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COLLABORATIVE GOVERNANCE IN MINING EXCAVATION: A CASE STUDY OF FORMER ILLEGAL TIN MINING IN BANGKA REGENCY

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Abstract. Tin mining in Bangka has long been a source of livelihood for the community. However, the rampant illegal tin mining causes damage to the environment and ecosystems, as well as social conflicts. Collaborative governance, or collaborative governance, offers an alternative approach to more sustainable and equitable post-mine management. This study aims to analyze collaborative governance practices in the management of illegal tin mining in Bangka Regency. Through a case study in Perlang Village, Lubuk Besar District, this study examines how local stakeholders, such as local governments, communities, and business actors, work together in rehabilitating and revitalizing former tin quarries. The results of the study show that collaborative governance in Perlang Village has had a positive impact, namely the creation of active community participation in the decision-making process related to the management of former tin mines and increasing public awareness about environmental sustainability and sustainable management of natural resources. The findings of this study contribute to the understanding of collaborative governance practices in post-mining management in Indonesia. The recommendations of this study can help local governments and other stakeholders in implementing collaborative governance effectively to achieve post-mining management.

Keywords: collaborative governance; mining mining; illegal tin; case studies

I. INTRODUCTION

This persistent environmental problem, exacerbated by human activities, has led to a decline in environmental quality, posing a threat to human survival and the well-being of society. The impacts include soil degradation, global warming, greenhouse gas emissions, and ecological imbalances[1 , these challenges require urgent and sustained action to ensure environmental sustainability. Efforts such as bioremediation for water pollution and microbial decomposition for plant residue waste are essential to reduce the negative effects of human activities[2]. Collaborative initiatives involving governments, communities, and the private sector are essential to address these issues and pave the way for a sustainable future for all forms of life on Earth[3]. Sustainable development strategies, including eco-efficient practices and resource management, are essential for combating environmental degradation and ensuring a balanced ecosystem.

The massive exploitation of natural resources driven by the increasing global demand for energy and economic growth has led to severe environmental consequences [4] , [5]. This uncontrolled exploitation results in deforestation, water and air pollution, and biodiversity loss, posing a significant threat to environmental sustainability. The exploitation of geographical resources, such as fossil fuels and underground cavities, can lead to seismicity, causing damage to industrial plants and surrounding areas. In addition, environmental destruction and resource wars have been linked to humanitarian conflicts, emphasizing the urgent need for sustainable resource management practices. To mitigate these risks and ensure long-term environmental health, it is critical to adopt preventive measures, develop safety protocols, and prioritize the protection of wildlife and ecosystems.

Tin mining in production and protected forests has indeed caused severe environmental degradation, including the destruction of forest ecosystems and soil degradation [6]. Mining activities produce hazardous wastes such as mine acid water and tailings, polluting water sources and soils, causing biodiversity loss, soil erosion, and air and water pollution [7] . Sustainable forest management practices and stricter regulatory enforcement are essential to mitigate these impacts and protect ecosystems and human health [8]. Reclamation efforts, such as reforestation and revegetation, play an important role in restoring degraded land after mining activities [9]. Continuous monitoring and long-term strategies, such as phytostabilization through reforestation, are essential for the sustainable management of forests affected by mining activities.

Environmental damage is a diverse problem caused by various entities, including legal and illegal actors. Legitimate business entities, even with official permits, can contribute to environmental damage through non-compliant or unsustainable practices[10] , [11]. Conversely, individuals who engage in illegal activities, such as illegal logging or wildlife trade, also have a significant impact on the environment[12] . This action leads to severe consequences such as pollution, habitat destruction, and land degradation. To address this complex issue, strict monitoring and effective

law enforcement are essential to prevent and mitigate environmental damage caused by various parties, emphasizing the need for comprehensive policies and strategies[13].

The drive for economic development in Bangka Regency has caused environmental damage, including land degradation, habitat loss, and pollution Overexploitation of land for activities such as tin mining has left a legacy of environmental problems, requiring sustainable management measures to safeguard the ecosystem and community well-being[14] . Despite the economic motivations, its negative impact highlights the urgency for a balanced development approach that prioritizes environmental protection and resource conservation. Sustainable land use practices that involve collaboration between the government, the community, and the private sector are essential to reduce environmental degradation and ensure the sustainability of Bangka Regency's natural resources in the long term[15].

