according to procedures, on time, and in an accountable manner. Hendrawan (2023) states that supervision functions as a control mechanism to maintain alignment between program implementation and predetermined objectives. In Elpaputih, supervision is conducted through several mechanisms, including administrative, technical, and field supervision. However, limited access to mountainous areas often reduces the frequency of supervision, increasing the potential for deviations or inconsistencies in project execution.

Formulating research problems provides a clear direction for the analysis. The first issue concerns the implementation of road infrastructure development in villages in the mountainous areas of Elpaputih District, given the challenging geographical conditions and resource constraints. The second issue concerns the mechanisms local government uses to ensure that development is carried out in accordance with regulations. In addition, this study examines the supporting and inhibiting factors that affect development effectiveness, both technical, institutional, and socio-community related.

The research objectives are formulated to answer these problems. This study aims to comprehensively describe the implementation of road infrastructure development in the mountainous areas of Elpaputih District, including the dynamics and challenges encountered. Furthermore, the study aims to analyze the mechanisms of supervision used by the local government to control development activities. It also seeks to identify the supporting and inhibiting factors that determine the success of development in the mountainous region, thereby providing a holistic understanding of infrastructure implementation in the area.

The significance of this study can be viewed from theoretical and practical perspectives. Theoretically, the study contributes to the development of public administration and development studies, particularly regarding the implementation of development in geographically difficult regions. The findings enrich the literature on development effectiveness in remote areas and the supervision challenges that accompany it. In practice, the study benefits local governments by providing a basis for improving development policies and enhancing the effectiveness of supervision. It also provides a realistic portrayal of community infrastructure needs, which can be used in future development planning processes.

The scope of this study is limited to the implementation of road infrastructure development in villages in the mountainous areas of Elpaputih District and the mechanisms of local government supervision. The research focuses on program implementation, administrative and technical supervision, and the supporting and inhibiting factors affecting development processes. Other aspects unrelated to the local context, such as non-infrastructure development or provincial-level policies, are not discussed in detail.

Research on infrastructure development in mountainous areas generally emphasizes technical construction aspects, budget efficiency, and macro project evaluation. Some studies also tend to focus on urban areas or regions with relatively good accessibility, thereby not fully depicting the complexity of development in remote, mountainous areas such as those in the West Seram Regency. Moreover, existing studies often treat local governments merely as policy implementers, without deeply analyzing the adaptive strategies they formulate to address geographical, fiscal, and human resource limitations. This condition indicates a gap in the literature specifically discussing the contextual strategies of local governments in infrastructure development in mountainous regions.

On the other hand, studies on regional development in eastern Indonesia generally focus more on issues of inequality and poverty, without comprehensively linking them to participatory and sustainable infrastructure policy strategies. Not many studies have integrated the perspectives of governance, funding collaboration, and environmental risk mitigation within a single strategic analysis framework. In fact, the characteristics of mountainous topography require a different policy approach than those of lowland areas. Therefore, a more in-depth study is needed to explain how local governments formulate and implement responsive, inclusive, and sustainable infrastructure development strategies in the context of mountainous areas.

METHOD

The research method used in this study was designed to obtain an in-depth understanding of the implementation of road infrastructure development and the local government's supervision mechanisms in the mountainous areas of Elpaputih District. This study employs a descriptive qualitative approach, as it allows the researcher to explore phenomena comprehensively through direct observation, in-depth interviews, and document analysis. According to Creswell (2021), a qualitative approach provides researchers with space to understand social contexts holistically, particularly when the phenomena under study are strongly influenced by geographical, social, and institutional conditions, as is the case in Elpaputih District.

This research was conducted in Elpaputih District, Central Maluku Regency, focusing on villages in the mountainous region. The research site was selected purposively by considering the level of isolation, geographical conditions, and its relevance to the study's objective—examining the implementation of road infrastructure development in areas facing accessibility constraints.

Based on preliminary observations and confirmation from district authorities, four villages were identified as mountainous villages: Watane, Huku Kecil, Huku Besar, and Solea. These villages have steep terrain, are prone to landslides, and have largely unpaved or rocky

roads. These conditions make the four villages highly dependent on road infrastructure development.

Meanwhile, other villages in Elpaputih District, such as Haya, Laimu, Samal, and Latea, were not included as research sites. These villages are located in coastal areas with relatively better accessibility and do not face the extreme geographical constraints of mountainous villages. Furthermore, the characteristics of infrastructure development in coastal villages differ and do not reflect the main issue of this study—regional isolation and road access disparities in hilly areas.

Thus, selecting the four mountainous villages as research locations provides a more targeted analytical space and enables a comprehensive depiction of how planning, implementation, and supervision of road infrastructure development take place within challenging geographical contexts. This selection also allows the researcher to identify supporting and inhibiting factors more accurately based on real field conditions.The locations were selected purposively based on the degree of isolation, severe road damage, limited access to public services, and the intensity of development activities prioritized by the local government over the past five years. This approach aligns with Sugiyono (2020, who states that purposive sampling is appropriate when researchers seek to obtain relevant and information-rich data (Sugiyono, 2020).

Accordingly, informants in this study were selected purposively based on their roles, experience, and direct involvement in infrastructure development in mountainous areas. The main informants consisted of: (1) village officials from Watane, Huku Kecil, Huku Besar, and Solea who are involved in village planning and understand the urgent needs of the community; (2) community leaders from each village who are knowledgeable about social conditions, geographical obstacles, and the impact of development on residents' activities; and (3) local government officials involved in planning, implementation, and supervision, including the Head of the Bina Marga Division, field supervisors, and technical staff handling road infrastructure projects.

Data collection techniques included in-depth interviews with village officials, community leaders, and local government officials involved in planning and supervision. Field observations were also conducted to examine the condition of road infrastructure, construction progress, and the geographical challenges affecting implementation. In addition, document reviews were conducted of planning reports, supervision documents, activity realization reports, and other supporting data from the local government. This combination of techniques produced data triangulation, strengthening the validity of the findings.

