Equivalent: Jurnal Ilmiah Sosial Teknik
Volume 8, Issue 5, 1954-1963
e_ISSN: 2775-0833
https://jurnalequivalent.id/index.php/jequi/index
DOI: doi.org/10.59261/jequi.v8i5.468

Community Participation in the Development of Transportation Infrastructure: The Mandomai Suspension Bridge in Saka Mangkahai Village, Kapuas Regency

Ina Elvina* Universitas Palangka Raya, Indonesia
Murniati Universitas Palangka Raya, Indonesia
Devia Universitas Palangka Raya, Indonesia

***Corresponding author:**
Ina Elvina, Universitas Palangka Raya, Indonesia.
✉ inaelvina@eng.upr.ac.id

Article Info:
***Article history*:**
Received: September 15, 2026
Revised: October 15, 2026
Accepted: October 16, 2026
Available Online: October 24, 2026

***Keywords*:**
Community Participation;
Mandomai Suspension Bridge;
Poverty Alleviation;

This is an open access article under the CC BY-SA license.

Copyright © 2026 by Author. Published by Politeknik Siber Cerdika International

Abstract

Background: The reconstruction of the historic Mandomai Suspension Bridge presents an opportunity to examine community participation in rural transportation infrastructure and potential livelihood benefits.
Objective: This study examines forms of community participation, perceived accessibility and economic opportunities, and a context-specific empowerment model.
Methods: A descriptive qualitative single-case study was conducted in West Kapuas, Central Kalimantan, involving eight informants. Interviews, focus group discussions, observation, documentation, and questionnaires informed qualitative analysis through data reduction, display, and verification.
Results: Community participation involved labor, local knowledge, ideas, and collaboration with SMK GKE Mandomai and its alumni. Seven informants perceived fewer poor households, although no official before-and-after poverty data were available. Five reported additional income associated with construction or related activities; three did not. Informants also described improved access and economic opportunities, but these outcomes were not independently quantified. A five-stage empowerment model was developed, covering participatory planning, capacity building, collaborative implementation, joint use and maintenance, and participatory monitoring.
Conclusion: The case illustrates how community and vocational-school participation may support infrastructure ownership, local capabilities, and perceived opportunities. Causal poverty reduction cannot be concluded from the available evidence.

To cite this article: Elvina, I., Murniati, & Devia. (2026). Community participation in the development of transportation infrastructure: The Mandomai Suspension Bridge in Saka Mangkahai Village, Kapuas Regency. *Equivalent: Jurnal Ilmiah Sosial Teknik, 8*(5), 1954-1963. https://doi.org/10.59261/jequi.v8i5.468

INTRODUCTION

Transportation infrastructure is essential to rural connectivity because physical access can influence residents' opportunities to reach markets, schools, health services, and employment (Cavalieri & Santangelo, 2026; Kaiser & Barstow, 2022). In remote and riverine communities, inadequate connections can intensify socioeconomic vulnerability, although infrastructure provision alone does not establish poverty reduction. Research has associated infrastructure development with economic opportunities and lower access barriers (Chotia & Rao, 2017). In Indonesia, the Ministry of Public Works and Housing reported the construction of 558 suspension bridges during 2015–2023 to improve rural connections (Kementerian PUPR, 2023). However, infrastructure outcomes also depend on the quality of community engagement in planning,

implementation, and subsequent management (Akbar et al., 2020; Gupta & Gupta, 2023). Village development funding alone may be insufficient to address poverty where participation and oversight remain weak (Arham & Hatu, 2020).

These concerns are particularly relevant in West Kapuas District, Kapuas Regency, Central Kalimantan, where rivers shape access between settlements. The Mandomai Suspension Bridge connects Saka Mangkahai Village and Mandomai Sub-district across the mouth of the Anjir Kalampan River, providing an important local transportation link. The Central Bureau of Statistics reported a poverty rate of 5.11% for Kapuas Regency in March 2023 (Badan Pusat Statistik Kabupaten Kapuas, 2023). This regency-level statistic describes the wider context; it cannot establish poverty prevalence in Saka Mangkahai Village or a causal relationship between the bridge and household poverty. The research problem is therefore not whether bridge reconstruction has demonstrably reduced poverty, but how residents participate in rebuilding the bridge, what opportunities they perceive, and how local participation may support longer-term use and maintenance.

