



## Perspective of Access Theory in the Context of Illegal Gold Mining: Insights from Kuantan Singingi Regency

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### **Abstract**

*Illegal gold mining in Kuantan Singingi Regency, Indonesia, is a complex issue influenced by various power dynamics and socio-economic factors. This qualitative case study examines the application of access theory in the context of illegal gold mining in the region. The study employs a literature review and an analysis of structural and relational access mechanisms to understand the factors driving the persistence of illegal mining activities. The results reveal that financial incentives, low entry barriers, regulatory gaps, political influences, and psychosocial factors contribute to the prevalence of unlicensed and artisanal small-scale gold mining (ASGM). The lack of access to technology and effective governance exacerbates the environmental degradation caused by these activities. The study highlights the need for a cross-sector collaboration approach involving government, security agencies, NGOs, local communities, and the private sector to address the challenges posed by illegal gold mining. The findings emphasize the importance of leveraging technology, such as remote sensing and GIS-cellular automata (CA) concepts, for improved modeling and monitoring of unauthorized land use. Furthermore, understanding the socio-economic factors driving illegal mining, such as access to capital and using privately owned or rented land, is crucial for developing sustainable solutions and promoting equitable resource management in the region.*

*Keywords: ASGM, Access Theory, Kuantan Singingi, Illegal Mining.*

### **1. Introduction**

Illegal gold mining refers to the extraction of gold without proper authorization or permits from the government, often using traditional or rudimentary methods. This activity is prevalent in various regions, including Indonesia, French Guiana, and Brazil, and is driven by economic necessity and lack of employment opportunities [1], [2]. The methods employed, such as using diesel-fueled suction machines and amalgamation with mercury, lead to significant environmental degradation, including soil and water contamination with heavy metals like lead and mercury [3], [4]. The socio-economic impacts are profound, providing livelihoods and alleviating poverty for rural communities but also causing social conflicts and shifting traditional livelihoods, such as farming, to mining [5], [6], [7]. Health risks are also notable, with miners exposed to high levels of mercury, which can accumulate in the body and cause serious health issues, including contamination through the food chain [8]. Additionally, illegal gold mining is associated with various social issues, including drug trafficking, human exploitation, and the spread of infectious diseases, particularly sexually transmitted infections (STIs) [9]. Despite efforts to control and eradicate illegal mining through law enforcement and policy measures, these activities persist due to inadequate regulation and enforcement and the economic benefits they provide to local communities.

Illegal gold mining poses a substantial challenge in

Taluk Kuantan Regency, impacting ecosystems and communities. The local government has adopted measures to combat illegal gold mining, such as enhancing oversight, fostering sustainable livelihoods, and collaborating with communities to promote responsible mining practices [8]. Despite these efforts, illegal gold mining continues to be a persistent issue in Taluk Kuantan Regency, with many miners operating outside of the legal framework [10]. Despite governmental measures to mitigate illegal gold mining, insufficient enforcement and oversight have perpetuated such activities in Taluk Kuantan Regency.

The impact of illegal gold mining on the environment and society has gained increasing attention in recent years, making it an important topic to address [11]. Governments and organizations must implement sustainable practices and regulations that balance the need for economic development with environmental and social responsibility to mitigate the negative effects of illegal gold mining [12]. In addition to adopting sustainable practices, public awareness of illegal gold mining's impacts is essential to promote ethical mining support [13].

Previous studies have explored the environmental [14], [15], and social consequences [5] of illegal gold mining, but there is limited research on the application of Access Theory in this context. This research will address this literature gap by examining the potential benefits of applying Access Theory to the issue of illegal gold mining and its

impact on the environment and local communities. This study seeks to enhance the understanding of illegal gold mining complexities and propose solutions for resource accessibility by applying Access Theory within Taluk Kuantan Regency, thereby addressing knowledge gaps and hypothesizing that such application will elucidate resource access factors and potential remedial measures in these communities.

