

Role of Village Government in Combating Illegal Gold Mining (PETI) at the Batang Teso Irrigation Dam, Marsawa Village, Riau

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ABSTRACT

Illegal gold mining without a permit (PETI) at the Batang Teso Irrigation Dam in Marsawa Village, Kuantan Singingi Regency, Riau Province, has become a serious environmental and social issue due to its destructive impacts and lack of government supervision. The activity not only causes water pollution and ecosystem degradation but also endangers the health and safety of local communities. This research aims to analyze the role and involvement of the village government in mitigating illegal gold mining activities and to identify the collaborative strategies employed to control and prevent PETI in the Batang Teso area. Using a qualitative research approach combined with a literature review and case study method, data were collected through interviews with village officials, security forces, local communities, and related institutions, as well as through document analysis and field observations. The findings indicate that illegal mining has led to severe water contamination caused by mercury waste, the destruction of the irrigation system, and the decline of Batang Teso's function as a community tourism site. Mitigation efforts have been conducted through cooperation between the village government, the Kuantan Singingi Police (Polres Kuansing), the Indonesian National Armed Forces (TNI), and the Department of Environment. These efforts include strict enforcement actions, socialization programs, public education, and community empowerment to promote alternative livelihoods that are environmentally sustainable. The study concludes that strong synergy between the village government, law enforcement agencies, and the community plays a crucial role in reducing illegal mining activities. Continuous supervision, legal enforcement, and sustainable livelihood programs are essential to protect both the environment and public health around the Batang Teso Irrigation Dam.

Keyword: Role, Village Government, Illegal Gold Mining



INTRODUCTION

Unlicensed gold mining (PETI) is an illegal activity that generates multidimensional impacts on the environment, society, and local economy. Across Indonesia, including Kuantan Singingi Regency, PETI has caused severe environmental degradation, water pollution, and ecological imbalance in river systems. The Batang Teso Irrigation Dam in Marsawa Village represents a clear example of this damage. Once a clean and productive water source, it is

now contaminated with mercury waste, posing serious threats to public health and local economic sustainability (Bouty et al., 2022; Douw et al., 2021; Melian et al., 2024).

The PETI problem at Batang Teso extends beyond environmental issues it reflects weak resource governance and ineffective local oversight. Mining activities are conducted without regard to legal frameworks or environmental preservation principles. As emphasized the lack of law enforcement and overlapping authorities exacerbate the problem (Prianto et al., 2019). Therefore, this study's urgency lies in understanding how village governments play an active role in mitigating and restoring the impacts of PETI through collaboration with communities and law enforcement agencies (Niwele et al., 2022).

The urgency of addressing PETI grows as its activities threaten the sustainability of the irrigation dam, which supports agricultural production and local livelihoods. Beyond disrupting agriculture, mining waste has degraded water quality and aquatic biodiversity (Anjami & Nurhamlin, 2017; Damar et al., 2022). This condition highlights that sustainable rural development cannot be separated from sound environmental governance. As the closest level of government to the people, village administrations hold a key responsibility to preserve ecological balance through supervision and community empowerment (Firman, 2017).

Previous studies have shown that local governments often struggle to enforce laws against PETI offenders. Limited inter-agency coordination and insufficient resources have weakened regulatory effectiveness (Junaidi, 2022; Putra & Hasanuddin, 2016; Putri, 2020). In this context, the village government becomes a crucial actor in strengthening grassroots control and collective action. Marsawa Village, strategically located around the Batang Teso Dam, provides an important case to observe how community-based interventions can respond to such complex and persistent problems (Sazeta, 2022).

Historically, the Batang Teso Irrigation Dam was a center of local tourism and community gatherings. However, since the proliferation of PETI, these socio-economic functions have sharply declined. The murky water, vegetation loss, and absence of visitors have caused economic stagnation and reduced community well-being (Douw et al., 2021; Octaviana et al., 2023). This phenomenon illustrates the direct connection between environmental degradation and social welfare. Thus, this study highlights the importance of sustainable rural development approaches that balance ecology and local livelihoods (Valois-Cuesta et al., 2025).

Village governments can serve as communication facilitators, conflict mediators, and initiators of alternative economic empowerment programs for residents previously dependent on illegal mining (Toft, 2000). To explore these dynamics, this research employs a descriptive qualitative approach to deeply understand the social and institutional contexts behind PETI mitigation. Through interviews, observations, and literature review, it examines how local actors shape adaptive and participatory governance (Saputra, 2023). This approach enables the tracing of relationships between policy implementation, social behavior, and ecological outcomes.

