

EVALUATION OF VILLAGE INFRASTRUCTURE DEVELOPMENT POLICY IN LIMAU SUNDAI VILLAGE, AIR PUTIH DISTRICT, BATU BARA REGENCY

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Abstract

Village infrastructure development is a strategic instrument to improve community welfare and to strengthen development equity in rural areas. This study aims to evaluate the implementation of village infrastructure development policies in Limau Sundai Village, Air Putih Sub-district, Batu Bara Regency. The evaluation focuses on planning and implementation processes, community participation, supporting and inhibiting factors, as well as policy outcomes and impacts on socio-economic conditions. A qualitative descriptive method was applied. Data were collected through in-depth interviews, participatory observation, and document study. The informants comprised village officials, the Village Consultative Body (BPD), the Activity Implementation Team (TPK), community leaders, and beneficiary residents. The data were analysed using the interactive model of Miles and Huberman, while the policy evaluation framework drew on William N. Dunn's six evaluation criteria and George C. Edwards III's policy implementation model. The findings indicate that the village infrastructure policy has been carried out in accordance with formal village procedures and has improved accessibility, mobility, and local economic activity. Several challenges remain. These include the limited technical capacity of implementers, the suboptimal community participation in monitoring and maintenance, and inequitable benefit distribution across hamlets. The study concludes that strengthening transparency, meaningful participation, quality control, and sustainable maintenance arrangements is essential to enhance the long-term effectiveness of village infrastructure policies.

Keywords: Policy Evaluation; Village Infrastructure Development; Village Fund; Community Participation; Public Welfare

INTRODUCTION

Village infrastructure development is a key driver in efforts to improve the welfare of rural communities. Infrastructure such as roads, bridges, drainage, social facilities, and public utilities serves more than just a physical purpose. It also opens up opportunities for local economic growth through smoother access to markets, basic services, and labor mobility. Previous research has shown that rural infrastructure development policies significantly contribute to poverty reduction and improved quality of life (Zam, 2025; Putri, Andiny, Safuridar, & Martahadi, 2024).

Since the enactment of Law Number 6 of 2014 concerning Villages, the central government, through the Village Fund program, has granted village governments greater authority and resources to design and implement infrastructure development according to local priorities. In the 2025 fiscal year, the national Village Fund allocation reached IDR 71 trillion (Ministry of Finance of the Republic of Indonesia, 2024). This policy framework positions villages no longer as administrative objects, but rather as strategic subjects in equitable development and improving the quality of life of rural communities (Wahyuni & Yulistiyono, 2021; Wildatul, 2025). Village planning documents, namely the Village Medium-Term Development Plan (RPJMDes), Village

Development Plan The Village Government Work Plan (RKPDDes) and the Village Revenue and Expenditure Budget (APBDes) serve as instruments for controlling development direction.

Although the regulatory framework provides ample scope, the implementation of village infrastructure development policies on the ground often does not fully align with policy intent. Various studies have noted recurring issues such as low citizen participation, weak budget transparency, inconsistent work quality, and the absence of a post-project maintenance system (Mahliani, Arifin, & Murjani, 2018; Sarah & Subadi, 2021; Timuneno, Rae, & Malut, 2024; Radhi, Maizuar, Wesli, Fithra, & Jalil, 2025). These issues demonstrate a gap between the formality of policy procedures and the substantive quality of development governance.

In academic contexts, public policy evaluation at the village level has received increasing attention in recent years. Recent studies have focused on combining William N. Dunn's evaluation framework with George C. Edwards III's implementation framework (Alfikri, Arnisyi, Azizah, Mawaddah, & Hakim, 2025; Nadila, 2023; Warman, Komariyah, & Kaltsum, 2023). This dual approach is considered relevant because it allows for policy analysis not only at the administrative output level, but also at the quality of the process and the sustainability of benefits. However, the application of this dual framework to case studies of villages in North Sumatra, particularly in the Batu Bara area, remains relatively limited.

Limau Sundai Village, Air Putih District, Batu Bara Regency, is one of the villages actively utilizing Village Funds for infrastructure development such as road repairs, drainage, and public facilities. Geographically, this village has agricultural and plantation potential, while also facing the challenge of unequal access to infrastructure. The results and impact of development implementation in this village also show variation in aspects of benefit equity, development quality, and level of community participation. This situation positions Limau Sundai Village as a relevant location for research, providing an empirical overview of how infrastructure development policies are planned, implemented, and evaluated at the village level.