The Mandomai Suspension Bridge also has historical and cultural significance. Originally constructed in the mid-1970s by Swiss architect Heinz Frick with students of STM GKE Mandomai, the bridge used a distinctive bowstring design and ulin wood. Following deterioration and demolition in February 2021, reconstruction activities commenced with first pile driving on August 10, 2024, retaining the original design approach and involving the local vocational-school community. Consequently, this case combines physical connectivity, preservation of local architectural heritage, and opportunities for community-based technical participation. As illustrated in Figure 1, residents contributed labor during construction. The photograph documents one form of involvement; it does not by itself indicate the extent of participation across all project stages or demonstrate economic outcomes.



Figure 1. Community participation as labor in the Construction of the Mandomai Suspension Bridge

Relevant research provides a foundation for examining these issues. Cohen & Uphoff (1980) distinguish participation across stages of rural development, while Arnstein (1969) draws attention to differences in the degree of community influence over decisions. Studies in rural Indonesia emphasize participatory planning and stakeholder collaboration as conditions relevant to sustainable development (Sari et al., 2024). Research on post-disaster reconstruction similarly identifies the importance of beneficiary involvement in implementation and decision-making (Mushtaha et al., 2025; Ngulube et al., 2024; Sadiqi et al., 2017; Siriwardhana & Kulatunga, 2023). Joshi et al. (2021) further show the relevance of participatory approaches to cultural heritage reconstruction. Meanwhile, Nguyen & Rieger (2017) caution that community-driven projects do not necessarily generate uniform social outcomes. These studies indicate that participation

should be examined as a process rather than assumed to produce welfare gains automatically.

The urgency of this study arises from the practical need to understand community participation in a historic rural bridge reconstruction where transport access, technical skills, and heritage preservation intersect. Prior studies discussed above address rural planning, general infrastructure, reconstruction, or community-driven development, but do not directly examine the specific collaboration among residents, government, construction actors, and the vocational-school network in the Mandomai case. The contribution of this study lies in analyzing that case-specific intersection, particularly the involvement of SMK GKE Mandomai and its alumni as sources of technical competence and institutional memory. This is a contextual contribution rather than a claim that no comparable participatory reconstruction has previously been studied. A collaborative perspective also helps describe the complementary stakeholder roles without presuming the existence of a formally established triple-helix structure (Etzkowitz & Zhou, 2017).

Accordingly, this study has two objectives: first, to describe the forms of community participation in reconstructing the Mandomai Suspension Bridge and informants' perceptions of accessibility and economic opportunities; and second, to formulate a case-derived participatory community empowerment model for rural infrastructure development. The study focuses on participation and perceived opportunities relevant to SDG 1 rather than testing changes in poverty rates (United Nations, 2020). Its expected benefits are to inform community capacity-building, improve coordination among government, residents, contractors, and vocational education actors, and identify ways to strengthen collective responsibility for bridge use and maintenance. Theoretical implications concern the interpretation of participation as a combination of labor, knowledge sharing, deliberation, and institutional collaboration. Practical implications concern locally appropriate planning, technical assistance, maintenance education, and participatory monitoring. Given the single-case qualitative design, the proposed model should be understood as a framework for adaptation and further evaluation rather than evidence of generalizable or causally verified poverty alleviation.

METHOD

The research was conducted in West Kapuas District, specifically in Mandomai Sub-district and Saka Mangkahai Village, Kapuas Regency, Central Kalimantan. The research was carried out in April-June 2026. The available material does not independently establish the bridge's exact operational status during data collection; therefore, statements concerning post-construction benefits are treated as informant accounts rather than verified before-and-after observations.