Furthermore, this study aims to fill the gap in existing literature concerning environmental governance at the village level. Previous works have predominantly focused on national or provincial policies, while community-based governance remains underexplored (Melian et al., 2024; Douw et al., 2021; Junaidi, 2022). By positioning the village government as the analytical locus, this study introduces a new perspective on how decentralization and local empowerment strengthen the effectiveness of environmental policy implementation (Rafi et al., 2023).

Community participation represents a decisive factor in PETI mitigation success. Through awareness campaigns, counseling, and economic empowerment initiatives, the village government promotes collective responsibility toward environmental preservation (Zulfikar et al., 2021; Niwele et al., 2022). Argued, successful community empowerment depends on how local policies accommodate citizens' aspirations and economic realities.

Therefore, this study also assesses the effectiveness of participatory mechanisms in decision-making processes (Yu et al., 2025).

This research does not merely address PETI from a legal or environmental lens but also considers the social transformation emerging from its mitigation. The findings are expected to contribute theoretically to the discourse on local environmental governance and provide practical recommendations for regional authorities and policymakers (Zenebe et al., 2025). Through synergy among village governments, law enforcement agencies, and communities, this study aspires to propose a local collaborative model for sustainable and community-driven natural resource governance (Xu et al., 2025).

RESEARCH METHODS

This study employs a qualitative descriptive approach to gain a deep understanding of the dynamics surrounding the mitigation of unlicensed gold mining (PETI) at the Batang Teso Irrigation Dam in Marsawa Village, Kuantan Singingi Regency. The qualitative method was selected because it allows the researcher to capture social realities, perceptions, and actions of stakeholders involved in PETI control, including village officials, security forces, and local residents. The research design focuses on exploring the interactions between human activities, environmental impacts, and institutional responses within the local governance context. This approach is also aimed at revealing how participatory and collaborative governance can emerge as an adaptive solution in rural environmental management (Coast & Jackson, 2017; Creswell & Creswell, 2018).

The data collection process involves several techniques: in-depth interviews, direct field observations, and documentation analysis. Interviews were conducted with key informants such as village leaders, community members, and representatives of related agencies involved in PETI mitigation. Field observations were used to examine the physical conditions of the Batang Teso Dam and its surrounding environment, while documentation was carried out by reviewing government reports, academic studies, and relevant policy documents. The triangulation of these three data sources strengthens the validity and reliability of the findings, ensuring that the interpretation reflects a comprehensive view of the issue.

Data analysis technique applied in this study follows the stages of thematic analysis, consisting of data reduction, data display, and conclusion drawing. All interview transcripts and observation notes were coded and grouped into themes related to government roles, community participation, and environmental impacts. This process allows for identifying recurring patterns and relationships between institutional actions and community responses. The chosen methodology is justified because it aligns with the study's objective to understand deeply the governance mechanisms and social dynamics influencing PETI mitigation. Transparency in describing each stage of data analysis enhances the study's credibility and allows future researchers to replicate or expand upon its findings.

RESULTS AND DISCUSSION

1. The Scale and Environmental Impacts of PETI in Kuantan Singingi

Unlicensed gold mining (PETI) in Kuantan Singingi Regency has become a complex environmental and governance problem that threatens both ecological stability and community livelihoods. Field data and secondary reports indicate that thousands of illegal mining machines operate daily across multiple districts, causing widespread land degradation and water pollution. The Batang Teso Dam in Marsawa Village, once a vital irrigation and tourism site, has been severely affected by sedimentation and mercury contamination. Water that was once clear has turned turbid, while aquatic biodiversity has drastically declined, reflecting the ecological damage typical of unregulated artisanal mining (Douw et al., 2021; Bouty et al., 2022).

The environmental crisis caused by PETI is characterized not only by the contamination of water resources but also by the destruction of vegetation and agricultural soil surrounding the Batang Teso watershed. The use of mercury and other hazardous chemicals has damaged riparian ecosystems, while excavations have disrupted soil structure and reduced fertility in nearby farmlands. Residents testified that irrigation water is no longer usable for agricultural purposes due to heavy metal residues. These observations align with findings that illegal gold mining accelerates environmental degradation, diminishes food security, and heightens vulnerability among rural populations dependent on natural resources (Melian et al., 2024).

