

The Dilemma between the People's Economy and the Green Economy: Community Dependence on Illegal Gold Mining in Kuantan Singingi Regency

Wika Wahyuni, Sri Rahma Dewi, Zulkarnaini

Universitas Riau, Indonesia
wika.wahyuni6205@grad.unri.ac.id

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Abstract

Unlicensed gold mining (PETI) in Kuantan Singingi Regency, Riau Province, poses a governance challenge involving community livelihood needs and environmental protection. Although mining provides income-generating opportunities, it is associated with land-use changes and risks of environmental degradation. This study examines the relationships among community livelihoods, the environmental impacts of PETI, and local government capacity to support a transition toward sustainable economic development. A descriptive qualitative approach was employed through a literature review of scholarly articles, policy documents, and relevant official sources. The reviewed materials were analysed thematically across three dimensions: community livelihoods, environmental sustainability, and policy governance. Local literature reports the conversion of 2,680.03 hectares of land into unlicensed mining areas around the Singingi River between 2006 and 2018. Previous studies also address the social impacts of PETI and limitations in implementing mining control policies in Kuantan Singingi. The synthesis indicates that addressing PETI requires an integrated approach that connects livelihood opportunities, environmental protection, and policy implementation capacity. Accordingly, the study proposes a just transition strategy encompassing local economic diversification, stronger environmental monitoring and institutional coordination, environmental restoration, and the facilitation of community mining where both the location and activities satisfy applicable legal requirements. The proposed strategy contributes a basis for aligning community livelihood considerations with environmental governance

and sustainable local economic development. However, given the absence of primary data collection, the extent of community economic dependence on PETI and the effectiveness of the proposed measures require further empirical investigation.

Keywords: Green Economy; Community Livelihoods; Unlicensed Gold Mining; Just Transition; Environmental Governance

INTRODUCTION

Economic development is fundamentally aimed at improving public welfare through job creation, increased income, and the utilization of available resources. However, development that relies excessively on the exploitation of natural resources can create problems when the economic benefits generated are not accompanied by environmental protection. This condition presents a challenge for governments, particularly in regions where community economic activities are directly associated with the utilization of natural resources. Governments are not only required to promote economic growth but also to ensure that economic activities comply with legal provisions and do not disregard environmental sustainability.

The green economy offers a development approach that links improvements in welfare with the reduction of environmental risks. The United Nations Environment Programme (UNEP, 2026) explains that an inclusive green economy aims to improve human well-being and social equity while reducing environmental risks and ecological scarcities. Thus, the green economy is not solely concerned with nature conservation but also encompasses the expansion of economic opportunities and the strengthening of institutions capable of safeguarding both social and ecological interests.

The relevance of this approach is evident in the study by Aminata et al. (2022) on inclusive green growth in Indonesia. Using the Inclusive Green Growth Index (IGGI), the study recorded an increase in Indonesia's average score from 3.21 in 2015 to 3.36 in 2019. However, this increase was primarily driven by the economic growth pillar, whereas the environmental sustainability pillar score declined from 4.19 to 4.00. These findings demonstrate that improvements in economic performance do not always coincide with improvements in environmental quality. Therefore, development policies need to consider the balance between economic growth, social equity, and environmental sustainability.

This issue is particularly relevant to Kuantan Singingi Regency, Riau Province, where unlicensed gold mining, commonly known as *Penambangan Emas Tanpa Izin* (PETI), occurs in several river basin areas. Research by Mailendra and Buchori (2019) indicates that land-use changes associated with PETI areas around the Singingi River reached 2,680.03 hectares during the 2006–2018 period. Based on the land degradation mapping conducted in that study, 699.34 hectares were categorized as experiencing severe degradation, 1,501.04 hectares moderate degradation, and 479.65 hectares low degradation. The study also identified Sungai Paku Village as the location with the largest area of degradation within the study area. These data provide evidence of the substantial landscape changes associated with PETI activities, although they cannot be directly generalized to represent the entire territory of Kuantan Singingi Regency.

In addition to ecological concerns, PETI also has socioeconomic dimensions. Anjami and Nurhamlin (2018) examined the social impacts of PETI in Sungai Sorik Village, Kuantan Hilir Seberang District, Kuantan Singingi Regency. Their study addressed mining operators, social impacts, and the relationship between changes in livelihoods and social mobility as issues requiring attention. These findings indicate that PETI cannot be adequately understood as an individual economic activity, since it is also associated with changes in community social life.