The exploitation of tin minerals in Bangka Regency has led to the conversion of agricultural land into mines, ignoring the environmental consequences. This unregulated mining, both on land and at sea, has resulted in significant environmental damage and legal problems. Conflicts arise from the uneven distribution of power among government actors, mining companies, illegal miners, fishermen, and tourism businesses. Media attention has highlighted a wide range of environmental issues related to tin mining, emphasizing the need for a balanced approach to economic development and environmental preservation [16] . Reclamation efforts by mining companies such as PT Timah have shown mixed results, demonstrating the importance of effective land restoration for ecological, social, and economic benefits. Raising awareness about the need to balance economic growth with environmental protection is essential to address the ongoing challenges in Bangka Regency.

The exploitation of tin mining, guided by public policy based on Article 33 paragraph (3) of the 1945 Constitution (1945 Constitution), emphasizes state control over natural resources for the prosperity of the people. However, the implementation of tin mining has led to environmental and social controversies. The study highlights adverse impacts such as property damage, social instability, and environmental degradation in local communities due to activities. In response to poorly implemented reclamation obligations in tin mining areas such as Bangka Belitung, criminalization policies have been introduced to effectively enforce post-mining responsibilities Conflicts between fishing communities and tin mines arise due to ecological influences, socioeconomic factors, and the attractiveness of tin revenues, which require a deeper understanding of conflict dynamics[17] . Media coverage of tin mining in Bangka Belitung has shed light on various issues such as reclamation, regulations, impacts, and CSR, pointing to the need for more investigative environmental journalism.

Tin mining in Bangka Regency, Indonesia, has significant economic importance [18].. However, this activity brings environmental and social challenges. The history of tin mining in the region for more than 200 years has raised concerns about natural radiation due to heavy minerals containing elements of radionuclides.

The decline in white pepper prices has pushed individuals to the mining sector as an alternative source of income amid economic instability(Calzada Olvera and Iizuka 2023). Mining, which has historically been important for economic growth, has a direct impact on infrastructure, employment, and community development(Perchard, Ingulstad, and Storli 2021). However, mining activities can cause adverse environmental effects, such as deteriorating air quality, noise pollution, and disruption of water availability (Бурцева 2023). The mining industry's response to economic challenges highlights the sector's adaptability to fluctuations in commodity prices, demonstrating its role in the diversification of the local economy(Mukaddas 2022). To reduce negative environmental impacts, it is important for mining companies to address issues such as biodiversity loss, waste management, and social displacement, ensuring sustainable practices for long-term economic and environmental well-being.

The economic uncertainty caused by the decline in pepper prices has caused some communities to convert pepper plantations into mining land as an alternative source of income [19] . This shift reflects changes in dynamics in the local economy due to fluctuations in commodity prices. While such actions can generate additional revenue, they come with a range of consequences, including potential environmental impacts that need to be carefully considered. The conversion of plantation land to mining land signals a significant transformation in land use patterns and highlights the adaptive strategies adopted by communities facing economic challenges(Ismuhajaroh et al. 2023). It is critical to assess the long-term implications of the transition on local economies and the environment to ensure sustainable development and resource management.

Mining activities in Bangka Regency have indeed created a double impact for While serving as an important economic driver, mining has caused severe environmental degradation in the region. Environmental damage caused by mining includes high levels of pollution in the soil, water, and air, disrupting the lives of local people [20]. In addition, mining activities have resulted in the destruction of coral reefs, reduced fishing yields, and posed a threat to traditional fishermen who rely heavily on the ocean for their livelihoods. The negative consequences go beyond the local level, potentially impacting the broader ecosystem and overall environmental sustainability. Efforts to address this problem include legal measures to enforce reclamation obligations and criminalization policies for non-compliance, which aim to reduce the environmental impact of mining activities in Bangka Regency.