The intensity of PETI operations in Kuantan Singingi demonstrates the depth of structural issues underlying the problem. The abundance of illegal machinery and the persistence of local participation suggest that economic incentives, weak law enforcement, and limited employment opportunities drive the expansion of mining. In many cases, local communities perceive PETI as a traditional livelihood rather than a criminal act, resulting in widespread tolerance. This finding echoes the argument that economic dependency is the main reason for PETI's endurance despite multiple government interventions aimed at eradication (Junaidi, 2022).

The ecological implications of PETI at Batang Teso are multidimensional, affecting water, soil, air, and biodiversity simultaneously. Mercury residues pollute the irrigation network and accumulate in fish tissue, posing risks to human health. Sedimentation reduces the dam's storage capacity and efficiency, threatening agricultural productivity and increasing flood risk. Therefore, immediate remediation efforts such as soil bioremediation and reforestation are needed to restore ecological balance. This aligns with the view that integrated ecological rehabilitation is essential to reverse the long-term impacts of unregulated mining (Valois-Cuesta et al., 2025).

2. The Institutional and Governmental Response to PETI

The Marsawa Village Government has emerged as a key local actor in coordinating PETI mitigation. In collaboration with the Kuantan Singingi Police, the TNI, and the Environmental Agency, the village government has carried out a series of joint enforcement actions. These include equipment confiscation, destruction of illegal machinery, and continuous monitoring of high-risk zones. This proactive approach demonstrates a form of decentralized governance in practice, where local institutions take initiative to complement higher-level authorities (Firman, 2017; Damar et al., 2022).

In addition to direct enforcement, the Marsawa administration also prioritizes education and socialization efforts to raise public awareness. Environmental campaigns are conducted through community meetings, school programs, and religious gatherings to explain the dangers of PETI. This soft approach has gradually increased public participation in environmental protection activities. Residents have begun to view PETI as a collective problem that threatens the village's future rather than as a personal income opportunity. This cultural shift supports the argument that sustainable governance requires moral legitimacy and social learning among citizens (Sazeta, 2022).

Institutional coordination among various agencies has also strengthened local governance structures. Regular meetings between the village government, sub-district offices, and environmental authorities ensure that monitoring data and enforcement outcomes are consistently shared. These collaborative mechanisms not only improve administrative efficiency but also enhance the legitimacy of village-level environmental action. However, challenges remain, including funding limitations and the absence of clear legal authority for villages to impose environmental sanctions. Institutional fragmentation often limits the continuity of PETI control efforts, especially after enforcement campaigns end (Niwele et al., 2022).

Overall, the Marsawa case demonstrates that local governance, when supported by multi-stakeholder collaboration, can produce measurable progress in curbing illegal mining.

The success lies not merely in the reduction of active PETI sites but in the gradual institutionalization of preventive policies and community involvement. The integration of environmental education, joint patrols, and livelihood training programs represents a holistic model of rural governance. This finding supports the argument that the strength of environmental enforcement depends on local ownership and participatory mechanisms that link law, community, and sustainability goals (Damar et al., 2022).

3. Community Empowerment and Socio-Economic Recovery

The long-term success of PETI mitigation depends heavily on the community's ability to transition toward sustainable economic activities. Recognizing this, the Marsawa Village Government, supported by NGOs and universities, has implemented several empowerment programs. These include eco-farming, freshwater aquaculture, handicraft production, and youth-led environmental initiatives. The aim is to reduce dependency on mining by creating viable alternative livelihoods. This finding confirms that empowerment must be both participatory and economically rewarding to ensure lasting community engagement in environmental preservation (Zulfikar et al., 2021).

Many former miners have successfully shifted to sustainable occupations, cultivating crops or managing fish ponds with support from local training programs. Although income levels remain modest compared to mining profits, participants reported greater stability and safety in their new livelihoods. This economic diversification has also revitalized community solidarity, as collective farming groups and cooperatives emerge to share resources and market access. This aligns with the argument that adaptive community learning promotes resilience and strengthens social cohesion in post-mining recovery efforts (Rafi et al., 2023).

The empowerment initiatives have also generated a deeper sense of environmental stewardship among residents. Community members now voluntarily monitor local rivers, report illegal mining attempts, and participate in clean-up programs around the Batang Teso Dam. Youth groups play a crucial role by using digital media to raise awareness about the importance of sustainable development. These activities mark a cultural shift from exploitation to protection of natural resources, reflecting the transformative potential of grassroots environmental movements (Zenebe et al., 2025).