Eight informants were selected because they were community leaders, teachers of SMK GKE Mandomai, or residents near the Mandomai Suspension Bridge with relevant knowledge of the project. The available records do not specify the distribution across these categories or a formally documented sampling protocol; accordingly, no subgroup counts or definitive sampling procedure are asserted.



Figure 2. FGD activity at SMK GKE Mandomai

This study adopts a descriptive qualitative, single-case approach to examine community participation in the reconstruction of the Mandomai Suspension Bridge. The case is examined through accounts of involvement in deliberation, proposing ideas, implementation, infrastructure use, and maintenance. The inquiry explores informants' perspectives and supporting materials rather than estimating population-level effects or demonstrating causal poverty reduction.

Data collection included semi-structured interviews, direct observation, documentation, and questionnaires. Interviews explored experiences of participation, perceived benefits, constraints, and the roles of the community, school, and other stakeholders. Observation focused on the bridge setting and observable community activities; documents provided contextual information about construction, while questionnaires captured expressed views. The available manuscript does not provide the full instruments or item-level responses, so their content is not reconstructed here.

Documentation was used as supporting data in the form of activity photos, bridge conditions, minutes of meetings, and documents and archives related to the bridge construction. Meanwhile, open and closed questionnaires were used to obtain a broader picture of the community's views on their involvement in the bridge construction. The use of several of these techniques allowed the researcher to obtain information from various perspectives and compare findings obtained in the field.

The qualitative analysis followed data reduction, data display, and conclusion drawing and verification. Material from interviews, observation, documents, and questionnaires was organized under the analytical topics of participation, perceived accessibility and economic benefits, institutional roles, constraints, and proposed model components. These are reported as interpretive categories; the manuscript does not document a software-generated coding trail or permit claims about coding reliability.

The next stage was conclusion drawing and verification. Conclusions were not immediately determined based on a single source of information but were re-examined by comparing statements between informants and interview results with observation and documentation. This process was carried out through source and technique triangulation to increase data credibility. The results of the analysis then became the basis for understanding patterns of community participation and formulating a more participatory community empowerment model that can support the sustainability of the construction and maintenance of the Mandomai Suspension Bridge. The study does not report documented ethics-committee approval or the form of participant consent; these should not be presumed. Interview and FGD material is therefore summarized without disclosing identifiable personal testimony.

RESULTS AND DISCUSSION

Results

The Influence of Community Participation on Poverty Alleviation Efforts

Among eight informants, seven expressed the perception that the number of poor families had decreased, whereas one could not confirm this. These responses are perceptions rather than official village-level poverty statistics, and the study provides no comparable poverty measurements before and after the bridge works. Consequently, a reduction in poverty cannot be established from these interviews.

Five of the eight informants reported additional income associated with construction work or activities around improved access, whereas three reported no direct additional income. Reported sources included construction labor, contracting-related activities, and trading. Income amounts, precise periods, and independently documented changes were not supplied; the accounts should therefore not be interpreted as measured income gains for the wider population.

Interestingly, all informants shared the same view that community participation plays an important role in supporting poverty reduction. This shows that the community does not only interpret participation as involvement in physical work but also as a form of care, responsibility, and cooperation in realizing development that benefits all residents. The spirit of gotong royong (mutual assistance) that emerged during the construction process became social capital that strengthened the success of the village development program.

Informants described improved access to commercial areas, schools, health services, and other public facilities, along with perceived opportunities for trade and mobility. The study did not record comparative travel times, transport expenditures, or quantified changes in service access. These benefits are therefore presented as qualitative accounts rather than measured effects.

The interviews suggest a possible pathway linking participation, bridge development, access, and economic opportunities. However, the study design does not test this sequence causally or isolate the bridge's effects from other influences on local livelihoods.

This finding is in line with Chotia & Rao (2017), who state that transportation infrastructure development is able to expand community access to markets, employment, education, and public services, thus contributing to improving community welfare. Good infrastructure is also able to reduce transportation costs, increase local economic productivity, and strengthen more inclusive economic growth.