Based on this background, this research aims to address four issues. First, to evaluate the planning and implementation process for infrastructure development policies in Limau Sundai Village. Second, to analyze the level of community participation in the policy cycle. Third, to identify supporting and inhibiting factors for implementation. Fourth, to examine the outcomes and impacts of the policies on the community's socioeconomic conditions. The novelty of this study lies in the structured application of Dunn and Edwards III's dual framework to interpret the implementation of village infrastructure development policies in North Sumatra.

RESEARCH METHODS

This study uses a qualitative approach with descriptive methods (Mulyana et al., 2024; Nurhayati, Apriyanto, Ahsan, & Hidayah, 2024). The qualitative approach was chosen because the study aims to deeply understand the process of implementing infrastructure development policies, map the perceptions of policy implementers and recipients, and explain the dynamics of implementation obstacles and successes that are difficult to capture through quantitative approaches. The research location was purposively selected in Limau Sundai Village, Air Putih District, Batu Bara Regency, North Sumatra Province, considering that this village actively implements infrastructure development programs through Village Funds and shows variations.

relevant results to be evaluated. The research area schematic is presented in Figure 1. The research was conducted from March to May 2026.

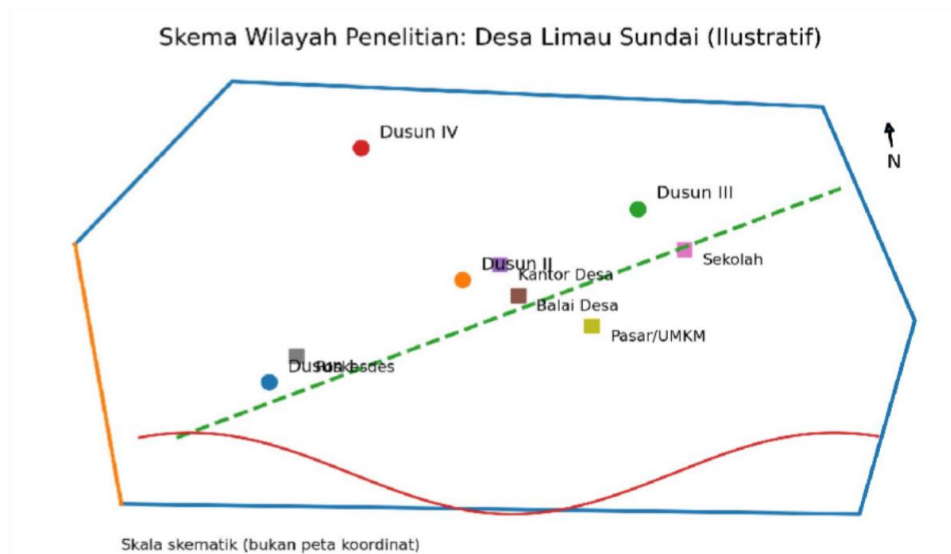


Figure 1. Scheme of the Limau Sundai Village area as a research locus (illustrative)

Informants were identified through purposive sampling and divided into two groups (Asrulla, Jailani, & Jeka, 2023). Primary informants included the Limau Sundai Village Head, Village Secretary, Head of the Village Consultative Body (BPD), Head of the Activity Implementation Team (TPK), and village officials actively involved in infrastructure development management. Supporting informants included community leaders, hamlet heads, and beneficiary residents, who provided a reflective perspective on policy implementation from the perspective of the beneficiaries. The composition of informants is presented in Table 1.

Table 1. Composition of Research Informants

No	Group / Position	Role in Research
1	Limau Sundai Village Head	Policy and development management authority holder
2	Village Secretary	Planning and reporting administration coordinator
3	BPD Chairperson	Supervisors and community representatives in village deliberations
4	TPK Chairperson	Technical implementer of infrastructure development activities
5	Community Leaders and Hamlet Heads	Provider of social perspective and hamlet dynamics
6	Beneficiary Residents	Assessor of the impact and benefits of policies

Source: Processed by researchers (2026).