## 2. Research Methods

The research design for this study was a qualitative case study [16], which involved an in-depth examination of the application of access theory in

the context of illegal gold mining in Taluk Kuantan Regency. The research method used in this study was a qualitative approach, which involved collecting and analyzing data through a literature review and structural and relational access mechanism analysis [17].

A comprehensive literature review was conducted to elucidate access theory and its application in illicit gold extraction. The review revealed various theoretical frameworks that substantiate this theory. The analysis underscored critical themes such as power dynamics and structural influences on resource access, highlighting the significance of stakeholder interactions in the illegal gold mining industry.

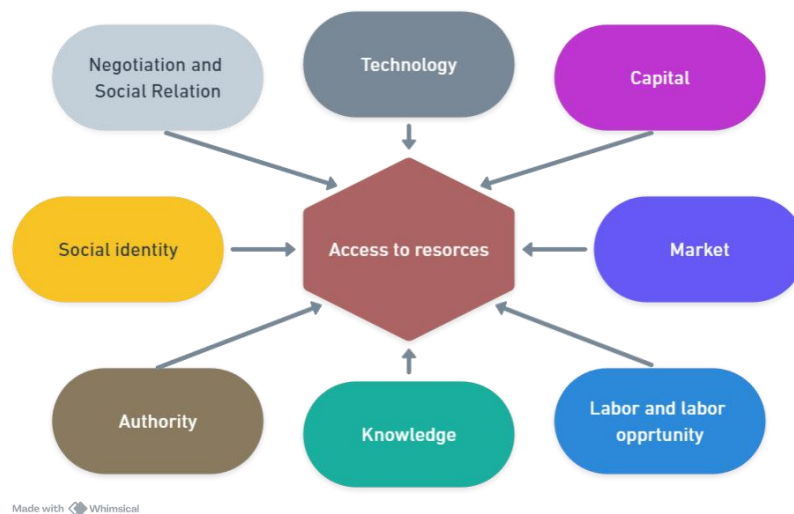


Figure 1. Structural and relational mechanisms of access (adapted from Ribot and Peluso)

The investigation by Ribot and Peluso into the structural and relational mechanisms of access elucidates the intricacies of resource accessibility, thereby providing essential guidance for creating more equitable and efficient resource allocation frameworks across diverse socio-economic contexts.

## 3. Results and Discussions

### 3.1. General Overview

Illegal gold mining is a multifaceted issue influenced by various power dynamics and socio-economic factors. In Indonesia, the persistence of illegal gold mining is driven by financial incentives, low entry barriers, regulatory gaps, political influences, and psychosocial factors, with politicians, government officials, and law enforcement authorities adding complexity to the structure [18].

Gold mining in Kuantan Singingi, Riau, Indonesia, is dominated by unlicensed and artisanal small-scale gold mining (ASGM) activities, which have significant environmental, social, and economic impacts. Land use change and degradation are very

evident during the period 2007 - 2024 (Fig.3). The region has rampant illegal gold mining (PETI), with many mining vessels operating without licenses, leading to extensive environmental degradation and forest destruction [8]. Illegal gold mining activities are widespread in various sub-districts, including Singingi, Kuantan Tengah, Sentajo Raya, and Logas Tanah Darat, where the land is often privately owned or leased for mining purposes [19].



Figure 2. Illegal gold mining activity (source: kesmas.id)

The Kuantan Singingi District Environmental Office states that the number of illegal gold miners

is around 2155 across sub-districts [20]. Discussions about access to natural resources on private land often focus on property rights and ownership [21] and often revolve around the intricate dynamics of property rights and ownership, which are crucial for sustainable resource management and conservation. Property rights frameworks are essential for visualizing and

managing hidden resources like subsurface minerals and groundwater, where resource blindness can impede effective governance [22]. Claeys's theory of interest-based natural property rights, which emphasizes justified interests and productive use, underscores the tension between individual and community interests in resource management [23].