In addition, the research results also support the concept of participatory development that places the community as the main actor in development (Sari et al., 2024). Community involvement from the planning stage to implementation not only improves the quality of development but also fosters a sense of ownership of the development outcomes so that the community is encouraged to maintain and preserve the infrastructure sustainably. This kind of approach is considered capable of producing greater social value and supporting the achievement of sustainable development goals.

Taken together, these accounts suggest that participatory reconstruction may be relevant to the accessibility and economic-opportunity dimensions associated with SDG 1. They do not demonstrate that the project has reduced poverty or that benefits have been distributed evenly across households. Table 1 summarizes the analytical categories inferred from the accounts and the project context; it does not represent a separately validated causal model.

Table 1

Analysis of Community Participation in the Construction of the Mandomai Suspension Bridge

Model Component	Findings in the Analysis Map
Participatory Planning	Development deliberations, awareness of development, care for the village
Capacity Building	Involvement of teachers, students, alumni, educational institutions, as well as knowledge and technical skills
Collaborative Implementation	Kapuas Regency Government, contractors, craftsmen, technical personnel, community, alumni and SMK GKE Mandomai institution
Joint Utilization &	Community participation in maintenance, use according to function,

Maintenance	hope for community involvement in maintenance
Monitoring & Evaluation	Monitoring of bridge condition, bridge use, identification of damage and repair needs
Impact	Increased mobility, reduced transportation costs, easier access to markets/schools, additional income, new business opportunities

Impact and sustainability of activities

The model designed in this research shows that community empowerment does not stop at involving the community as labor during the construction process. Empowerment must take place sustainably through capacity building, institutional strengthening, collaboration between stakeholders, and the growth of a shared sense of responsibility for the infrastructure that has been built. With this approach, infrastructure development not only produces physical assets but also strengthens community capacity, improves welfare, and supports the sustainability of village development.