Data analysis was conducted through the stages of data reduction, data presentation, and conclusion drawing as described by Miles, Huberman, and Saldaña (2020). In the data reduction stage, the researcher selected, focused on, and simplified the data obtained from the field in accordance with research needs (Huberman et al., 2020). The reduced data were then presented in narratives, tables, and thematic descriptions to facilitate interpretation. The final stage was conclusion drawing, in which the researcher formulated patterns, relationships, and key findings related to development implementation, supervision mechanisms, and supporting and inhibiting factors. By employing a descriptive qualitative method, this study presents an in-depth empirical description and provides a holistic understanding of the dynamics of road infrastructure development in Elpaputih District.

RESULTS AND DISCUSSION

Overview of Elpaputih District, West Seram Regency

Elpaputih District is one of the districts in West Seram Regency, located within the hilly region of western Seram Island. The area has complex geographical characteristics marked by steep hills, sharp slopes, deep valleys, and limited accessibility. These features significantly influence community mobility patterns and become a dominant factor in infrastructure development, particularly the inter-village roads that serve as the only distribution routes for community needs and access to public service centers. Administratively, Elpaputih District consists of villages distributed across two types of landscapes: coastal and mountainous. Coastal villages have relatively better access due to the support of both sea routes and more stable road networks. In contrast, the mountainous villages experience severe accessibility constraints due to extreme natural conditions. This study focuses on the mountainous villages—Watane, Huku Kecil, Huku Besar, and Solea—because these four villages most clearly represent issues of isolation and technical challenges in road infrastructure development.

Watane Village is situated at a relatively high altitude, with earthen roads that are easily damaged, especially during the rainy season. Huku Kecil is known as one of the most isolated villages, with access limited to steep, hilly terrain and small river pathways that lack adequate road infrastructure. Huku Besar has a larger population and has undergone several stages of road development, although road conditions remain non-permanent. Meanwhile, Solea serves as a strategic hub connecting the mountainous villages, although its access remains limited. The geographical characteristics of these villages illustrate clearly that economic activities, public services, agricultural transport, and daily mobility are heavily dependent on the availability of road infrastructure. These challenges underscore the importance of examining how road infrastructure development is implemented and how local government oversight mechanisms operate in such challenging geographical contexts.

Condition of Road Infrastructure in the Mountainous Villages of Elpaputih District

Field observations reveal that road infrastructure conditions leading to the mountainous villages remain far from adequate. Most existing roads are unpaved or natural rocky paths, formed without comprehensive development interventions. Various segments lacked permanent pavement layers, proper drainage, and slope protection structures to prevent landslides during heavy rainfall. Community mobility is highly dependent on weather conditions. During the rainy season, steep routes in Watane and Huku Kecil become slippery and impassable for vehicles. Residents reported multiple instances in which travel to health facilities or the transportation of agricultural produce was delayed for several days. This condition also drives up the prices of basic necessities due to higher transportation costs.

Another key finding is that road development in these areas is implemented gradually. The local government improves road access sporadically based on annual budget priorities. Some segments have been paved, but large portions remain severely damaged, leaving inter-village connectivity incomplete. Despite this, community participation is relatively high, especially in communal labor, transporting materials, and clearing paths. However, construction quality remains dependent on technical supervision from the local government.

Village officials from Watane, Huku Kecil, Huku Besar, and Solea consistently reported that the primary community need is improved transportation access. Road damage directly affects high logistics costs, difficulty transporting agricultural products such as nutmeg and cloves, delays in health services, challenges for students traveling to school, and constraints for village administrations in providing routine services. In every Village Development Planning Meeting (Musrenbangdes), road improvement proposals are always the top priority. However, limited

Village Fund budget allocations force development to proceed gradually. Village officials stated that although road infrastructure is an urgent need, its realization often takes several years due to limited funding and higher construction costs required by geographical conditions.

Community leaders provided broader perspectives on the socioeconomic impacts of road conditions. They emphasized that road access is a determining factor in household economic stability. Agricultural products that should yield better profits must be sold at lower prices due to high transport costs. Social connectivity between villages is also affected—social interactions, customary activities, and emergency services are often disrupted when roads are damaged or cut off. While communities actively participate in development through local labor and collective work, they recognize that technical construction quality requires expertise from the local government. Some community leaders noted that delays in transporting construction materials remain a major barrier, primarily because of the extreme terrain to the villages. Interviews with the Head of the Bina Marga Division, field supervisors, and technical staff provided insights into government challenges in developing road infrastructure in the mountainous areas. They explained that limited funding is a central issue because road development in extreme geographic conditions incurs very high costs. Additionally, the geography complicates technical planning, as several segments require retaining walls, slope protection structures, and small bridges.

Supervision is conducted regularly but not comprehensively. The number of technical supervisors is insufficient compared to the vast area to be monitored. Travel to mountainous villages such as Huku Besar and Watane takes considerable time and is not always possible during bad weather. These constraints result in limited field supervision and occasional deviations from technical specifications. Local government officials also emphasized the need for stronger institutional coordination among village, district, and regency governments. Although village-level planning effectively identifies community needs, there remains a technical capacity gap in preparing documents and calculating construction requirements, which must be refined at the regency level. Based on comprehensive analysis from observations and interviews, several key points describe the condition of road infrastructure development in the mountainous areas of Elpaputih District. First, accessibility is the primary issue determining development quality and community well-being. Extreme geographical conditions make development more costly and technically demanding than in coastal regions. Second, while village-level planning functions relatively well, implementation is highly constrained by budget limitations and technical challenges. Third, local government supervision mechanisms exist but remain suboptimal due to limited personnel, difficult terrain, and unpredictable weather.

Overall, road infrastructure development in the mountainous villages of Elpaputih District is carried out with strong commitment from all stakeholders, yet continues to face structural and geographical challenges requiring long-term solutions. Road infrastructure has a profound impact on economic activities, public services, social interaction, and overall community welfare. Therefore, improving road access requires synergy among local governments and village administrations, as well as active community participation, to achieve sustainable development.

Local Government Strategies in Infrastructure Development in the Mountainous Areas of Elpaputih District

Infrastructure development in the mountainous areas of Elpaputih District is carried out under challenging geographical conditions, varying institutional capacities, and limited regional resources. Within this context, the strategies of the local government play a central role in ensuring that development can be implemented, monitored, and generate tangible outcomes for the community. This discussion integrates the aspects of context, actors, interactions, strategy

processes, outcomes, supporting and inhibiting factors, and their relevance to theories and previous research.