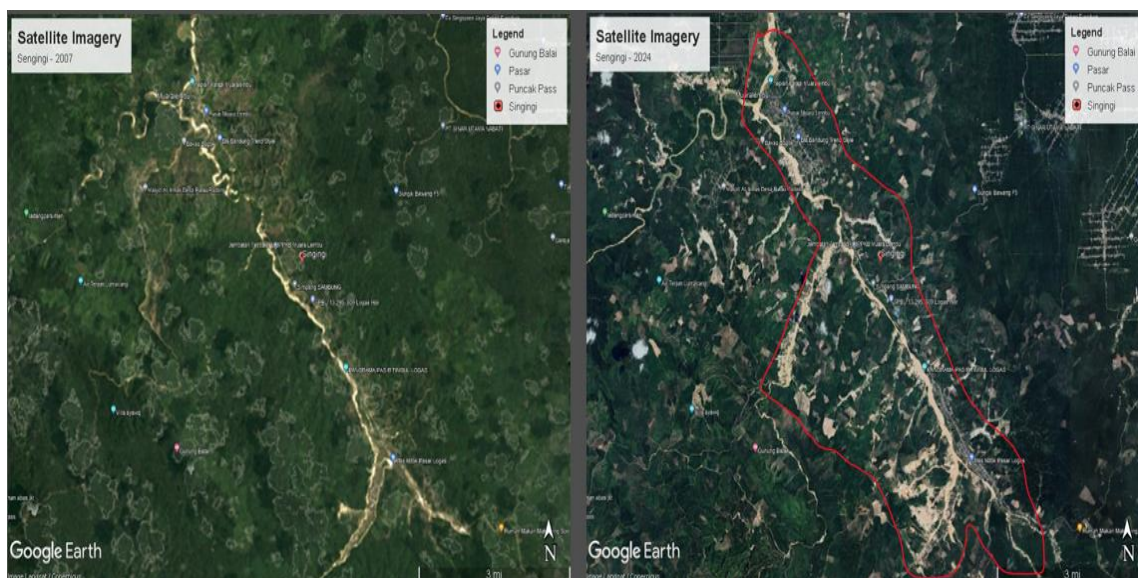


Figure 3. Land cover change 2007-2024

Economists argue that market-based solutions and property rights can effectively address environmental and natural resource issues, but these solutions require practical examples to gain policy-level traction [24]. The dual nature of property—de jure and de facto—further complicates the regulation of property relations, as legal ownership must align with practical application to be effective [25]. Private lands play a critical role in conservation efforts, and identifying areas where landowners are likely to participate in conservation initiatives can help mitigate conflicts and enhance ecological benefits [26].

### 3.2. Insight from access theory

#### Access to technology:

Ribot and Peluso posited that a fence serves as a rudimentary access control mechanism that not only physically deters individuals from utilizing a resource but also signifies the intention to limit access; moreover, the extraction of certain resources necessitates sophisticated tools or technology, which tends to advantage those with access, rendering these technologies and their corresponding institutional networks as distinct "modes of extraction."

Illegal gold mining in Kuantan Singingi Regency is a significant issue, exacerbated by the lack of

access to technology and effective governance. The mining activities, often carried out without permits, have led to severe environmental degradation, including the loss of river water bodies and the inability to use former mining lands for agriculture [8], [19]. The lack of proactive and collaborative engagement from local authorities and community stakeholders in regulating these activities underscores the necessity for a more cohesive strategy, while traditional amalgamation techniques employing mercury present significant health hazards to miners and the surrounding populace due to mercury pollution [27]. Efforts to address these issues include the development of dug wells to provide clean water and prevent the community from resorting to illegal mining [28]. A cross-sector collaboration approach involving government, security agencies, NGOs, local communities, and the private sector is essential for effective policy governance and eradicating unlicensed mining activities [29]. Additionally, implementing remote sensing and GIS-cellular automata (CA) concepts could improve the modeling and monitoring of unauthorized land use, aiding in preventing and controlling illegal mining [30]. The reclamation of former mining lands and mapping of these areas are crucial steps before any rehabilitation efforts can be undertaken [31]. Furthermore, understanding the socio-economic factors driving illegal mining, such as the use of land owned by individuals or rented

from others, is vital for developing sustainable solutions [31], [32]. Overall, leveraging technology and fostering cross-sector collaboration is key to addressing the challenges of illegal gold mining in the Kuantan Singingi Regency.