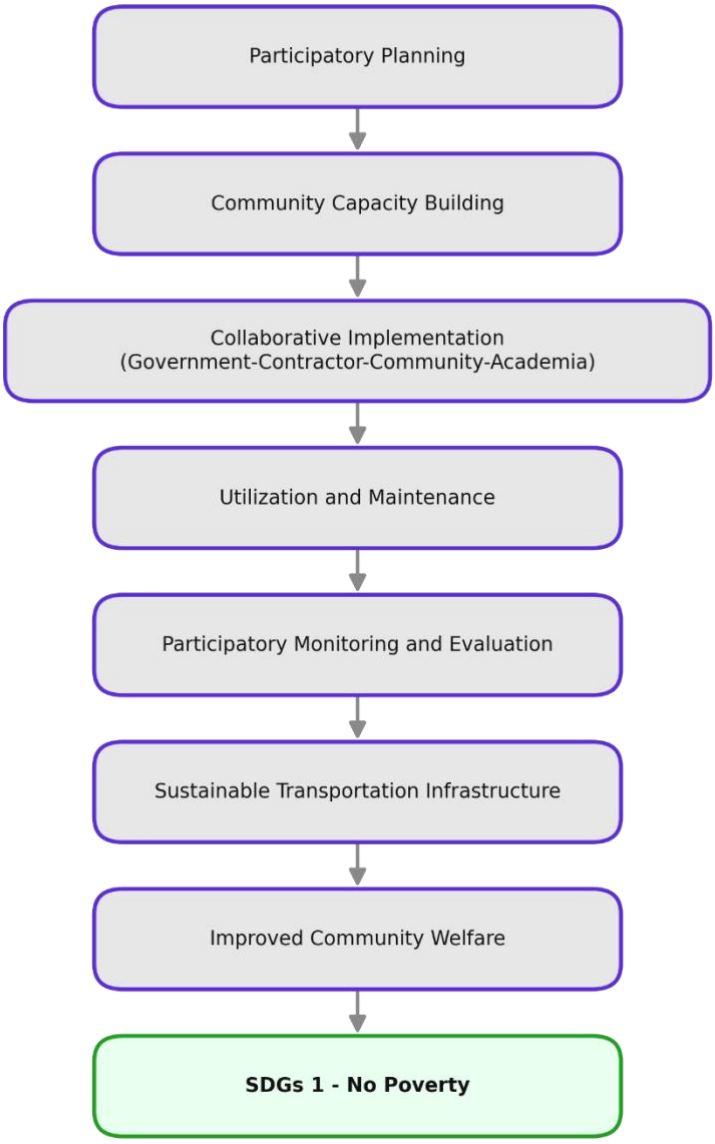


Figure 3. Conceptual Model Chart of Community Participation

This model not only describes the construction process of the Mandomai Suspension Bridge but provides a case-derived conceptual framework that may be explored, adapted, and evaluated in other rural infrastructure settings that prioritize community empowerment and

sustainable development. This approach is also in line with the community capitals framework, which emphasizes that infrastructure resilience is built from the interaction of social, human, and institutional capital, not merely physical capital (Daniel et al., 2022).

One important finding in this research is the significant contribution of educational institutions, particularly SMK GKE Mandomai, in encouraging community participation in the reconstruction of the Mandomai Suspension Bridge. Unlike infrastructure development in general, which is dominated by government and contractors, the construction of this bridge shows that educational institutions can be a bridge between technical knowledge, historical values, and community empowerment.

Based on the results of the Focus Group Discussion (FGD), the involvement of SMK GKE Mandomai is not only symbolic as a school that has a history with the bridge construction in the mid-1970s but is also realized through the involvement of alumni who have competencies in wood construction. Alumni act as implementing contractors, experts, field supervisors, and technical personnel who work on the assembly of the bridge frame. This condition shows that competencies acquired through vocational education can be implemented concretely to answer development needs in their own region, in line with the principle of link and match between vocational education and the business and industrial world, which emphasizes the importance of school collaboration with work partners in the field so that graduate competencies are relevant to real needs (Irwanto, 2021).

Discussion

In addition to providing competent human resources, SMK GKE Mandomai also acts as a knowledge keeper regarding the history, construction methods, and philosophy of the Mandomai Suspension Bridge. The teachers, principal, and alumni become important sources of information regarding the ulin wood bridge construction techniques, the reasons for maintaining the original architectural form, and the maintenance experience passed down by the previous bridge designer. This knowledge transfer becomes capital that is not possessed by the general public or contractors who have no historical connection to the bridge.

The case may be read through a collaborative governance perspective: the regional government is described as supporting policy and project implementation, contractors and technical personnel contribute construction expertise, residents provide local knowledge and participation, and SMK GKE Mandomai and its alumni contribute vocational skills and institutional memory. These complementary roles illustrate collaboration in this particular reconstruction; the available evidence does not measure the relative contribution of each actor or establish that a formal triple-helix governance arrangement operated.

The role of academics in this research also goes beyond the function of formal education. SMK GKE Mandomai becomes a center for community capacity building through the dissemination of knowledge regarding the use and maintenance of the bridge. The principal and teachers actively educate students and the community to use the bridge according to its function, not to cross the specified load limit, and to foster a sense of responsibility for public facilities. These efforts are a form of community education that supports infrastructure sustainability.

This finding shows that the existence of vocational education institutions in the regions has great potential as agents of development. Schools not only produce graduates ready to work but are also able to become centers of innovation, preservation of local knowledge, and drivers of community participation. By utilizing alumni networks that have professional competencies, infrastructure development can more easily accommodate community needs while maintaining local characteristics that are the identity of the region.

Therefore, the community empowerment model designed in this research places academics, especially SMK GKE Mandomai and its alumni, as one of the main actors in participatory infrastructure development. This role includes community capacity building, provision of experts, knowledge transfer, technical assistance, maintenance education, and facilitation of collaboration between government and community. The involvement of academics like this is worthy of replication in other infrastructure projects, especially in areas that have strong local resource potential and historical value.

In this case, SMK GKE Mandomai does not only function as an educational institution but

develops into a community knowledge center, namely a center of knowledge and community empowerment. In the context of your research, the position of academics is not merely a complement but a strategic actor that connects technical competence, cultural heritage preservation, and participatory development towards sustainable infrastructure.