Large-scale mining operations such as PT Timah Tbk can have a significant impact on land use and natural resources due to their substantial production levels and land needs For example, PT Timah Tbk's reclamation efforts in former tin mines have shown positive results in terms of backfilling, topsoil spread, erosion control, planting, and water management, highlighting the importance of environmental considerations In addition, Studies on runoff prevention and

control in mining areas emphasize the need for careful planning to reduce environmental impacts, such as designing sinks, ditches, and sedimentation ponds to effectively manage runoff(Yusup, Ashari, and Isniarno 2022). Analyzing access to natural resources in mining areas reveals conflicts between different interest groups, underscoring the importance of balancing economic interests with environmental and social sustainability for long-term survival

Environmental damage in Bangka Regency due to tin mining is indeed severe, as evidenced by various studies. Illegal mining, lack of reclamation, and unauthorized activities have led to significant environmental degradation. Urgent action is essential to mitigate these impacts and safeguard the well-being of the community. Collaboration between governments, communities, and the private sector is essential for a comprehensive approach to effectively address environmental challenges. Continuous evaluation of mining policies and enhanced environmental rehabilitation efforts are essential to improve current environmental conditions in a sustainable manner(Rochmawati, Pawito, and Hastjarjo 2023). By implementing systematic and sustainable assessments, the negative consequences of tin mining in Bangka Regency can be mitigated, ensuring a healthier environment for current and future generations.

Due to the existence of former mining holes, a total of 21 drowning deaths have been documented. Of these, 15 people died in the incident, of which 12 were children under the age of 20, with an age range of 7 to 20 years. In addition to causing deaths, mining activities also create new pathways for diseases, such as becoming mosquito breeding grounds or dangerous areas with increased radiation levels.

Based on these findings, the researcher is interested in investigating the impact of tin mining exploitation on the quality of shallow groundwater and community attitudes towards waste disposal in Bangka Regency. What is the environmental damage caused by mining activities and how it affects groundwater health. In addition, this study also aims to evaluate the attitude of the community towards waste disposal practices that do not meet environmental requirements. Thus, it is hoped that the results of this study can contribute to environmental protection and public health efforts in the region.

II. RESEARCH METHODS

Proposed research on *Collaborative Governance* in overcoming the impact of former illegal tin mining in Bangka Regency in line with existing studies that utilize qualitative methods for data collection[21]. By conducting direct observations, interviews with *Stakeholders*, and analyzing relevant documents, this study aims to explore the dynamics of collaboration between local governments, communities, and private entities in environmental mitigation efforts [22]. This approach reflects the essence of *Collaborative Governance*, emphasizing the need for joint decision-making and integrated mechanisms to address environmental challenges caused by mining activities. Through comprehensive data analysis, this study intends to explain the effectiveness of collaborative models in addressing environmental problems stemming from illegal mining practices, contributing valuable insights to the fields of environmental governance and sustainable resource management.

III. RESULT AND DISCUSSION

The results of the study show that the collaborative governance approach in handling illegal tin mining in Bangka Regency has the potential to be an effective solution [23]. Through collaboration between local governments, communities, and the private sector, various environmental mitigation and rehabilitation efforts can be carried out in a more integrated and sustainable manner. It was found that the active participation of all parties involved is the key to success in dealing with this complex environmental problem [24]

The discussion highlighted the importance of coordination between *stakeholders* in formulating policies and strategies for handling former illegal tin mining. An effective and transparent communication mechanism is needed so that all parties can understand each other's roles and responsibilities [25]. In addition, it was found that a strong understanding of the legal and regulatory aspects related to illegal mining is crucial in ensuring the sustainability of these collaborative efforts [26].

The active involvement of the local community is also a determining factor in the successful implementation of the environmental rehabilitation program. Through their participation in monitoring and implementing rehabilitation activities, a sense of belonging and shared responsibility for the environment is created. This can increase environmental awareness and strengthen local capacity to manage natural resources sustainably.