Data collection was conducted using three complementary techniques (Sari, Aprisilia, & Fitriani, 2025): in-depth interviews, participant observation, and documentation studies. The documentation study included the RPJMDes, RKPDes, APBDes, development realization reports,

and village deliberation minutes. Data analysis was conducted using the Miles and Huberman interactive model, encompassing data reduction, data presentation, conclusion drawing, and verification. Data validity was maintained through source triangulation by comparing information between informants and documents.

The analytical framework combines two complementary models (Figure 2). First, William N. Dunn's six policy evaluation criteria—effectiveness, efficiency, adequacy, equity, responsiveness, and accuracy—serve as the basis for assessing outcomes. Second, George C. Edwards III's implementation model encompasses four factors: communication, resources, disposition, and bureaucratic structure. This framework serves as an explanatory process.



Gambar 2. Kerangka konsep penelitian: integrasi evaluasi Dunn dan implementasi Edwards III

RESULTS AND DISCUSSION

Overview and Policy Framework for Limau Sundai Village Infrastructure

Limau Sundai Village is located in an area with agricultural and plantation potential that requires supporting infrastructure such as roads, drainage, and public facilities. Infrastructure development policies in this village are mandated by the Village Law and are embodied in planning documents (RPJMDes and RKPDes) and budgeting (APBDes). The implementation mechanism involves the village government, BPD (Regional Development Planning Agency), TPK (Community Development Planning Team), and the community through a self-management model commonly applied to village infrastructure activities.

From a public policy perspective, policy quality is determined not only by adherence to document formats but also by the deliberation process that results in decisions, namely whether they accurately reflect community needs, local potential, and environmental risks (Widodo, 2021; Iriawan & Ilma'nun, 2024). In terms of design, village infrastructure development policies ideally include measurable objectives, clear targets for hamlets or beneficiary groups, output and outcome

indicators, a division of implementing roles, and a maintenance strategy. Maintenance elements are often overlooked in many cases, even though they determine the long-term sustainability of policy benefits. Table 2 presents a matrix of examples of the relationship between programs, objectives, outputs, and outcomes in the context of village infrastructure development.

Table 2. Matrix of Interrelationships between Programs, Objectives, Outputs, and Outcomes of Village Infrastructure Development

Programs/Activities	Policy Objectives	Output (Physical)	Outcome (Benefits)
Village road improvement	Improve mobility and economic access	Length of road sections repaired	Decreased transportation costs, increased market access
Drainage development	Reduce flooding and road damage	Drainage channels constructed	Reduced flooding, healthier environment
Clean water facilities	Expand access to clean water	Pipes, connections, and reservoirs	Reduced time collecting water, decreased risk of disease

Source: Researcher adaptation of village planning documents and literature references (2026).

Planning and Implementation Process

The planning stage serves as a bridge between problem identification and policy choices. In Limau Sundai Village, planning begins with identifying needs at the hamlet level through hamlet deliberations (*musyawarah*), then formulated in village deliberations (*musrenbangdes*) and village development planning (*musrenbangdes*), before being finalized in the Village Work Plan (*RKPD*) and Village Budget (*APBD*). Procedurally, this process complies with the provisions of the Village Law and the relevant Minister of Home Affairs Regulations.

However, planning quality is not solely determined by adherence to procedures. It is also determined by three substantive aspects. First, inclusiveness of participation, namely who is present and whose voice is heard in the deliberations. Second, the basis for determining priorities, whether they are based on data on needs, risks, and benefits. Third, document consistency, namely whether community proposals are actually reflected in the *RKPD* and Village Budget (*APBD*). Field findings indicate that participation in the planning stage is relatively good formally, although space for substantive deliberation remains limited. Some hamlet proposals not accommodated in the Village Budget are also not always accompanied by adequate feedback to residents.

Policy implementation aligns plans with on-the-ground conditions. The chosen self-management model allows for the utilization of local labor while simultaneously responding quickly to village needs. This model requires disciplined quality control regarding material specifications, accurate work volumes, and work safety procedures. When quality control is weak,

physical results are at risk of rapid deterioration, which in turn reduces the effectiveness and adequacy of policies.