This study is limited by its focus on a single bridge and a small sample of eight informants. The group discussions may also have been influenced by conformity, while the lack of verified before-and-after data on poverty, income, and transportation indicators limits causal interpretation and the transferability of the proposed model.

CONCLUSION

The reconstruction of the Mandomai Suspension Bridge illustrates community participation through labor, local knowledge and ideas, and collaboration among residents, technical practitioners, and SMK GKE Mandomai alumni. Interview findings indicate perceived improvements in access to services and economic opportunities, with five of eight informants reporting additional income related to construction or associated activities and seven perceiving a reduction in poor households. However, these perceptions were not supported by verified before-and-after data, limiting conclusions about the bridge's direct impact on poverty alleviation. The study proposes a five-stage participatory empowerment model comprising participatory planning, community capacity building, collaborative construction implementation, joint utilization and maintenance, and participatory monitoring and evaluation. The involvement of SMK GKE Mandomai and its alumni highlights the importance of technical skills, institutional memory, and preservation of historical value in supporting community participation. Nevertheless, the model requires adaptation and further evaluation in other contexts. Future studies should involve a broader range of participants and use longitudinal data to assess changes in access, income, and poverty levels.

The Kapuas Regency Government and village and sub-district governments are encouraged to strengthen participatory infrastructure development by involving communities in planning, implementation, and maintenance. Sustainable maintenance mechanisms should also be established through adequate budget allocation, the formation of infrastructure maintenance groups, and improved interagency coordination to extend infrastructure service life. Meanwhile, SMK GKE Mandomai and its alumni are encouraged to continue contributing technical knowledge and assistance to community-based infrastructure development through training, maintenance education, and collaboration with government institutions and local communities. These efforts can strengthen knowledge transfer, improve community capacity, and support more sustainable regional development.

ACKNOWLEDGEMENT

The authors acknowledge the contributions of the community members and other informants whose perspectives informed this study of the Mandomai Suspension Bridge reconstruction. The study also recognizes the local knowledge and vocational expertise associated with SMK GKE Mandomai and its alumni, as discussed in the research.

AUTHOR CONTRIBUTION STATEMENT

Ina Elvina, Murniati, and Devia are credited collectively for the scholarly work presented in this manuscript, including the study's analysis, interpretation, and preparation of the article.

REFERENCES

Akbar, A., Flacke, J., Martinez, J., & van Maarseveen, M. F. A. M. (2020). Participatory planning practice in rural Indonesia: A sustainable development goals-based evaluation. *Community Development*, *51*(3), 243–260. https://doi.org/10.1080/15575330.2020.1765822

Arham, M. A., & Hatu, R. (2020). Does Village Fund Transfer Address the Issue of Inequality and Poverty? A Lesson from Indonesia. *The Journal of Asian Finance, Economics and Business*, *7*(10), 433–442. https://doi.org/10.13106/jafeb.2020.vol7.no10.433

Arnstein, S. R. (1969). A Ladder Of Citizen Participation. *Journal of the American Institute of Planners*, *35*(4), 216–224. https://doi.org/10.1080/01944366908977225

Badan Pusat Statistik Kabupaten Kapuas. (2023). Maret 2023: Persentase Penduduk Miskin Maret 2023 sebesar 5,11 Persen. https://kapuaskab.bps.go.id/id/pressrelease/2023/07/17/1260/maret-2023--persentase-penduduk-miskin-maret-2023-sebesar-5-11-persen.html [Accessed 27 Jun. 2025].