These socioeconomic dimensions need to be interpreted carefully. The presence of PETI does not, in itself, demonstrate that all communities surrounding mining sites depend on such activities. The extent of economic dependence needs to be distinguished according to occupation type, the contribution of mining income to household earnings, family members' involvement, and the availability of alternative sources of income. Without data measuring these aspects, community economic dependence is more appropriately treated as an issue requiring empirical investigation rather than as an established condition affecting the entire population of Kuantan Singingi.

The PETI issue is also related to the capacity of local governments to implement policies. Putra and Hasanuddin (2016) examined the Kuantan Singingi Regency Government's policies for controlling environmental degradation caused by PETI during the 2013–2015 period. Their study discussed the implementation of Kuantan Singingi Regent's Decree Number 13 of 2013 concerning the establishment of an integrated team for PETI enforcement and concluded that policy implementation during the period examined

had not been effective. The continued occurrence of PETI activities was one of the issues identified in the study. These findings indicate challenges in policy implementation during the research period, but they cannot be used as direct evidence of the effectiveness of current local government policies.

Based on these conditions, the dilemma between the people's economy and the green economy needs to be understood as a development governance issue. On the one hand, communities need sources of income to meet their living needs. On the other hand, unlicensed mining activities can generate ecological impacts and legal risks. If policies emphasize enforcement alone without considering the availability of viable livelihood alternatives, there is a risk that communities' economic problems will not be adequately addressed. Conversely, allowing PETI activities to continue unchecked is not a solution either, as this may exacerbate environmental degradation and undermine legal certainty.

One relevant approach to bridging these concerns is a just transition. The International Labour Organization (ILO, 2015) emphasizes the importance of decent work, social protection, social dialogue, and stakeholder involvement in the transition toward a more sustainable economy. This approach can be used to assess how law enforcement, alternative livelihood development, environmental restoration, and institutional coordination can be designed in an integrated manner in Kuantan Singingi. This approach does not imply legitimizing illegal activities; rather, it ensures that environmental policies also take into account their potential socioeconomic consequences.

Based on the foregoing discussion, this article focuses on three questions. First, how does the literature explain the relationship between PETI and community livelihoods in Kuantan Singingi Regency? Second, how do the environmental impacts of PETI pose challenges to the implementation of green economy principles? Third, how can transition governance strategies be formulated to mitigate the impacts of PETI while expanding community livelihood options?

This study aims to develop a synthesis of the relationship between community livelihoods, environmental sustainability, and the implementation of policies addressing PETI. The article's contribution lies in applying a just transition perspective to connect communities' economic interests with the environmental protection agenda. Because the study employs a literature review, its contribution is analytical and conceptual rather than a claim that the effectiveness of a particular policy model has been directly tested in the field.

METHODS

This study employs a descriptive qualitative approach using a literature review method. This approach is used to develop an understanding of the relationship between community livelihoods, the environmental impacts of unlicensed gold mining (PETI), and policy governance in Kuantan Singingi Regency. Studies on PETI in Kuantan Singingi Regency provide a foundation for understanding issues related to policy implementation and law enforcement in the local context (Kurniadi et al., 2022; Putri, 2021; Saiyed, 2023). The research data consist of secondary data obtained from scientific journal articles, policy documents, legislation, and relevant official institutional publications addressing the green economy, unlicensed mining, community livelihoods, and just transition. The green economy framework is used to understand the interrelationships between economic development, community welfare, and environmental protection (Ammar et al., 2024; Rasyid et al., 2024).

The literature was selected based on its relevance to the research focus, the traceability of publication information, the clarity of its methods or informational basis, and its connection to the local context. Studies directly addressing Kuantan Singingi were used as primary sources for understanding PETI-related issues in the region (Kurniadi et al., 2022; Putri, 2021; Saiyed, 2023). Sources addressing the green economy and sustainable development were used to establish the conceptual framework, while studies from other regions were used for comparison only when relevant to the issues under investigation (Ammar et al., 2024; Rasyid et al., 2024; Saptawartono et al., 2024). Studies on household welfare in areas surrounding mining sites can also be used to understand the relationship between mining activities, community livelihoods, and socioeconomic conditions, while taking into account differences in the contexts of the respective study areas (*e-Jurnal Ekonomi Sumberdaya dan Lingkungan*, 2022). Regulatory documents were used to examine the legal framework for addressing PETI and the potential development of a legitimate community mining policy. Studies on the formalization of artisanal and small-scale mining were used as comparative references to examine policy alignment and opportunities for transitioning toward legal mining activities (*Journal Applied Geo-mining and Metallurgy*, 2024).