#### **Access to capital:**

Access to capital plays a significant role in the persistence of illegal gold mining activities in Kuantan Singingi. The mining operations are often funded by individuals or groups with substantial financial resources, who either own the land or rent it from others for mining purposes [8]. These financiers, or investors, are key actors in the conflict surrounding illegal gold mining, driven by the potential for high profits from mining products [19]. The economic allure of gold mining has led many residents to engage in these activities as a primary livelihood despite the lack of legal permits and the associated environmental and social risks [33]. The presence of well-capitalized investors intensifies the situation by facilitating extensive mining through financial support, which is essential for sustaining such operations that individual miners cannot afford. At the same time, local government attempts to regulate illegal mining are hindered by inadequate stakeholder collaboration and weak regulatory enforcement, underscoring the necessity for improved legal frameworks and intersectoral cooperation to tackle these challenges effectively [27]. The environmental impact of these activities is severe, with significant contamination of water bodies and land degradation, making it unsuitable for agricultural use [34]. Ongoing initiatives are focused on fostering alternative livelihoods and enhancing community awareness regarding the risks of illegal mining to diminish reliance on such practices. In contrast, the pivotal role of investor capital in perpetuating illegal gold mining in Kuantan Singingi underscores the urgent need for integrated policy interventions to alleviate its repercussions.

#### **Access to market:**

Market access critically shapes the economic opportunities and constraints associated with illegal gold mining, influencing the capacity to derive benefits through a complex interplay of social dynamics and economic conditions that govern resource utilization [35]. In illegal gold mining, market access critically influences these operations' economic viability and longevity, as evidenced by discrepancies in travel time reporting in Peru that may skew economic behavior assessments and distort the perceived advantages of illicit mining activities. [36]. Furthermore, the role of the state and power relations in the informal economy, as seen in the gold mining sector, highlights how favorable treatment of certain businesses can drive others towards illegal practices to overcome formal

barriers [17]. Despite various eradication efforts in Indonesia, illegal gold mining persists due to the economic benefits it provides to rural communities. This suggests that market access through alternative livelihoods and formalization could be key to addressing the issue [37]. Furthermore, research in tourism reveals that destinations with limited market access may not inherently suffer competitive disadvantages, suggesting that illegal miners could exploit opportunities despite market limitations. [38].

#### **Access to labor and labor opportunities:**

Access to labor and labor opportunities significantly shape who can benefit from illegal gold mining, as evidenced by various studies. In many regions, illegal gold mining provides crucial livelihoods for rural communities, contributing to poverty alleviation despite its controversial nature and environmental impact [39]. The division of labor in these operations is often based on the skills and expertise of the workers, with income distribution reflecting the number of workers and operational costs, which can create job opportunities for those willing to engage in this risky activity [40]. However, the socio-economic benefits are not uniformly distributed. For instance, in regions like Myanmar, many miners are economic migrants who turn to mining as a complementary livelihood to agriculture, indicating that labor opportunities in mining are often a response to economic necessity rather than choice [41]. The informal nature of this sector means that traditional regulatory frameworks are often bypassed, leading to a lack of formal labor protections and benefits [29]. Despite the economic benefits, illegal gold mining also brings significant social challenges, including health risks and the prevalence of transactional sex and substance abuse, which further complicate who benefits from this labor market [42]. Therefore, while illegal gold mining can provide economic opportunities, the benefits are unevenly distributed and often come with significant social and environmental costs [43], [44], [45].