However, the discussion also highlighted several challenges faced in the implementation of *the collaborative governance* approach. One of them is the difference in interests among stakeholders, which sometimes hinders the decision-making process and program implementation. Therefore, effective mediation and conflict management mechanisms are needed to ensure smooth cooperation [27].

Overall, the results of this study show that *collaborative governance* can be an effective model in addressing complex environmental problems such as illegal tin mining. However, to achieve long-term success, strong commitment and cooperation from all parties involved is needed as well as continuous efforts to repair the environmental damage that has occurred.

Tin mining in Bangka Regency has been going on since the colonial period and continues to this day. PT TIMAH Tbk carries out mining activities on land and sea, with a total of 127 Mining Business Permits (IUP) covering an area of 288,716 hectares on land and 184,672 hectares at sea. Tin mining activities in Bangka Regency have caused environmental damage and casualties. Based on data from Walhi Bangka Belitung Islands, throughout 2021-2022, there were 17 cases of drowning in the underworld, with 11 victims dying, 8 of whom were children to teenagers with an age

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range of 7-20 years. Reclamation efforts continue to be carried out, but there are still many areas scattered in other use areas and forests [28

Figure 1. Tin Mining Activities in Bangka Regency

Tin mining in Bangka Regency has also affected the socio-cultural community. Thousands of former tin mining pits or pits are scattered throughout the land, with some less than 100 meters from settlements. Children are often used as play areas, which can be dangerous. In addition, forest degradation due to extractive industries, one of which is tin mining, is suspected to have triggered socio-cultural changes in the people of Bangka Belitung.

In an effort to improve mining governance, the government is downstreaming tin products by setting export bans. PT TIMAH Tbk has also consistently reclaimed ex-mining land, with a target of 402.5 hectares in 2022 and has realized 366.55 hectares until November 2022. However, there are still many challenges that must be faced to improve mining governance and reduce its negative impact on the environment and society.

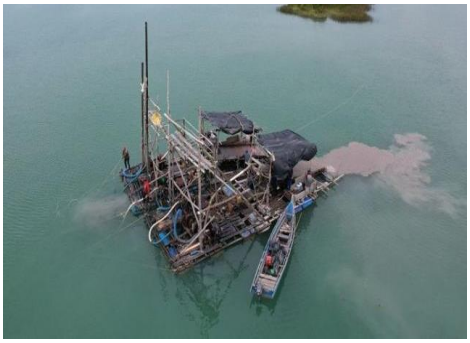

Figure 2. Tin Mining in the Coastal and Sea of Bangka Regency

Tin mining in Bangka Regency has a long history that dates back to the colonial period, when this region was known as one of the largest tin producers in the world. For centuries, tin mining has been the backbone of the local economy, with mining techniques that continue to evolve from traditional to modern methods. The coast and sea of Bangka Regency in particular, have very large tin reserves, which makes this area continue to be a strategic area for the extraction of this mineral. On the coast of Bangka Regency, tin mining is carried out using land mining methods and spray mining (hydraulic mining). This method involves the use of high-pressure water to separate the lead from other sediments [29]. After that, the tin that has been separated is further processed to remove impurities and improve its quality. This method is effective for producing large amounts of tin, but it also has environmental impacts such as erosion and landscape changes.

At sea, tin mining is carried out by dredges and suction boats. These ships are equipped with special equipment to suck up seabed materials containing tin ore. The material is then processed on board the ship to separate the tin from other materials. This type of mining allows access to tin deposits that are not accessible from land, but is often debated due to its potential negative impact on marine ecosystems and coastlines.

IV. CONCLUSIONS

In this study, it was found that collaborative governance in the management of mining excavations in Bangka Regency can increase efficiency and transparency in natural resource management. With cooperation between the government, the community, and companies, environmental security and community welfare can be guaranteed. Therefore, this study suggests that the government and companies increase cooperation and transparency in mining management, as well as increase public awareness of the importance of sustainable natural resource management.

REFERENCES

[1] Abd-Hamid, Izzah, Wan Asrina Wan-Yahaya, and Wan Mohd Razi Idris. 2023. "Effect of Different Black Pepper Crop Ages on the Availability of Nitrogen, Phosphorus, and Potassium." *AGRIVITA Journal of Agricultural Science* 45 (1): 1–10.