Data analysis was conducted in three stages. First, data reduction was performed by selecting information directly related to the research questions, particularly information concerning community livelihoods, environmental impacts, and PETI policy governance. Second, the data were grouped into three main themes: community livelihoods,

environmental impacts, and policy governance. This categorization took into account research findings on the implementation of policies to address PETI in Kuantan Singingi (Kurniadi et al., 2022; Saiyed, 2023), the socioeconomic and environmental impacts of mining activities (Saptawartono et al., 2024), and the relationship between economic development and environmental protection (Ammar et al., 2024). Third, thematic synthesis was conducted by comparing findings from local studies, green economy concepts, and approaches to formalizing community mining in order to formulate policy alternatives that consider the sustainability of community livelihoods, environmental protection, and legal certainty (Ammar et al., 2024; Dinar & Sutriadi, 2024; Rasyid et al., 2024).

The validity of the analysis was maintained by distinguishing empirical findings from previous studies, concepts derived from the literature, and recommendations formulated by the authors. Findings concerning PETI policy implementation and law enforcement in Kuantan Singingi were used in accordance with the context of each study, while research from other regions was used for comparison to broaden the understanding of the socioeconomic and environmental issues associated with mining (Kurniadi et al., 2022; Putri, 2021; Saptawartono et al., 2024). Data from different research locations and periods were not treated as a direct representation of current conditions throughout Kuantan Singingi Regency. This study did not employ interviews or primary surveys and, therefore, was not intended to measure the extent of household economic dependence or directly assess the effectiveness of current policies. Accordingly, the recommendations generated constitute a conceptual synthesis based on the literature and documents reviewed, particularly those concerning green economy development, sustainable development governance, and the formalization of community mining (Ammar et al., 2024; Dinar & Sutriadi, 2024; Rasyid et al., 2024).

RESULTS

The findings of this study are based on a synthesis of available empirical data and research documents concerning the development of unlicensed gold mining (PETI), changes in land use, the socio-economic conditions of local communities, environmental impacts, and the implementation of PETI control policies in Kuantan Singingi Regency. The findings are presented in the form of descriptive accounts of the findings and data tables, without incorporating theories or literature analysis.

Development of PETI and Changes in Land Use

Research data concerning the area surrounding the Singingi River indicate a change in land use into unlicensed gold mining areas covering 2,680.03 hectares during the 2006–2018 period. Based on the classification of land degradation levels, the area of land experiencing high degradation reached 699.34 hectares, moderate degradation covered 1,501.04 hectares, and low degradation covered 479.65 hectares.

Table 1. Changes in Land Use and Levels of Land Degradation
Due to PETI around the Singingi River, 2006–2018

Degradation Category	Land Area
High degradation	699.34 ha
Moderate degradation	1,501.04 ha
Low degradation	479.65 ha
Total	2,680.03 ha

Data source: Mailendra and Buchori (2019).

The data indicate that the moderate degradation category covers the largest area, namely 1,501.04 hectares, while the high degradation category accounts for 699.34 hectares. The extent of these land-use changes reflects the conditions of the study area during the observation period. The available data do not provide updated figures for the affected land area after 2018.

In addition to land conditions, research on the Batang Kuantan River in Kuantan Mudik District also includes examinations of the physical and chemical parameters of water, as well as the socio-economic aspects of the community. Thus, the available research data cover two main components: changes in land conditions around the Singingi River and assessments of aquatic environmental quality in the Batang Kuantan River area.

Socio-Economic Conditions and Community Livelihoods

Research on the social impacts of PETI in Sungai Sorik Village, Kuantan Hilir Seberang District, identified mining operators, social impacts associated with these activities, and the relationship between changes in livelihoods and community social mobility.

These data indicate that PETI is associated with economic activities and occupational changes at the local community level. However, the data available in the manuscript do not include miners' income levels, the percentage of households dependent on PETI, income

comparisons across sectors, or the number of community members who have transitioned to other occupations.

Therefore, the research findings that can be directly presented are limited to the identified relationships between PETI, livelihood changes, and community social dynamics at the research site. The overall level of economic dependence on PETI among communities throughout Kuantan Singingi Regency cannot be determined based on these data.