Ultimately, the Marsawa experience demonstrates that community empowerment is not only an economic intervention but also a process of social transformation. The combination of livelihood programs, environmental education, and participatory governance has produced a self-sustaining model of rural resilience. This confirms that post-mining recovery should integrate ecological awareness with local entrepreneurship to ensure equitable and enduring development outcomes (Xu et al., 2025; Zhao et al., 2025).

4. Mitigation Efforts of PETI Activities at Batang Teso Irrigation Dam, Marsawa

The mitigation of unlicensed gold mining (PETI) activities at the Batang Teso Irrigation Dam in Marsawa aims not only to protect the environment but also to safeguard public health. Various initiatives have been undertaken to minimize the health impacts caused by PETI, including monitoring water and air quality, conducting community education programs about the dangers of mining waste, and empowering residents to pursue safer and more sustainable sources of livelihood. These actions reflect an integrated approach that combines preventive, corrective, and participatory strategies to address both the environmental and social dimensions of illegal mining.

One of the key strategies implemented by the Marsawa Village Government is socialization and public education. Through regular counseling sessions, the government actively informs residents about the environmental, social, and economic risks of PETI. The primary goal of this initiative is to raise awareness of the importance of environmental protection and promote sustainable livelihood options such as eco-friendly agriculture and local fisheries. These sessions also cover legal aspects, ensuring that citizens understand the

legal consequences of engaging in illegal mining. Through collaboration with stakeholders, the government ensures that monitoring and evaluation systems are in place to maintain the effectiveness of these programs over time.

The second step involves enforcement and law application. The village government, in close cooperation with security forces, has conducted strict actions to suppress PETI activities, including confiscating and destroying illegal equipment and machinery. Legal sanctions have been imposed on offenders to create a deterrent effect and emphasize that illegal mining will not be tolerated. These enforcement efforts are essential not only for stopping illegal operations but also for strengthening public confidence in environmental governance and ensuring that legal norms are upheld fairly and consistently within the community.

The third and equally important measure is community empowerment. The local government has initiated training programs that equip residents with new skills in sustainable agriculture, aquaculture, and small-scale entrepreneurship. The goal is to provide realistic economic alternatives for former miners and reduce their dependence on illegal extraction. Additionally, the government facilitates the process of obtaining community mining permits (IPR) to ensure that any future mining activities are conducted legally and responsibly. Complementing these efforts, Marsawa Village has also established strong inter-institutional cooperation with the Environmental Agency, the Indonesian National Police, and the TNI to strengthen supervision and enforcement. This cross-sectoral collaboration has become a cornerstone for ensuring the long-term success of PETI mitigation, balancing ecological preservation with community welfare and sustainable development.

CONCLUSION

This study concludes that unlicensed gold mining (PETI) at the Batang Teso Irrigation Dam in Marsawa Village has caused severe and multidimensional impacts, encompassing environmental degradation, social disruption, and governance challenges. The uncontrolled use of mercury and intensive mining practices have resulted in critical water pollution, loss of biodiversity, and declining agricultural productivity. These environmental consequences have not only undermined ecological balance but also threatened public health and local livelihoods. Therefore, PETI must be viewed not merely as a legal violation but as an urgent environmental crisis requiring comprehensive, cross-sectoral intervention.

The findings highlight that the Marsawa Village Government plays a central role in coordinating mitigation efforts through enforcement, socialization, and inter-agency collaboration. The integration of community participation and educational campaigns has strengthened local awareness and accountability. However, structural constraints such as limited funding and regulatory authority remain major barriers to sustainable enforcement. Strengthening village institutions through legal empowerment, technical assistance, and budgetary support is essential to ensure long-term environmental governance. Collaborative frameworks between local governments, law enforcement, and civil society can enhance the effectiveness of PETI prevention strategies.

Finally, the study emphasizes that community empowerment is the cornerstone of sustainable PETI mitigation. The transition from illegal mining to alternative livelihoods demonstrates the potential for social and economic transformation when local actors are actively involved. Programs promoting eco-farming, aquaculture, and environmental education have created pathways for resilient and self-reliant communities. These efforts confirm that ecological restoration and socio-economic recovery must proceed simultaneously to achieve lasting development outcomes. The Marsawa experience thus offers a replicable model of community-based environmental governance for other regions facing similar challenges in balancing development and conservation.

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