[2] Abubakar, Kana Aisha, Isah Muhammad Awwal, and Kana Ahmad Abubakar. 2023. "An Appraisal of Heavy Metal Distribution in Surface Water and Groundwater in the Vicinity of a Salt Mine" 9 (1): 17–25. https://doi.org/10.11648/j.ajwse.20230901.13.

[3] Agussalim, Muhammad Sibgatullah, Ariana Ariana, and Ramlah Saleh. 2023. "Environmental Damage Due to Nickel Mining in Kolaka Regency through an Environmental Political Approach." *Palita: Journal of Social Religion Research* 8 (1): 37–48.

[4] Agustian, A, E Ariningsih, K S Indraningsih, H P Saliem, E Suryani, S H Susilowati, and E Gunawan. 2021. "Study of the Utilization of Ex-Tin Mining Land for Agriculture: Analysis of Land Potential and Constraints Faced." In *IOP Conference Series: Earth and Environmental Science*, 648:12086. IOP Publishing.

[5] Ahmad, Faheem, Qamar Saeed, Syed Muhammad Usman Shah, Muhammad Asif Gondal, and Saqib Mumtaz. 2022. "Environmental Sustainability: Challenges and Approaches." *Natural Resources Conservation and Advances for Sustainability*, 243–70.

Volume 08, Number 03, Page 811-815
e-ISSN: 2598-120X; p-ISSN: 2598-117X

[6] Ahmed, Mustapha Mohammed, Bawa Yusuf Muhammad, Moses Zira Zaruwa, and Semiu Olalekan Ajiboso. 2023. "Effect of Mining Activities on Some Biochemical Parameters of Opanda-Ugya Inhabitants, Toto Local Government of Nigeria." *Asian J. Res. Biochem* 13 (1): 1–11.

[7] Akhrianti, Irma, Moh Agung Nugraha, Aditya Pamungkas, and Andi Gustomi. 2023. "Total Suspended Solid Distribution as Impact Tin Mining at Surrounded Pangkalpinang Seawater Bangka Island." In *IOP Conference Series: Earth and Environmental Science*, 1207:12029. IOP Publishing.

[8] Anang, Emmanuella, Meshack Tei, Anthony Boakye Antwi, Victor Kwabena Aduboffour, and Benjamin Anang. 2023. "Assessment of Groundwater and Surface Water Quality in a Typical Mining Community: Application of Water Quality Indices and Hierarchical Cluster Analyses." *Journal of Water and Health* 21 (7):

[9] Azevedo, Sayonara Vieira de, Andrea Sobral, and Maria de Fátima Ramos Moreira. 2019. "Spatial Pattern of the Environmental Exposure to Tin in the Vicinity of an Alloy Industry in Volta Redonda, Rio de Janeiro State, Brazil." *Cadernos de Saúde Pública* 35: e00079819.

[10] Battimelli, Elvira. 2022. "Exploitation of Energy Geo-Resources and Their Impacts on the Environment." In *EPJ Web of Conferences*, 268:15. EDP Sciences.

[11] Bolly, Yovita Yasintha, and Charly Mutiara. 2023. "Analysis of Soil Physical Quality in Rice Fields in Bangkoor Village, Sikka Regency." *AGRICA* 16 (1): 76

[12] Butar-Butar, Klinton, and Juanita R Horman. 2021. "Sensitivity Analysis At Pt Ae: Sensitivity Analysis At Pt Ae." *Intan Journal of Mining Research* 4 (1): 43–53.

[13] Calzada Olvera, Beatriz, and Michiko Iizuka. 2023. "The Mining Sector: Profit-Seeking Strategies, Innovation Patterns, and Commodity Prices." *Industrial and Corporate Change*, dtad020.

[14] Chaurasia, R S, and S N Mohapatra. 2024. "Effect of Mining Activities on Neighbouring Environment and Eco-Restoration/Management Plan for Abandoned Mining Sites." *Sustainability, Agri, Food and Environmental Research* 12 (2).