Implementation supervision is divided into administrative and technical supervision. Administrative supervision includes ensuring the orderliness of documents such as purchase orders (SPJ), daily reports, and proof of purchase. Technical supervision includes checking work quality, such as concrete thickness, material density, and drainage slopes. In Limau Sundai Village, administrative supervision proceeded fairly orderly due to the support of formal documentation. Technical supervision tended to rely on the experience of individual implementers in the field and was not yet supported by standardized work quality standards.

Community participation was evident at the planning stage, through attendance at deliberations, and during the implementation stage through mutual cooperation (gotong royong). However, participation at the monitoring and maintenance stages tended to be weak, especially when technical and budget information was not presented in an easily understood manner or when residents lacked secure and formal feedback channels. This finding is in line with Deni, Ardiyanto, Sinyo, Mawar, and Andriyani (2025) who emphasized that the quality of public services in villages requires meaningful participation space, not just procedural.

Policy Evaluation Based on William N. Dunn's Criteria

A synthesis of the assessments against William N. Dunn's six criteria is presented in Figure 3. This visualization shows the relative position of each indicator in the context of Limau Sundai Village. Scores were obtained through triangulation between key informant assessments, documentary evidence, and field observations.

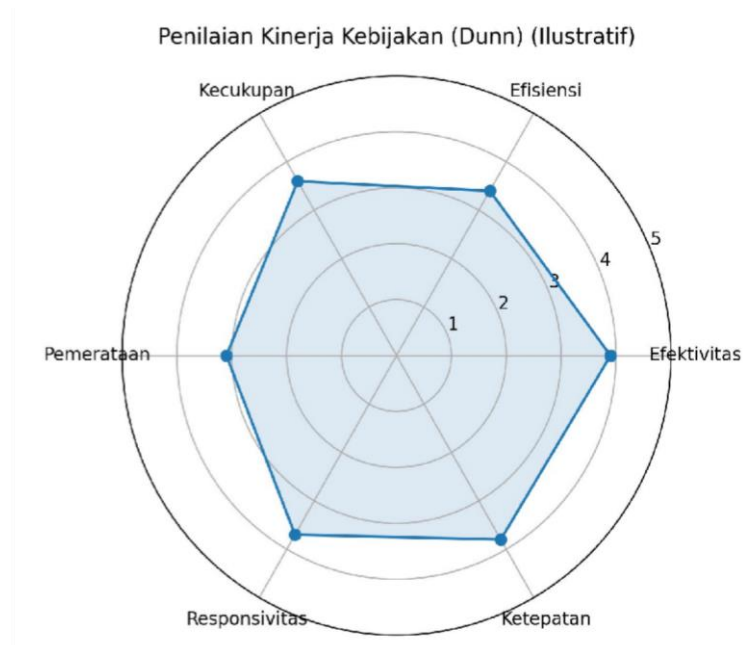


Figure 3. William N. Dunn's evaluation indicator assessment radar on the infrastructure development policy of Limau Sundai VillageEfektivitas.

Infrastructure development policies have demonstrated sufficient effectiveness in achieving physical outputs such as repaired roads, constructed drainage systems, and provided public

facilities. However, the effectiveness of achieving outcomes (socioeconomic changes perceived by residents) varies across hamlets, primarily due to varying levels of utilization and quality of maintenance.

Efficiency. Budget efficiency is quite good, as seen from the ratio of costs to physical output. More substantive efficiency indicators, namely conformity to material specifications, accuracy of work volumes, and administrative order, still require strengthening of quality control SOPs to prevent waste due to premature damage.

Adequacy. Adequacy assesses whether policy outcomes address the underlying problem. Road repairs on one section may be effective for that point but may not be sufficient to close access for residents on other sections. Therefore, adequacy is often directly related to budget constraints and dispersed needs.

Equity. Equity is an indicator that requires special attention. The distribution of project locations across hamlets and access to infrastructure benefits by vulnerable groups remains variable. Some hamlets benefit more quickly, while others wait for priority. Consequently, perceptions of unfairness arise.

Responsiveness. Policy responsiveness to community aspirations is evident in the handling of complaints and adjustments to activities when urgent conditions arise. The village government is quite open, although formal complaint handling mechanisms are not yet fully standardized.