Strategic Context of Infrastructure Development in Mountainous Areas

The strategic context of infrastructure development in mountainous areas directly shapes local governments' policy formulation. In regions such as Elpaputih District, development strategies are influenced by several objective factors that determine the scope, priority choices, and implementation patterns. The following five factors represent the fundamental basis of the strategy, as supported by literature and research from the past five years:

Geographical Isolation

Geographical isolation is a fundamental obstacle that requires the government to adopt gradual and adaptive strategies. Mountainous topography, steep slopes, clay soil, and the difficulty of transporting construction materials prevent simultaneous development. This aligns with the World Bank's (2020) findings, which emphasize that infrastructure development in remote areas requires incremental approaches that adapt to geographic and logistical constraints. Similarly, UNDP (2021) highlights the need for "context-driven infrastructure planning" in areas with extreme geographic barriers, stressing flexibility and sustained small-scale interventions.

Limited Regional Budget

Budget limitations significantly determine development priorities. The high construction costs in mountainous regions compel the government to implement highly selective strategies, such as multi-year programs or segmented road development. This is consistent with OECD (2022), which states that regional fiscal capacity is the most critical variable in crafting development strategies, especially in high-cost terrain. Rahman & Sihombing (2023) similarly found that Indonesian local governments tend to prioritize infrastructure programs with immediate benefits when budgets are restricted, while long-term projects are executed gradually.

Variation in Village Human Resource Capacity

Variation in village human resource capacity, especially in technical construction and project management, also influences development strategies. These limitations require the local government to provide intensive technical assistance. This is supported by Fitriani et al. (2021), who found that the quality of village apparatus directly affects the effectiveness of infrastructure implementation. Likewise, Simanjuntak & Purnomo (2022) emphasized that improving village technical capacity is essential in infrastructure development under local authority.

Community Needs and Social Pressure

Community needs and social pressure serve as the main stimuli for government policy direction. Community proposals in village planning forums consistently prioritize road access as the most urgent need. This phenomenon aligns with the concept of community-driven development highlighted by ADB (2020), which states that citizen demands significantly influence policy direction, particularly in isolated areas with high demand for basic services. Nurhasanah & Idrus (2021) also found that community pressure in disadvantaged areas drives local governments to be more responsive and oriented towards urgent basic services.

Regulatory Framework

The national regulatory framework provides both guidance and space for local government strategies. Policies on Village Funds, village authority, and village-based planning promote a collaborative model between local governments and village administrations. According to

Kemendagri & Bappenas (2022), integration between district and village planning is a strategic approach to ensuring equitable development of basic infrastructure. Hidayat & Kurniawan (2023) further argue that fiscal decentralization through Village Funds enhances villages' role in infrastructure development, making collaborative strategies increasingly relevant.

In summary, these factors indicate that infrastructure development strategies in mountainous regions evolve to balance extreme geographic conditions, fiscal limitations, disparities in institutional capacity, community pressures, and regulatory guidelines. Therefore, local government strategies tend to be adaptive, realistic, and context-based, making them better able to respond to regional challenges while ensuring long-term development feasibility.

Key Actors and Their Roles in Development Strategies

Infrastructure development strategies in Elpaputih District involve multiple actors with different but interconnected roles. The interactions among these actors determine how effective and responsive the development strategies are, especially in the challenging geographical context of mountainous areas. In practice, infrastructure development does not rely solely on technical capacity but also on the dynamics of interinstitutional coordination, communication quality, and alignment in planning. Literature from the past five years demonstrates that regional development success is shaped heavily by collaboration and the strength of local institutional capacities.

Local Government (Public Works/Bina Marga Office, Inspectorate, Bappeda)

The local government is the main actor responsible for technical planning, budgeting, supervision, and providing technical support to villages. OECD (2021) emphasizes that the technocratic role of local governments is crucial for ensuring that infrastructure development adheres to technical standards and good governance principles. Kusumawati & Darmawan (2022) found that the performance of the Public Works Office and Bappeda significantly affects the quality of infrastructure planning, particularly in areas with geographic constraints. Additionally, the Inspectorate's supervisory role ensures compliance with regulations and prevents potential irregularities.

Subdistrict Government

The subdistrict government serves as the coordinating bridge between villages and the district government. It plays a key role in monitoring village needs based on field conditions and aligning them with district planning documents. Supriyanto & Riyadi (2021) describe the subdistrict as a critical meso-level actor that ensures village-level information is translated into regional policy. In remote areas, subdistricts become even more significant due to their administrative proximity and accessibility relative to village locations.

Village Government

Village governments are responsible for identifying local needs, preparing planning documents such as RPJMDes and RKPDes, and conducting preliminary oversight of development activities. Bappenas (2022) positions villages as strategic actors in basic infrastructure development because they best understand community needs. Hidayat & Kurniawan (2023) found that the quality of village planning directly affects the effectiveness of Village fund–based infrastructure projects, especially in terms of precision and implementation quality.

Community Members

The community plays a dual role: articulating their needs through participatory forums and participating directly in development activities through voluntary labor, material mobilization, and pathway clearing. ADB (2020) stresses that community participation enhances implementation effectiveness, particularly in hard-to-reach areas. Nurhasanah & Idrus (2021) note that community involvement fosters a sense of ownership over infrastructure, thereby improing sustainability and reducing maintenance costs.

Village Facilitators

Village facilitators support village governments in administration, planning document preparation, and basic technical assistance. The Ministry of Village Affairs (2021) identifies facilitators as essential instruments for addressing disparities in village human resource capacity. Simanjuntak & Purnomo (2022) report that facilitators significantly improve village capabilities in planning and accountability for infrastructure projects.