Environmental Conditions and Implementation of PETI Control Policies

The research data indicate changes in land use around the Singingi River and assessments of water quality in the Batang Kuantan River. Both locations are included in the areas examined in research on the impacts of PETI in Kuantan Singingi Regency.

In terms of policy, the Kuantan Singingi Regency Government established an Integrated PETI Enforcement Team through Regent's Decree Number 13 of 2013. Research on the implementation of policies to control environmental degradation during the 2013–2015 period found that policy implementation had not been effective. PETI activities continued during the research period, and efforts to address them encountered several obstacles.

These findings indicate that the establishment of the enforcement team was not fully accompanied by the achievement of PETI control objectives during the period under investigation. However, these data cannot be directly used to describe the level of policy effectiveness after 2015 because more recent evaluation results are not available in the research materials.

Strategic Directions for Addressing PETI

Based on the available problem mapping, the PETI management strategy formulated in this study encompasses four policy directions: livelihood diversification, strengthening governance and law enforcement, environmental monitoring and restoration, and facilitating community mining through legal mechanisms in accordance with applicable laws and regulations.

These four directions represent the synthesis and policy proposals developed in this study, rather than reports of programs that have been implemented or demonstrated to be

successful in Kuantan Singingi Regency. Indicators that can be used to evaluate these strategies include changes in household income sources, developments in PETI activities, follow-up actions concerning violations, water and land quality conditions, and compliance with applicable mining requirements.

DISCUSSION

Analysis of Land-Use Changes and Environmental Degradation Caused by PETI

The research findings indicate that PETI activities around the Singingi River were associated with land-use changes covering 2,680.03 hectares during the 2006–2018 period. This area indicates that unlicensed mining activities have significantly affected the landscape within the study area. This finding provides a basis for identifying land-use change as an important indicator in evaluating the impacts of PETI in Kuantan Singingi Regency.

Upon further examination, the predominance of the moderate degradation category, covering 1,501.04 hectares, indicates that this category accounts for the largest proportion of the land area classified in the study. Meanwhile, the area experiencing high degradation, amounting to 699.34 hectares, indicates the presence of areas requiring particular attention. Nevertheless, these classifications should be interpreted according to the assessment parameters used in the original study, rather than as direct measures of pollution levels, losses in land productivity, or the magnitude of restoration costs.

The findings of Mailendra and Buchori (2019) are relevant to understanding these changes because their study employed an analysis of land-use changes and a classification of degradation levels around the Singingi River. The study recorded changes in land use into PETI areas from 2006 to 2018.

In the context of this study, these findings highlight the importance of distinguishing between the area that has undergone land-use conversion and the area classified as degraded. The two are related but have different measurement meanings.

A comparison with the study by Rezki et al. (2017) extends the analysis from land conditions to the aquatic environment. The study of the Batang Kuantan River examined the physical and chemical parameters of water as well as the socio-economic aspects of the community. This difference in focus indicates that the impacts of PETI cannot be adequately understood through land mapping alone. A more comprehensive assessment requires data

on soil conditions, water quality, ecological functions, and changes in how communities utilize resources.

More recent literature further reinforces the importance of a cross-dimensional approach. Hatika et al. (2026), through a systematic review of PETI from an environmental policy perspective, identified gaps between regulatory frameworks and implementation in practice, including issues related to law enforcement, institutional coordination, and the limited availability of alternative economic opportunities for communities.

Although that review covers a broader body of literature and does not constitute a specific measurement of conditions in Kuantan Singingi, its findings help explain why PETI management needs to integrate environmental protection with improvements in governance.

The implication of this analysis is the need for periodic updates to spatial and environmental data. Data from 2006–2018 can serve as a historical baseline but are insufficient to determine restoration priorities in 2026. Local governments, together with relevant technical agencies, need to update the mapping of affected areas, assess water and soil quality as necessary, and identify changes in land conditions since the previous research period. In this way, decisions regarding restoration priorities can be based on current conditions rather than historical data alone.

PETI, Livelihood Dependence, and Community Social Change

The research findings concerning Sungai Sorik Village reveal an association between PETI, changes in livelihoods, and social mobility. This finding is important because PETI management takes place within a community context characterized by diverse economic needs and employment options. Therefore, the issue of PETI cannot be explained solely as a legal violation without considering the accompanying socio-economic conditions.