[15] Cherchyk, Larysa. 2022. "Methodology for the Assessment of Damage and Economic Losses from Harm to Forest Ecosystems as a Result of Armed Aggression." *Forestry Studies* 77 (1): 2–20.

[16] Darumurti, Awang, Muhammad Baiquni, and Gabriel Lele. 2023. "Collaborative Governance ' s Risk Management (Case Study : Implementation of Tobacco Control Policy in Kulonprogo and Pekalongan City)" 10 (2): 164–78.

[17] Dehghani, Hesam, Marc Bascompta, Ali Asghar Khajevandi, and Kiana Afshar Farnia. 2023. "A Mimic Model Approach for Impact Assessment of Mining Activities on Sustainable Development Indicators." *Sustainability* 15 (3): 2688.

[18] Dewata, Hendra, Ni Nyoman Nepi Marleni, and Budi Kamulyan. 2023. "Source Identification of Groundwater Contamination in Densely Populated Settlements." In *AIP Conference Proceedings*. Vol. 2609.AIP Publishing.

[19] Dwi Haryadi, S H, M Si Ibrahim, and S H Darwance. 2022. "Environmental Issues Related To Tin Mining In Bangka Belitung Islands." *PEOPLE: International Journal of Social Sciences* 8 (3).

[20] Falowo, Olumuyiwa Olusola, and Moses Philip Otuaga. 2022. "A Geo-Environmental Impact Assessment of Abattoir Effluent Discharge on Groundwater Quality in Igoba Area of Ondo State, Nigeria." *Indonesian Journal of Earth Sciences* 2 (2): 110–25.

[21] Fikri, Zakiyudin, and Hattami Amar. 2023. "The Effect of Human Development on Poverty in Bangka District 2011-2020." *Ilomata International Journal of Social Science* 4 (2): 175–87.

[22] Firdaus, Imam, Didik Susetyo, and Restu Juniah. 2018. "Reclamation Planning on Mining Operations PT. Prima Timah Utama in Mapur Village, Bangka Regency, Bangka Belitung Province." *Indonesian Journal of Environmental Management and Sustainability* 2 (4): 98–101.

[23] Gareev, Aufar, and Emil Gareev. 2023. "Characteristics of Environmental Degradation in Mining Areas (A Case Study of the Southern Trans- Urals" 7: 4–12.

[24] Haligamo, Demamu Tagele, and Tamru Tesseme Aragaw. 2021. "Shallow Groundwater Quality and Human Health Risk Assessment in Holte, a Town in Southern Ethiopia." *Ethiopian Journal of Water Science and Technology* 4: 62–89.

[25] Handayani, Lidia, and Evelyn Hanaseta. 2022. "The Role of Life Cycle Assessment in Supporting the Acquisition of the Company Performance Rating Assessment Program (Proper) in the Tin Mineral Industry." *Environmental Engineering Scientific Media (Mitl)* 7 (1): 24–31.

[26] Harahap, Fitri Ramdhani, Ridha Taqwa, Restu Juniah, and Elisa Wildayana. 2018. "Sustainability for Management and Protection Tin Mining Environment." In *E3S Web of Conferences*, 68:3002. EDP Sciences.

[27] Haryadi, D. 2023. "Environmental Improvement Policy through the Obligation of Post-Tin Mining Reclamation in the Islands of Bangka Belitung." In *IOP Conference Series: Earth and Environmental Science*, 1175:12021. IOP Publishing.

[28] Haryadi, Dwi, Ibrahim Ibrahim, and Darwance Darwance. 2022. "Environmental Law Awareness as Social Capital Strategic in Unconventional Tin Mining Activities in the Bangka Belitung Islands." *Society* 10 (2): 665–80.

[29] Haryadi, Dwi, Rafiqa Sari, Muhammad Syaiful Anwar, and Ndaru Satrio. 2023. "Tin Mining in Bangka Belitung Islands and Its Impact on the Reputation of Geographical Indication: A Policymakers Perspective." In *IOP Conference Series: Earth and Environmental Science*, 1181:12011. IOP Publishing.