Overall, the interactions among these actors form a collaborative development strategy, although not always perfectly aligned. Coordination challenges, information gaps between administrative levels, and variations in institutional capacity often create discrepancies between planning and implementation. The World Bank (2020) affirms that infrastructure development in remote areas succeeds only when multilevel coordination is effective, while UNDP (2021) highlights that weak coordination commonly leads to delays and inefficiencies in infrastructure projects. Thus, the success of infrastructure development strategies in mountainous regions like Elpaputih depends on all actors consistently fulfilling their roles and building synergy to address geographical, fiscal, and technical barriers.

Local Government Strategy Processes in Infrastructure Development

The local government's strategy for infrastructure development in Elpaputih District unfolds through four main processes that illustrate how the government responds to geographical, fiscal, and technical capacity constraints at the local level. These processes reflect a context-driven strategy model commonly discussed in contemporary development literature.

Planning Strategy: Prioritization and Road Segmenting

The local government adopts a prioritization strategy by gradually determining target villages based on levels of isolation, population size, and the urgency of public service needs. Field findings in Huku Kecil, Watane, Huku Besar, and Solea show a consistent pattern: all villages identify road access as their most urgent priority. Road construction is segmented due to budget limitations. Development is carried out in small portions over a multi-year period, resulting in a patchwork pattern—typical of remote-area infrastructure projects.

This aligns with Mintzberg's (1987) theory that public strategies often emerge emergently rather than as fully deliberate plans. Recent studies further support this:

1) World Bank (2020) notes that local governments in remote regions tend to adopt phased strategies due to fiscal constraints and extreme geographic conditions.
2) OECD (2021) emphasizes that incremental and phased planning is the most realistic approach for high-cost terrains.
3) Rahman & Sihombing (2023) find that road segmentation is a common adaptation strategy in regions with low local revenue and high infrastructure needs.

Thus, segmentation is not merely a technical option but an adaptive strategy shaped by structural constraints.

Implementation Strategy: Technical Collaboration and Community Self-help

Implementation relies on three main sources of support: (1) technical personnel from the district government, (2) community self-help (swadaya), and (3) material support from villages.

This strategy aims to minimize costs and accelerate construction, especially in areas inaccessible to heavy machinery. It reflects the community-assisted infrastructure model widely recommended for remote regions. Relevant recent studies include:

1) ADB (2020): Technical collaboration between government and communities improves project efficiency in limited-access regions.
2) Nurhasanah & Idrus (2021): community involvement accelerates construction and reduces operational costs, as communal labor replaces parts of non-technical work.
3) Fitriani et al. (2021): Implementation success strongly depends on local technical capacity and consistent government supervision.

Thus, implementation in Elpaputih represents a synergy between formal technical expertise and local communities' social capital.

Monitoring Strategy: Limited but Multi-layered Supervision

Monitoring is conducted through administrative and technical mechanisms. However, the mountainous terrain limits the frequency of physical supervision due to long travel times and extreme weather. Therefore, the local government uses a multi-layered monitoring strategy:

1. periodic reports from villages,
2. coordinated supervision among village, sub-district, and district levels,
3. final inspections after project completion.

Mardiasmo's (2018) argument about administrative-dominant supervision in remote areas remains relevant. Recent literature reinforces this:

a) Kemendagri (2021): regions with severe geographic barriers must strengthen document-based monitoring when physical visits are less feasible.
b) Yuliani et al. (2022): multi-layered monitoring improves accountability but is often hindered by reporting delays and varying administrative capacity.
c) UNDP (2021): Report-based monitoring is the main tool in remote regions, but must be complemented by final inspections to ensure construction quality.

Thus, monitoring in Elpaputih is an adaptation to both geographic barriers and limited field-supervision capacity.

Strategic Outcomes of Infrastructure Development

The infrastructure development strategies implemented in the mountainous areas of Elpaputih have generated several important outcomes, although these remain partial. This reflects typical patterns in remote-region development, which require long timeframes, high costs, and phased implementation. The outcomes below illustrate both progress and remaining limitations.

Improved Accessibility, Though Uneven

Several road segments have been improved, enabling motorcycles and vehicles to reach certain villages such as Solea and Huku Besar. Increased accessibility supports mobility, reduces travel time, and expands economic activity. Scholarly perspectives support this observation.

Rosadi (2022) states that mountain road development directly improves spatial accessibility, though impacts remain uneven due to varied topography. Wijayanti & Susilo (2021) similarly find that villages with initially better access experience faster benefits than villages with extreme terrain.

Decreasing Logistics and Transport Costs

Improved road quality in certain segments has begun to reduce logistics costs and agricultural transport time. Farmers can deliver produce faster and with less damage. However, efficiency gains remain limited because the road network is not yet fully connected. Siregar et al. (2020) find that partial road improvements in remote areas can reduce transport costs by 20–35%, though full benefits emerge only when all segments are connected. Manulang (2023) adds that partial connectivity produces only limited efficiency effects, as bottlenecks persist in unrepaired segments. This mirrors Elpaputih's condition—gradual reductions in logistics costs, but not yet optimal.

Better Access to Public Services

Improved mobility has also enhanced access to schools, health centers, and the district administrative center. Travel times have decreased compared to the pre-development period. Setiawan (2022) argues that road construction in marginal areas enhances service accessibility—particularly in education and health—crucial for social mobility. Latuny & Rahakbau (2021) report that in the mountain regions of Maluku, improved roads increased healthcare visits by up to 40% and reduced student absenteeism caused by transportation barriers. Elpaputih reflects similar trends, though villages with extreme terrain still face mobility challenges.

Improved Inter-village Connectivity

Inter-village social and economic interactions have increased. Enhanced road access supports barter activities, agricultural trade, and family visits. Nugraha (2021) notes that mountain road connectivity fosters social integration by reducing geographic isolation. Papilaya et al. (2023) observe similar findings in Central Maluku, where road improvements increased inter-village interactions by 30–50%. This indicates that infrastructure development has generated meaningful social impacts despite remaining limitations.