Cavalieri, B., & Santangelo, A. (2026). Access to Essential Services in Rural Europe: A Systematic Review for Fostering Sustainable Rural Development. In *Sustainability (Switzerland)* (Vol. 18, Number 15). https://doi.org/10.3390/su18157714

Chotia, V., & Rao, N. V. M. (2017). An empirical investigation of the link between infrastructure development and poverty reduction. *International Journal of Social Economics*, *44*(12), 1906–1918. https://doi.org/10.1108/IJSE-06-2016-0154

Cohen, J. M., & Uphoff, N. T. (1980). Participation's place in rural development: Seeking clarity through specificity. *World Development*, *8*(3), 213–235. https://doi.org/10.1016/0305-750X(80)90011-X

Daniel, L., Mazumder, R. K., Enderami, S. A., Sutley, E. J., & Lequesne, R. D. (2022). Community Capitals Framework for Linking Buildings and Organizations for Enhancing Community Resilience through the Built Environment. *Journal of Infrastructure Systems*, *28*(1). https://doi.org/10.1061/(ASCE)IS.1943-555X.0000668

Etzkowitz, H., & Zhou, C. (2017). The triple helix: University-industry-government innovation and entrepreneurship. In *The Triple Helix: University-Industry-Government Innovation and Entrepreneurship*. https://doi.org/10.4324/9781315620183

Gupta, M. C., & Gupta, S. (2023). Strengthening community-led development of adaptive pathways to rural resilient infrastructure in Asia and the Pacific. *Sustainable and Resilient Infrastructure*, *8*(sup1), 133–142. https://doi.org/10.1080/23789689.2022.2134644

Irwanto. (2021). Link and Match Pendidikan Kejuruan Dengan Dunia Usaha dan Industri di Indonesia. *Jurnal Inovasi Penelitian*, *2*(2).

Joshi, R., Tamrakar, A., & Magaiya, B. (2021). Community-based participatory approach in cultural heritage reconstruction: A case study of Kasthamandap. *Progress in Disaster Science*, *10*. https://doi.org/10.1016/j.pdisas.2021.100153

Kaiser, N., & Barstow, C. K. (2022). Rural Transportation Infrastructure in Low-and Middle-Income Countries: A Review of Impacts, Implications, and Interventions. In *Sustainability (Switzerland)* (Vol. 14, Number 4). https://doi.org/10.3390/su14042149

Kementerian Pekerjaan Umum dan Perumahan Rakyat. (2023). Kementerian PUPR Bangun 558 Jembatan Gantung Sepanjang 2015–2023. [online] detikFinance. Available at: https://finance.detik.com/infrastruktur/d-6997844/kementerian-pupr-bangun-558-jembatan-gantung-sepanjang-2015-2023 [Accessed 27 Jun. 2025].

Mushtaha, A. W., Alaloul, W. S., Baarimah, A. O., Musarat, M. A., Alzubi, K. M., & Khan, A. M. (2025). A decision-making framework for prioritizing reconstruction projects in post-disaster recovery. *Results in Engineering*, *25*. https://doi.org/10.1016/j.rineng.2024.103693

Ngulube, N. K., Tatano, H., & Samaddar, S. (2024). Toward participatory participation: A community perspective on effective engagement in post-disaster recovery and reconstruction. *Community Development*, *55*(6). https://doi.org/10.1080/15575330.2024.2382169

Nguyen, T. C., & Rieger, M. (2017). Community-Driven Development and Social Capital: Evidence from Morocco. *World Development*, *91*, 28–52. https://doi.org/10.1016/j.worlddev.2016.10.013

Sadiqi, Z., Trigunarsyah, B., & Coffey, V. (2017). A framework for community participation in post-disaster housing reconstruction projects: A case of Afghanistan. *International Journal of Project Management*, *35*(5). https://doi.org/10.1016/j.ijproman.2016.11.008

Sari, N., Parawu, H. E., & Taufik, A. (2024). Strategi Meningkatkan Partisipasi Masyarakat dalam Pembangunan Desa yang Berkelanjutan. *Kolaborasi : Jurnal Administrasi Publik*, *10*(2), 107–121. https://doi.org/10.26618/kjap.v10i2.15459

Siriwardhana, S. D., & Kulatunga, U. (2023). Evolution of post-disaster reconstruction policy framework in Sri Lanka: A longitudinal case study. *International Journal of Disaster Risk Reduction*, *85*. https://doi.org/10.1016/j.ijdrr.2022.103506

United Nations, 2020. The Sustainable Development Goals Report 2020. New York: United Nations
and focus, the appendix should not exceed three pages in length.