Accuracy. Accuracy assesses the alignment of policies with priority needs and community values. In the infrastructure context, accuracy relates to whether a project is truly necessary and produces tangible benefits, rather than simply being a "physical project." The use of transparent priority criteria, taking into account economic access, risk mitigation, and the provision of basic services, helps prevent decisions that simply follow elite preferences or pressure from certain groups.

A synthesis of the six criteria indicates that Limau Sundai Village's infrastructure development policy is relatively strong in terms of output effectiveness and efficiency. Strengthening is needed to ensure equitable, adequacy, and appropriate distribution of benefits between hamlets.

Implementation Factors: Edwards III Analysis

Communication that supports implementation is characterized by clear socialization, the dissemination of budget information and work schedules, and active coordination channels between the village government, the Village Consultative Body (BPD), the Community Empowerment and Development Team (TPK), and residents. Good communication reduces rumors while increasing trust, which in turn strengthens participation (Machieu, 2023). Resources include budgets, equipment availability, and human resource capacity. Resource support is not just about the amount of funds. The ability to manage administration, develop work plans, and conduct quality control is also an integral part of resources. Technical assistance from the sub-district and district levels can be a factor in strengthening resources.

Disposition refers to the attitude and commitment of implementers. The leadership of the village head and the integrity of the TPK influence the consistency of implementation, administrative order, and responsiveness to community input. A good disposition is reflected in openness to

correction, not simply the ability to complete work. A simple but clear bureaucratic structure facilitates program control. Conversely, an unclear structure leads to overlapping roles, delayed decisions, and accountability difficulties.

Barriers, Outcomes, and Policy Impacts

Implementation barriers arise from three main areas. The first is institutional capacity, evident in limited technical human resources, administrative discipline, and minimal work quality standards. Consequently, reliance on individual experience is high. The second area is socio-political dynamics, including competing interests between groups and perceptions of injustice between hamlets. The third area is geographic and environmental conditions, such as seasonal flooding and land contours, which affect infrastructure resilience if not integrated into the technical design.

A frequently overlooked obstacle is post-project maintenance. When there is no clear division of roles and funding sources for maintenance, infrastructure becomes a "common good" without clear responsibilities. This phenomenon can be explained from a governance perspective, namely that policies require rules to ensure the sustainability of benefits. Research by Zalsa, Nurdin, and Nuklirullah (2022) and Radhi et al. (2025) confirms that the quality of Village Allocation Fund (ADD) infrastructure development is significantly influenced by maintenance and quality control systems.

In terms of outcomes and impacts, policies result in increased accessibility, resulting in shorter travel times and lower transportation costs, and support for local economic activity through the smoother transportation of agricultural and plantation products. On the social side, improved access facilitates access to schools, health services, and administrative centers. Environmental impacts are also observed, particularly the reduction of waterlogging at improved drainage points. However, the sustainability of these impacts depends heavily on maintenance management. Without a maintenance system, infrastructure will deteriorate, and its socio-economic benefits will be eroded.

CLOSING

Conclusion

Infrastructure development policies in Limau Sundai Village have essentially followed formal village procedures through deliberations, the Village Work Plan (RKPDs), and the Village Budget (APBDes), and have had a positive impact on accessibility, mobility, and local economic support. However, the quality of the policies varies in terms of benefit equity, adequacy, and sustainability. Based on Dunn's criteria, the policies are strong in terms of output effectiveness and efficiency, but require strengthening in terms of equity and accuracy. Based on the Edwards III framework, the main obstacles stem from the limited technical capacity of implementers and the lack of established SOPs for post-project maintenance. Implementer communication and disposition are relatively supportive of implementation.

Recommendations

The village government needs to develop clear development priority criteria that consider economic benefits, environmental risks, and basic services. They should be published during deliberations, provide a summary of the Village Budget (APBDes) and work progress openly, and establish SOPs for quality control and documentation. The Village Consultative Body (BPD) needs to strengthen its oversight function through a monitoring schedule and regular evaluation forums. The Community Development Team (TPK) needs to implement simple quality checklists (materials, volume, finish) and step-by-step documentation. The community should be encouraged to increase participation in oversight and maintenance, including fair and transparent maintenance contribution agreements. Sub-district and district governments need to provide ongoing technical assistance and training in activity management. Further research is recommended, including simple technical audits of the physical quality of the work and comparative studies of several villages to strengthen analytical generalizations.

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