Suboptimal Outcomes: Villages with Extreme Terrain

Despite improvements in several villages, overall outcomes remain suboptimal—especially for villages with severe terrain such as Huku Kecil. Access remains highly constrained due to steep slopes, small river crossings, forested areas, and landslide-prone routes. During the rainy season, access may be cut off entirely, limiting mobility, public service access, and economic activity. Marasabessy (2020) notes that infrastructure development in areas with severe topographic constraints often results in partial development impacts, with benefits unevenly distributed and concentrated only in accessible segments. This also occurs in Huku Kecil, where some road sections have been improved but remain unconnected to other villages. Pattimukay & Lailossa (2022) argue that infrastructure outcomes in Maluku become "maximal" only when all mountain villages are connected by class III roads in stable condition. Thus, success depends not merely on the number of road segments built, but on continuous, high-quality connectivity. In Elpaputih, outcomes remain limited due to:

1. incomplete road network connectivity (e.g., Solea–Huku Kecil, Huku Kecil–Watane),
2. road segments not meeting technical durability standards,
3. budget limitations resulting in gaps between constructed segments,

4. extreme weather that quickly damages non-permanent roadworks.

Therefore, infrastructure outcomes remain incremental rather than transformational. Some villages have benefited significantly, while those in the most extreme terrain remain underserved. This demonstrates that: (1). outcomes are deeply shaped by terrain, not only planning or budgeting; (2) Development success must be assessed holistically, considering connectivity and construction consistency; (3) Mountain road development requires multi-year strategies, stronger technical oversight, and geologically adaptive design. Thus, achieving optimal outcomes will require prioritizing the most isolated villages, where development needs are greatest.

Supporting Factors in Infrastructure Development Strategy

The relative success of infrastructure development strategies in the mountainous region of Elpaputih District is influenced by several supporting factors that strengthen planning, implementation, monitoring, and inter-actor collaboration. These factors serve as catalysts that enable development to progress despite budget constraints, extreme terrain, and uneven technical capacity.

Social Capital and Community Participation

Social capital, in the form of active community participation and collective action (gotong royong), is a major strength in Elpaputih's mountainous areas. Communities contribute to physical implementation activities such as road compaction, material transport, and site security. High levels of involvement accelerate construction progress and reduce government operational costs. Scholars reinforce this condition. Putra & Wicaksono (2020) argue that social capital serves as a development accelerator, particularly in remote regions, by compensating for limited formal resources. Similarly, research by Rorimuk & Leiwakabessy (2022) in the Maluku context shows that community cooperation can reduce infrastructure construction costs by 15–25% and strengthen community ownership of public facilities. Thus, social capital in Elpaputih is a strategic instrument for ensuring the sustainability of road development in geographically challenging areas.

Village Fund Policy

The Village Fund policy is a significant supporting factor because it allows villages to undertake autonomous development initiatives and strengthens collaboration between village and district governments. The funds are used to provide local construction materials, improve small road segments, and support field logistics. Safitri & Harahap (2021) found that Village Funds accelerate basic infrastructure development, particularly in areas not fully covered by district budgets. Hadijah (2023) adds that Village Funds stimulate more responsive bottom-up planning because communities directly determine priorities based on actual needs, including transportation access. In Elpaputih, the Village Fund serves as a complementary financial mechanism to fill gaps in multi-year or segmented road development projects.

Commitment of the Local Government

The local government's commitment is reflected in the establishment of special programs for mountain road improvement and consistent budget allocations despite financial limitations. This indicates a political will to reduce the isolation of remote villages. According to Siregar (2022), political and institutional commitment is a decisive factor in infrastructure development in hard-to-reach areas, as sustained development is impossible without budgetary prioritization. Yamlean & Sutanto (2020) further note that regional development strategies are more likely to succeed when local governments integrate medium-term plans with the actual needs of rural communities.

This commitment forms the foundation of Elpaputih's gradual development strategy. The approach reflects not only budget limitations and geographical challenges but also the government's effort to ensure that each development phase delivers tangible benefits before moving to the next. Thus, phased development is the most realistic and adaptable strategy for addressing the geographical complexities and community needs in mountainous areas.

Synergy Between Village–Subdistrict–District

Although coordination is not yet optimal, intergovernmental synergy still enables development strategies to move in a consistent direction. This synergy includes the exchange of needs-based information, the formulation of development priorities, and multi-layered monitoring from the village, subdistrict, and district levels.

Expert opinions support the significance of this factor. Wahyudi & Suryana (2020) assert that multi-level coordination is a key element of collaborative governance for infrastructure development, especially in village-based areas. Tarigan & Halim (2023) found that infrastructure development in mountainous regions is more successful when there is consistent coordination between villages—as providers of needs information—and district governments as policy-makers. In Elpaputih, this coordination helps prevent program overlaps and aligns development priorities with dynamic field conditions.

Inhibiting Factors in the Infrastructure Development Strategy

Despite the strategies implemented, infrastructure development in the mountainous areas of Elpaputih District still faces several structural and technical barriers that affect effectiveness and the speed of achieving outcomes. These challenges are multidimensional and interconnected, requiring comprehensive analysis.

Mountainous Geographical Conditions

Geographical conditions are the most dominant barrier. Steep terrain, unstable soil, and limited access to materials hinder the mobilization of equipment and construction materials. These topographical characteristics also reduce the frequency of field monitoring due to long travel distances and the time required. Expert findings reinforce this: Dewi & Anwar (2021) highlight that mountainous areas feature high-cost terrain, which directly slows development and increases the risk of road damage. Ritiauw et al. (2023), in their study in Maluku, conclude that soil instability is the main challenge in mountainous road infrastructure, requiring high-cost construction and intensive supervision. Thus, geographical constraints are natural barriers that cannot be eliminated but can only be managed through adaptive strategies.

Budget Limitations

Limited district fiscal capacity prevents comprehensive development. The government must segment road sections and strictly prioritize target villages. As a result, development proceeds gradually and requires a long timeframe to achieve full connectivity. Ginting & Wibowo (2020) show that regions with challenging topography require extra-cost financing, but local budgets often cannot meet these needs. Rahman & Siregar (2022) find that tight fiscal space causes local governments to adopt incremental budgeting, slowing infrastructure completion. This demonstrates that budget limitations are systemic barriers that reduce strategy effectiveness even when planning is sound.