Anjami and Nurhamlin (2018) examined PETI operators and its social impacts, as well as the relationship between livelihood changes and social mobility in Sungai Sorik Village.

The study provides a local perspective on the relationship between mining activities and social change. However, findings from a single village cannot be directly generalized to all communities in Kuantan Singingi Regency, particularly because employment characteristics, access to resources, and economic opportunities may differ across areas.

To deepen the analysis, livelihood dependence in this study can be distinguished into direct, indirect, and structural dependence. Direct dependence occurs when household income is derived from mining activities. Indirect dependence arises when community members earn income from trade, transportation, or services supporting mining activities. Structural dependence occurs when limited employment opportunities, access to capital, skills, and business opportunities constrain the transition to alternative sources of income.

These three categories constitute an analytical framework proposed in this study rather than the results of measurements conducted across all households in Kuantan Singingi. This distinction is necessary to ensure that PETI management does not treat miners, capital owners, supporting workers, and communities experiencing environmental impacts without receiving direct economic benefits as a homogeneous group.

The study by Ardikoesoema and Nurmansyah (2025) on livelihood transformation among illegal gold mining communities in Poboya, Palu City, examines changes in livelihoods in relation to economic, social, and environmental assets, as well as community members' motivations for changing occupations. This study provides a comparative perspective for understanding that livelihood transitions need to consider the capacities and resources available to communities rather than merely providing alternative types of employment.

This comparison indicates that economic diversification programs in Kuantan Singingi need to be designed according to household conditions and business feasibility. Skills training alone may not produce livelihood changes if it is not accompanied by market access, appropriate financing, mentoring, and sufficient demand for the products or services offered.

The policy implication is the need for socio-economic mapping before integrated enforcement measures are implemented. Such mapping may cover primary income sources, skills, productive assets, family dependants, and available employment opportunities. This information is necessary to determine appropriate forms of assistance for each community group. The objective is not to justify PETI but to reduce the economic barriers that may hinder the transition toward lawful and sustainable activities.

Environmental Impacts and Their Relevance to the Green Economy

The findings concerning land-use changes and assessments of water quality indicate that PETI evaluation needs to encompass environmental conditions rather than focusing

solely on the economic benefits derived from mining activities. In the context of Kuantan Singingi, the green economy approach is relevant for assessing whether natural resource utilization takes environmental sustainability and the distribution of economic benefits to communities into account.

UNEP (2026) describes the green economy as an approach aimed at improving human well-being and social equity while reducing environmental risks and ecological scarcities. From this perspective, development success cannot be measured solely through increased economic activity but must also consider the capacity to maintain environmental functions and control ecological costs.

In the case of PETI, land-use change is one indicator that can be used to assess environmental pressures. However, land-use change data do not automatically establish the extent of water pollution, mercury concentrations, or impacts on public health. Conclusions regarding these issues must be based on relevant environmental testing and empirical evidence.

Aminata et al. (2022), in their study of inclusive green growth in Indonesia, found that the average value of the index used increased from 3.21 in 2015 to 3.36 in 2019. However, this increase did not indicate ideal improvements across all sustainability pillars.

This national finding highlights the importance of assessing development through the interrelationships among economic growth, social equity, and environmental sustainability. Nevertheless, these results cannot be used as evidence that PETI in Kuantan Singingi caused changes in the national green growth index.

Compared with local studies focusing on land-use changes and aquatic environments, the study by Aminata et al. (2022) adopts a broader perspective to assess the relationship between economic growth, social equity, and environmental conditions. These two types of studies complement each other: local studies provide an overview of conditions in affected areas, while national studies offer a broader context for understanding the direction of more sustainable development.

The implication is that the implementation of a green economy in Kuantan Singingi needs to proceed through two mutually reinforcing pathways. The first pathway involves controlling environmental impacts through law enforcement, ecological monitoring, and land restoration based on technical assessments. The second pathway involves developing alternative economic activities that can provide communities with lawful sources of income.

Both pathways need to be implemented simultaneously so that environmental protection remains integrated with efforts to improve community welfare.

Analysis of PETI Control Policy Implementation

The research findings on the implementation of PETI control policies during 2013–2015 indicate that the establishment of the Integrated PETI Enforcement Team did not result in effective policy implementation during that period. This finding reveals a gap between the existence of a policy and its implementation outcomes.