The availability of labor and employment opportunities significantly influences the beneficiaries of illegal gold mining in Kuantan Singingi, where the economic incentives of substantial income entice individuals despite the associated risks and legal consequences, with task distribution often reflecting workers' skills, providing essential but insufficient income for marginalized groups amid limited job options, thus leading to continued participation despite potential governmental intervention.

#### **Access to knowledge:**

Illegal gold mining (PETI) in Kuantan Singingi

Regency poses multifaceted challenges and repercussions, notably environmental degradation due to unregulated mining practices. Efforts such as community-led clean water initiatives and educational programs utilizing story maps aim to raise awareness and provide alternative solutions for affected populations. A comprehensive approach integrating governance, reclamation of contaminated lands, and economic development through village-owned enterprises is imperative for mitigating illegal mining activities and restoring ecological balance.

#### **Access to authority:**

Access to authority profoundly affects individual participation in illegal gold mining within Kuantan Singingi Regency, driven by high-income potential despite regulatory infractions and risks. The ineffective enforcement of mining regulations and limited government-community engagement exacerbate the prevalence of unlicensed activities, underscoring the necessity for improved local governance and intergovernmental cooperation. The decline of traditional environmental management institutions has diminished local regulatory efficacy, highlighting the importance of cross-sectoral collaboration and the integration of customary law with formal regulations to address the challenges posed by illegal mining.

#### **Access through social identity:**

Social identity factors greatly shape access to resources in illegal gold mining in Kuantan Singingi. Social identity theory suggests that group belonging influences behavior and resource access. In illegal gold mining, social identity can create unequal opportunities based on group affiliation. Historically marginalized communities often encounter obstacles in accessing mining opportunities due to persistent social discrimination. This mirrors the impact of social identity on access to education and health, where marginalized groups have restricted access despite favorable economic conditions. Moreover, social identity affects information processing and belief systems, potentially reinforcing disparities in resource access. In labor markets, racial and social identities function as sorting agents, influencing employment outcomes that similarly apply to the mining sector. Social identity also fosters collective meaning and support, which can alleviate or worsen exclusion effects. The intersectionality of identity aspects complicates resource access dynamics as individuals confront multiple identity-related barriers. Thus, comprehending social identity's role in illegal gold mining in Kuantan Singingi is vital for addressing resource distribution inequities and promoting inclusive access.

#### **Access via the negotiation of other social relations of friendship:**

Access to resources in illegal gold mining in Kuantan Singingi is closely linked to social relations such as friendship and trust. Social relations are crucial for navigating and securing resource access. Social complexity significantly influences acquiring scarce resources, which is evident in primate behavior. In illegal gold mining, such behaviors lead to alliances that facilitate resource access. The access economy emphasizes the advantages of access over ownership, shaped by social exchanges. This is pertinent in illegal mining, where access is often negotiated through social ties. The concept of access to justice reveals how social relations aid in overcoming legal barriers for disadvantaged groups. Social networks help navigate law enforcement and local power dynamics in illegal mining. The multidimensional nature of access illustrates how social relations optimize user-resource alignment. Political-economic struggles over resources underscore the importance of social relations in mediating access amid inequality. Thus, in Kuantan Singingi, social relations are pivotal in determining access to resources in illegal gold mining.

#### **4. Conclusion**

Illegal gold mining in Kuantan Singingi Regency, Indonesia, is a complex issue driven by various factors such as financial incentives, low entry barriers, regulatory gaps, political influences, and psychosocial factors. The region is dominated by unlicensed and artisanal small-scale gold mining (ASGM) activities, which have led to significant environmental degradation and forest destruction. The lack of access to technology and effective governance exacerbates the problem. The study highlights the need for a cross-sector collaboration approach involving government, security agencies, NGOs, local communities, and the private sector to address the challenges posed by illegal gold mining. Understanding the socio-economic factors driving illegal mining and leveraging technology for improved modeling and monitoring of unauthorized land use is crucial for developing sustainable solutions and promoting equitable resource management in the region.

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