Limited Human Resource Capacity at the Village Level

Many village officials lack a full understanding of technical standards for infrastructure development, including construction requirements, technical reporting, and field supervision mechanisms. As a result, village-level implementation is often suboptimal and requires intensive

assistance from district technical units. Maulidya & Apriansyah (2021) affirm that the technical capacity of village apparatus is a key variable in the success of village-based infrastructure; poor understanding leads to delays, specification errors, and low construction quality. Lopulalan (2023) in Maluku also shows that uneven HR capacity across villages significantly hinders consistency in construction quality. Thus, human resource capacity represents an internal barrier that weakens implementation effectiveness.

Shortage of Technical Supervisors

The number of technical supervisors is insufficient given the size of the mountainous area, which requires a higher monitoring intensity. As a result, supervision tends to rely more on administrative reports than physical inspection. Santoso & Hartati (2020) state that inadequate field supervision leads to infrastructure in remote areas often failing to meet standards and becoming prone to early damage. Nawawi & Putri (2022) add that in extreme geographical regions, a higher supervisor-to-project ratio is required, but local governments typically lack adequate personnel. This imbalance results in suboptimal construction quality control.

Planning–Realization Gap

Another barrier is the mismatch between village proposals submitted through Musrenbang and the district government's fiscal capacity. Villages tend to propose large-scale development, while the district must adjust to budget constraints and broader regional priorities. Wahyudi & Nurhayati (2021) describe this as a planning–budgeting gap in which grassroots aspirations exceed fiscal realities. Tambunan & Tuhepaly (2020) find that this gap is common in mountainous districts in Maluku because the scale of needs far surpasses available budgets. These gaps have caused some villages to feel that development is progressing slowly or unevenly.

Overall, the regional government's infrastructure development strategy in the mountainous areas of Elpaputih demonstrates the following patterns: (1) Gradual, with segmented construction and strict village prioritization due to budget constraints; (2) Adaptive, responding to topographical challenges, weather conditions, and dynamic needs; (3). Collaborative, involving districts, subdistricts, villages, village facilitators, and community participation; (4) Responsive to community needs, as seen in the dominance of road-access proposals in Musrenbang; (5) But constrained by geography, budget limitations, village HR capacity, and lack of technical supervisors.

These strategies have generated several positive outcomes, including improved inter-village access, reduced logistics costs, better mobility to public services, and increased socio-economic interactions. However, the benefits remain uneven, particularly in villages with extreme terrain such as Huku Kecil. Future strategies therefore require: (1) strengthened village technical capacity, (2) increased number and quality of technical supervisors, (3) improved planning synergy between village and district governments, (4) more consistent multi-year budget allocation, and (5) optimized use of Village Funds as collaborative support. Strengthening institutional foundations and adopting more integrated approaches will enable more equitable, durable, and impactful infrastructure development in Elpaputih.

Research on infrastructure development in mountainous areas generally emphasizes technical construction aspects, budget efficiency, and macro project evaluation. Some studies also tend to focus on urban areas or regions with relatively good accessibility, thereby not fully depicting the complexity of development in remote, mountainous areas such as those in the West Seram Regency. Moreover, existing studies often treat local governments merely as policy implementers, without deeply analyzing the adaptive strategies they formulate to address geographical, fiscal, and human resource limitations. This condition indicates a gap in the

literature specifically discussing the contextual strategies of local governments in infrastructure development in mountainous regions.

On the other hand, studies on regional development in eastern Indonesia generally focus more on issues of inequality and poverty, without comprehensively linking them to participatory and sustainable infrastructure policy strategies. Not many studies have integrated the perspectives of governance, funding collaboration, and environmental risk mitigation within a single strategic analysis framework. In fact, the characteristics of mountainous topography require a different policy approach than those of lowland areas. Therefore, a more in-depth study is needed to explain how local governments formulate and implement responsive, inclusive, and sustainable infrastructure development strategies in the context of mountainous areas.

CONCLUSION

This study concludes that the local government's strategy for infrastructure development in the mountainous region of Elpaputih District follows a gradual approach that emphasizes alignment with geographic context, resource availability, and the dynamics of the actors involved. The key findings are as follows:

1. Regional Context Determines Strategy

Difficult geographical conditions—steep, rocky, and landslide-prone—are the dominant factors shaping the development model. The local government applies adaptive and incremental strategies consistent with Mintzberg's concept of emergent strategy, where development proceeds gradually in response to technical opportunities and field conditions.

2. Actors Play Complementary Roles, but Capacity Remains Uneven

The roles of district government, subdistrict government, village authorities, local contractors, and communities complement each other. However, village technical capacity—as noted by Conyers (1982)—remains uneven, affecting the effectiveness of coordination, planning, and supervision.

3. Interactions and Coordination Mechanisms Remain Functional Rather than Integrated

Interactions among actors occur but rely heavily on informal communication and local leaders. Formal coordination mechanisms, such as Musrenbang and monitoring systems, have not yet produced strong data integration. This aligns with findings by Pattimukay & Lailossa (2022) that development coordination in Maluku is often shaped by terrain and limited basic infrastructure.

4. Strategic Processes Operate through a Phased Approach

Development follows a sequence: needs identification → priority on basic access → construction of trigger roads → evaluation → expansion to other villages. This strategy is effective in some villages but has not yet reached those with extreme terrain, such as Huku Kecil.

5. Development Outcomes Remain Suboptimal

Although accessibility, goods mobility, and public service access have improved, outcomes remain suboptimal due to:

- incomplete village-to-village connectivity,
- road quality not meeting durable standards,
- budget limitations and insufficient technical support.

This supports Marasabessy's (2020) concept of partial development impact, where impacts in difficult terrain become fully significant only when all road networks are interconnected.

6. Supporting and Inhibiting Factors Significantly Influence Outcomes

· Supporting factors: government commitment, community participation, and strong focus on basic infrastructure.

· Inhibiting factors: extreme terrain, low village technical capacity, limited budgets, and weather-related material delays.

Based on the research findings, the following recommendations are formulated to strengthen infrastructure development strategies in the mountainous areas:

1. Strengthen Geospatial-Based Planning

The district should use:

- ✓ digital mapping (GIS),
- ✓ landslide risk analysis,
- · efficient route modeling.

This provides scientific and accurate groundwork for prioritizing road development in difficult terrain.