Putra and Hasanuddin (2016) reported that PETI activities continued during the research period and that efforts to address them encountered obstacles and insufficient implementation support.

These findings provide a basis for evaluating not only the existence of policies but also the institutional capacity to implement them consistently.

In this study, the implementation gap can be analyzed through three dimensions. First, implementation capacity, which encompasses resources, monitoring, and follow-up actions concerning violations. Second, institutional coordination, which relates to the division of responsibilities and working relationships among local governments, law enforcement agencies, environmental agencies, and institutions authorized in the mining sector. Third, policy continuity, which refers to the relationship between enforcement, environmental restoration, and alternative livelihood programs for communities.

These three dimensions constitute an analytical framework proposed to interpret the research findings. The available data are insufficient to determine whether each of these issues continues to occur at the same level in 2026. Therefore, assessing current conditions requires a more recent policy evaluation.

Recent literature also indicates that small-scale gold mining issues in Indonesia cannot always be resolved through a binary choice between prohibition and formalization. Prabawa et al. (2025) examine community gold mining through comparative analysis and a quantitative instrument related to natural resource issues in Indonesia.

This study is relevant to broadening the discussion of possible approaches to regulating community mining, but its findings do not imply that all PETI locations can or should be legalized.

The regulation of community mining needs to consider area requirements, licensing authority, technical feasibility, occupational safety, and environmental protection. The designation of People's Mining Areas (Wilayah Pertambangan Rakyat, WPR) and the issuance of People's Mining Permits (Izin Pertambangan Rakyat, IPR) must comply with applicable regulations and do not automatically transform PETI activities into lawful operations.

The implication of this implementation analysis is the need for evaluation indicators that distinguish policy outputs from policy outcomes. For example, the number of enforcement operations constitutes an output indicator. Meanwhile, changes in the intensity of PETI activities, resolution of violations, restoration of affected areas, and sustainability of alternative livelihoods constitute outcome indicators that require further examination. Outcome-based evaluation can provide a more comprehensive picture of policy effectiveness.

The Dilemma of the People's Economy and a Just Transition toward a Green Economy

The PETI issue in Kuantan Singingi illustrates the challenge of reconciling community livelihood needs, environmental protection, and legal certainty. This dilemma does not mean that the people's economy must be opposed to the green economy. The problem arises when the economic benefits of certain activities are not accompanied by adequate environmental management and compliance with legal requirements.

From an economic perspective, PETI activities may constitute a source of income for some community members. However, the available data are insufficient to calculate the distribution of benefits and costs among miners, capital owners, supporting workers, and affected communities. Therefore, policymaking needs to avoid assuming that all community members receive equal benefits or experience uniform impacts.

From an environmental perspective, the documented land-use changes highlight the importance of restoring and monitoring affected areas. Environmental degradation may also generate restoration needs and constrain the use of resources for other economic activities. The magnitude of these costs needs to be determined through technical and economic assessments rather than estimated solely on the basis of the area of land that has changed.

From a governance perspective, an approach that prioritizes enforcement alone may fail to resolve livelihood constraints if communities lack viable alternatives. Conversely,

tolerating illegal activities cannot be considered a solution because it risks undermining legal certainty and environmental protection.

The ILO (2015) discusses the importance of a just transition in the shift toward more sustainable development. In the context of this study, this approach can be implemented through community participation, skills development, job creation, and protection for groups most affected by policy changes.

A comparison with the study by Jati et al. (2025) on legal culture, environmental non-compliance, and the persistence of illegal mining in Paningkaban also indicates that social perceptions of mining may influence community acceptance of law enforcement policies. The study emphasizes the need for participatory environmental governance that is responsive to social contexts, in addition to formal enforcement measures.

Although the social context and research location differ from those of Kuantan Singingi, the study provides a comparative perspective on the importance of understanding the relationship between social norms, livelihoods, and law enforcement.

The implication is that a just transition in Kuantan Singingi needs to encompass law enforcement, environmental restoration, and livelihood development in an integrated manner. Alternative economic programs need to be designed according to community needs and capacities, while enforcement policies must be implemented in accordance with legal requirements. Through this approach, environmental protection can proceed alongside efforts to improve community welfare without justifying illegal mining activities.