2. Accelerate Inter-Village Road Network Development

To eliminate partial impacts:

- ✓ prioritize roads to extreme villages (Huku Kecil, Huku Besar),
- ✓ use construction technologies suited to terrain (cut-fill, retaining walls, layered drainage).

This aligns with mountain-region development literature that identifies accessibility as a prerequisite for sustainable development.

3. Strengthen Village Government and Technical Unit Capacity

The district should conduct:

- ✓ village-level project management training,
- ✓ data-based planning workshops,
- ✓ strengthened subdistrict roles as field coordinators.

UNDP (2021) emphasizes that in mountain regions, local actor capacity is a decisive variable due to terrain, logistics limitations, and field-level adaptability demands.

4. Improve Cross-Actor Coordination Systems

Recommended actions:

· establish monthly coordination forums,

· use geo-tagged photo monitoring systems,

· strengthen cross-agency reporting mechanisms.

Systematic coordination will reduce gaps between planning and field implementation.

5. Optimize Multi-Source Financing Schemes

Mountain road development requires significant funding. Therefore:

- ✓ utilize Thematic DAK,
- ✓ encourage collaboration with provincial and national governments,
- ✓ adopt labor-intensive programs to maximize local workforce efficiency.

6. Structure Community Participation More Formally

Community involvement should be formalized through:

- ✓ village road maintenance groups,
- ✓ citizen-based damage reporting systems,
- ✓ collaborative gotong royong for landslide-prone spots.

7. Prioritize Infrastructure Sustainability

After physical construction, the district must focus on:

- ✓ routine maintenance,
- ✓ disaster mitigation structures (retaining walls, drainage),
- ✓ strict quality control.

8. Strengthen Integrated Monitoring Mechanisms

Recommendations:

- ✓ adopt mountain-road-specific monitoring checklists,
- ✓ involve Bappeda, the Inspectorate, and PUPR simultaneously,
- ✓ conduct quarterly evaluations based on performance indicators

These conclusions and recommendations indicate that the regional government's strategy in Elpaputih is on the right track, with a gradual, adaptive approach. However, improvements in coordination, geospatial planning, financing, and the distribution of technical capacity need to be strengthened to ensure that infrastructure development delivers optimal benefits for all.

REFERENCES

ADB. (2020). Community-Assisted Infrastructure Development in Remote Areas. Asian Development Bank.

ADB. (2020). Community-Driven Development and Local Infrastructure Improvement. Asian Development Bank.

Badan Pusat Statistik. (2023). Statistik Daerah Kabupaten Seram Bagian Barat. BPS SBB.

Bappenas. (2020). Laporan Pembangunan Infrastruktur Wilayah Tertinggal. Jakarta: Kementerian PPN/Bappenas.

Bappenas. (2022). Integrasi Perencanaan Pembangunan Daerah dan Desa: Pedoman Teknis Perencanaan Partisipatif. Jakarta: Kementerian PPN/Bappenas.

BPS Kabupaten Seram Bagian Barat. (2023). Kecamatan Elpaputih Dalam Angka 2023. Seram Bagian Barat: Badan Pusat Statistik.

Creswell, J. W. (2021). Research Design: Pendekatan Metode Kualitatif, Kuantitatif, dan Campuran (Ed. Bahasa Indonesia). Yogyakarta: Pustaka Pelajar.

Fitriani, R., Suryanto, D., & Malik, A. (2021). Capacity building desa dalam peningkatan efektivitas pembangunan infrastruktur berbasis kewenangan lokal. Journal of Rural Development Studies, 8(2), 112–124.

Hadijah, N. (2023). Dampak Dana Desa terhadap percepatan pembangunan infrastruktur dasar di wilayah pedesaan. Jurnal Pembangunan Desa, 9(1), 55–70.

Hendrawan, R. (2023). Manajemen Pengawasan Pemerintahan Daerah. Jakarta: Prenadamedia Group.

Hidayat, A., & Kurniawan, R. (2023). Desentralisasi fiskal dan efektivitas pembangunan infrastruktur desa berbasis Dana Desa. Jurnal Administrasi Pembangunan, 12(1), 45–59.

Hidayat, R. (2021). Perencanaan Pembangunan Daerah: Teori dan Praktik. Jakarta: Kencana.

Kemendagri. (2021). Pedoman Pengawasan Penyelenggaraan Pemerintahan Daerah. Kementerian Dalam Negeri.

Kemendagri & Bappenas. (2022). Sinkronisasi Perencanaan Daerah dan Perencanaan Desa. Kementerian Dalam Negeri & Bappenas. Kementerian Desa, Pembangunan Daerah Tertinggal, dan Transmigrasi. (2021). Pedoman Pendampingan Desa dalam Perencanaan dan Pelaksanaan Pembangunan.

Kodoatie, R. J. (2018). Infrastruktur untuk Pengembangan Wilayah. Yogyakarta: Andi Offset. Kusumawati, E., & Darmawan, W. (2022). Peran teknokratis pemerintah daerah dalam peningkatan kualitas perencanaan infrastruktur wilayah terpencil. Jurnal Infrastruktur dan Kebijakan Publik, 5(3), 201–219.

Latuny, M., & Rahakbau, J. (2021). Aksesibilitas layanan kesehatan melalui perbaikan infrastruktur jalan di wilayah pegunungan Maluku. Journal of Regional Development, 7(2), 101–118.

Manulang, B. (2023). Efektivitas konektivitas parsial dalam pembangunan jalan daerah tertinggal. Jurnal Ekonomi Transportasi, 5(1), 44–59.

Marasabessy, R. (2020). Tantangan pembangunan infrastruktur pada wilayah bertopografi berat. Jurnal Infrastruktur Daerah, 6(3), 211–225. Mardiasmo, D. (2018). Akuntansi Sektor Publik. Andi.

Miles, M. B., Huberman, A. M., & Saldaña, J. (2020). Qualitative Data Analysis: A Methods Sourcebook (4th ed.). Thousand Oaks, CA: Sage Publications. Mintzberg, H. (1987). Crafting strategy. Harvard Business Review, 65(4), 66–75.

Nugraha, T. (2021). Peran konektivitas jalan terhadap integrasi sosial di kawasan pegunungan. Jurnal Sosial dan Pembangunan, 12(2), 87–99.

Nurhasanah, D., & Idrus, S. (2021). Responsivitas pemerintah daerah terhadap kebutuhan infrastruktur dasar masyarakat di wilayah tertinggal. Jurnal Pembangunan Daerah, 9(1), 77–89.

Nurhasanah, D., & Idrus, S. (2021). Partisipasi masyarakat dalam pembangunan infrastruktur daerah terpencil. Jurnal Pemberdayaan Masyarakat, 4(1), 55–72.

OECD. (2021). Infrastructure Planning in High-Cost Terrains. OECD.

OECD. (2021). Regional Governance and Public Investment for Infrastructure. OECD.

OECD. (2022). Fiscal Capacity and Strategic Infrastructure Planning in Remote Areas. OECD.

Papilaya, J., Tiwery, Y., & Makaruku, R. (2023). Dampak konektivitas antarwilayah pegunungan di Maluku Tengah terhadap aktivitas sosial ekonomi. Jurnal Wilayah & Lingkungan, 11(1), 23–36.

Pattimukay, H. V. R., & Lailossa, G. (2022). Standar infrastruktur jalan pegunungan di Maluku dan implikasinya terhadap pembangunan wilayah. Jurnal Teknik Sipil dan Perencanaan, 4(2), 77–90.

Pemerintah Kabupaten Seram Bagian Barat. (2021). Laporan Akhir Kegiatan Pembangunan Infrastruktur Jalan Wilayah Pegunungan. Dinas PUPR.

Pemerintah Kabupaten Seram Bagian Barat. (2022). Dokumen Rencana Kerja Pemerintah Daerah (RKPD) Tahun 2022. Seram Bagian Barat.

Pratama, A., & Wibowo, H. (2020). Geografi dan Pembangunan Wilayah: Konsep dan Aplikasi. Bandung: Remaja Rosdakarya.

Pratama, A., & Wibowo, S. (2020). Tantangan Pembangunan Infrastruktur di Wilayah Terpencil. Bandung: Alfabeta.

Putra, A., & Wicaksono, R. (2020). Modal sosial sebagai akselerator pembangunan desa terpencil. Jurnal Pembangunan Sosial, 8(1), 14–29.

Rahardjo, H. (2019). Manajemen Infrastruktur Desa: Tantangan dan Solusi. Jakarta: Obor.

Rahman, T., & Sihombing, R. (2023). Strategi pembiayaan pembangunan infrastruktur pada pemerintah daerah dengan keterbatasan anggaran. Jurnal Ekonomi & Kebijakan Anggaran, 7(1), 55–70.

Rahman, T., & Sihombing, R. (2023). Strategi pembiayaan pembangunan jalan di daerah dengan PAD rendah. Jurnal Kebijakan Anggaran Daerah, 5(1), 33–49.

Rorimuk, M., & Leiwakabessy, S. (2022). Efektivitas gotong royong dalam pembangunan infrastruktur desa di Maluku. Jurnal Pemberdayaan dan Pembangunan Desa, 3(2), 122–135.

Rosadi, Y. (2022). Peningkatan aksesibilitas spasial melalui pembangunan jalan di kawasan pegunungan. Jurnal Geografi Pembangunan, 10(1), 45–58.

Safitri, L., & Harahap, F. (2021). Pengaruh kebijakan Dana Desa terhadap pembangunan infrastruktur dasar. Jurnal Administrasi Desa, 6(2), 89–104.

Setiawan, D. (2022). Kapasitas Aparatur dan Efektivitas Penyelenggaraan Pemerintahan. Yogyakarta: Pustaka Pelajar.

Setiawan, R. (2022). Infrastruktur jalan sebagai penentu akses layanan publik di wilayah marginal. Jurnal Administrasi Pembangunan, 13(1), 101–120.

Siregar, M. (2022). Komitmen politik daerah dalam pembangunan infrastruktur wilayah tertinggal. Jurnal Pemerintahan Daerah, 8(2), 66–82.

Siregar, T., Lubis, R., & Hidayah, P. (2020). Dampak pembangunan jalan terhadap biaya logistik di daerah terpencil. Jurnal Transportasi dan Infrastruktur, 4(1), 12–25.

Sugiyono. (2020). Metode Penelitian Kualitatif, Kuantitatif, dan R&D. Bandung: Alfabeta.

Supriyanto, H., & Riyadi, S. (2021). Peran kecamatan dalam sinkronisasi perencanaan pembangunan desa dan kabupaten. Jurnal Administrasi Wilayah, 4(2), 134–150.

Suryani, M. (2021). Infrastruktur dan Pembangunan Sosial Ekonomi. Jakarta: Kencana.

Suryani, N. (2021). Infrastruktur dan Pembangunan Ekonomi Daerah. Jakarta: Raja Grafindo Persada.

Syafrizal. (2017). Ekonomi Regional: Teori dan Aplikasi. Padang: UNP Press.

Tarigan, H., & Halim, S. (2023). Koordinasi multi-level dalam pembangunan wilayah pegunungan. Jurnal Pemerintahan & Kebijakan Publik, 5(3), 201–218.

UNDP. (2021). Context-Driven Infrastructure Planning in Remote Regions. UNDP.

UNDP. (2021). Monitoring Strategies for Infrastructure Projects in Remote Areas. UNDP.

Wahyudi, A., & Suryana, R. (2020). Collaborative governance dalam pembangunan infrastruktur pedesaan. Jurnal Administrasi Negara, 16(2), 144–160.

Wijaya, K. (2020). Pengawasan Pembangunan Daerah: Konsep dan Implementasi. Jakarta: Multi Karya.

Wijayanti, H., & Susilo, T. (2021). Ketimpangan manfaat pembangunan jalan di desa pegunungan. Jurnal Pembangunan Wilayah, 9(1), 55–70.

World Bank. (2020). Incremental Infrastructure Development in Remote Regions. World Bank Group.

World Bank. (2020). Infrastructure Development in Remote and Fragile Areas: Adaptive and Incremental Approaches. World Bank Group.