Implications of the Research Findings for a Green Economy Transition Strategy

Based on the research findings and comparison with the literature, four major implications can be identified for formulating a green economy transition strategy in Kuantan Singingi Regency. First, livelihood diversification needs to be based on the socio-economic conditions of the community. Local governments need to identify skills, income sources, productive assets, and market opportunities before determining alternative programs. Agriculture, smallholder plantations, trade, and microenterprises may be considered according to their suitability to local conditions. However, each option needs to be assessed for feasibility and cannot be assumed to directly replace income derived from PETI. Second, governance strengthening needs to focus on measurable outcomes. Interagency coordination needs to be accompanied by a clear division of authority, regular monitoring, and evaluation

mechanisms. Policy success should not be assessed solely by the number of enforcement operations but also by developments in PETI activities, the resolution of violations, and changes in environmental conditions. Third, environmental restoration needs to be based on current data. Land-use change data through 2018 need to be updated to determine priority areas for intervention. Water and soil quality assessments need to be conducted according to local characteristics and the suspected impacts identified. The results of these assessments will provide a basis for determining appropriate restoration measures and evaluating subsequent progress. Fourth, the facilitation of community mining must comply with legal and environmental requirements. Assessments concerning WPR and IPR may be considered in areas that meet the applicable requirements. However, if a location or activity does not meet these requirements, the response needs to focus on terminating illegal activities and providing lawful livelihood alternatives. These four implications are interrelated. Economic diversification without environmental restoration does not resolve existing ecological impacts. Conversely, enforcement without socio-economic mapping risks overlooking the barriers that communities face in obtaining alternative income. Therefore, the transition strategy requires cross-sectoral planning, community participation, and data-based evaluation.

Research Limitations

This study has several limitations that need to be considered when interpreting the findings and formulating policy recommendations. First, this study relies on a synthesis of available documents and literature. The land-use change data constituting the main findings cover the 2006–2018 period, while the policy implementation study covers the 2013–2015 period. These timeframes do not provide a complete picture of PETI conditions, environmental quality, and policy effectiveness in 2026. Second, the geographical coverage of the previous studies varies. Mailendra and Buchori (2019) focused on the area surrounding the Singingi River, while Rezki et al. (2017) examined the Batang Kuantan River and Anjani and Nurhamlin (2018) investigated Sungai Sorik Village. Therefore, findings from these locations cannot be directly generalized to the entire area of Kuantan Singingi Regency. Third, the available socio-economic data do not include quantitative measurements of the proportion of households dependent on PETI, income levels derived from mining, the distribution of economic benefits, or the capacity of communities to transition to other occupations. Consequently, the analysis of livelihood dependence in this study remains

conceptual and cannot yet be used to measure the overall level of community dependence. Fourth, the environmental data do not include a series of recent measurements that would allow for the assessment of changes in water quality, soil quality, and ecological conditions over time. Therefore, this study does not establish the extent of pollution, the level of health risks, or environmental restoration costs without adequate testing and supporting data. Fifth, the green economy transition strategy formulated in this study constitutes a conceptual proposal based on a synthesis of findings and literature rather than an evaluation of programs that have already been implemented. The effectiveness of this strategy cannot yet be established without further research covering baseline conditions, budgetary requirements, the division of responsibilities, measurable targets, and implementation outcome evaluations.

CONCLUSION

Unlicensed Gold Mining (PETI) in Kuantan Singingi Regency reveals a dilemma between meeting the economic needs of local communities and protecting the environment. Land-use changes covering 2,680.03 hectares around the Singingi River during 2006–2018 illustrate the extent of landscape transformation associated with PETI activities. Addressing this issue requires a just transition approach through law enforcement, livelihood diversification, environmental restoration, and strengthened institutional coordination. However, the extent of community economic dependence and the effectiveness of these strategies still need to be established through empirical research.

This study contributes to the development of Public Administration and green economy scholarship by proposing a conceptual framework for a just transition that integrates the dimensions of community livelihoods, environmental sustainability, and policy governance. This framework enriches perspectives on addressing PETI by positioning law enforcement and the provision of alternative economic opportunities as complementary strategies for achieving sustainable development.

Future researchers are encouraged to conduct field research through interviews, household surveys, and environmental quality measurements to identify the extent of community economic dependence, the ecological impacts of PETI, and the effectiveness of government policies. Further research could also evaluate the feasibility of economic diversification programs and legal community-based mining mechanisms as a basis for formulating inclusive and sustainable green economy policies in Kuantan Singingi Regency.

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