

## **SMALL-SCALE GOLD MINING PRODUCTION TECHNOLOGY IN BUSINESS LAW PERSPECTIVE**

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### **Abstract**

This study was conducted to analyse and understand the technology of small-scale gold mining production carried out by the community through a business law perspective and try to provide alternative solutions for gold mining communities to pay attention to existing laws and regulations, as well as the government. Thus, it can accommodate the community's efforts. Thus, it is more legalized through applicable laws and regulations. The research method used in this study is a normative legal research method by conducting library research by analysing gold mining production according to related literature that is linked to the provisions of laws and regulations that apply to small-scale gold mining business production activities in Indonesia. We try to answer about the existence of small-scale gold mining carried out by the community with research results showing that small-scale gold mining businesses still use simple production technology, do not use environmentally friendly technology equipment that can provide broad benefits, from mining activities, the community also tends not to have a permit because existing laws and regulations are not sufficient to accommodate the community who mine in their area. The government needs to provide a solution by providing opportunities for the community to run small-scale mining businesses by providing convenience in granting permits and facilitating safe and sustainable gold mining technology in these regulations.

Keywords: Business law, Gold mine, Production, Safe and sustainable, Small-scale.

## 1. Introduction

Indonesia is rich in mineral content spread across various regions in Indonesia, but not all regions have the potential for gold mining. Gold mines are not only found on land but also in rivers [1]. Gold mining is a very strategic mineral commodity with very high economic value that is controlled by the state for the prosperity of the people following the mandate of Article 33 paragraph 3 of the 1945 Constitution [2]. The state grants permits to investors, both state and private companies, including small-scale gold mining businesses owned by the people that are run individually or cooperatively. Mining activities in Indonesia must be carried out in accordance with applicable laws and regulations. Arrangements regarding mining business activities are not only before and during mining production but also at the time after mining production is completed. Mining companies are bound by regulations to repair environmental damage arising from mining activities, the repair of environmental damage must be carried out as soon as possible without waiting for the entire mining process to be completed [3]. Before this research was carried out, many previous researchers had researched gold mining. Table 1 is the research on gold mining that has been carried out by other researchers.

**Table 1. Previous research.**

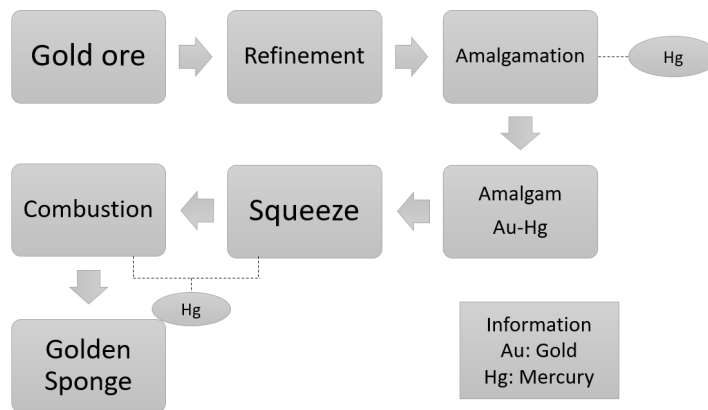
No.	Title	Ref.
1	Analysis of the impact of illegal gold mining on the environment in West Sumatra	[4]
2	The impact small-scale gold mining (SSGM) on agricultural production and the implementation of regional regulations	[5]
3	Isotherm and kinetic adsorption of rice husk particles as a model adsorbent for solving issues in the sustainable gold mining environment from mercury leaching.	[6]
4	How to calculate economic evaluation in industrial chemical plant design: a case study of gold mining using amalgamation method.	[7]
5	Research trend on the use of mercury in gold mining: Literature review and bibliometric analysis.	[8]
6	Techno-economic evaluation of gold nanoparticles using banana peel ( <i>musa paradisiaca</i> ).	[9]
7	Human basic need of housing supported by land bank system	[10]
8	Providing affordable housing for low-income people in Indonesia	[11]
9	The turbulences of strata title in the legal system of indonesia as a result of malcadastral	[12]
10	Land use reformulation of North Jakarta ex-reclamation for land procurement toward affordable houses in Jakarta	[13]

Based on our previous studies, the purpose of this research is to analyze and find out the production technology of small-scale gold mining carried out by the community through the perspective of business law and try to provide alternative solutions for the gold mining community to pay attention to existing legal regulations, as well as the government. Thus, it can accommodate the business of this community, and it is more legalized through applicable legal regulations.

Novelties of this study are the government creates legal regulations that accommodate the needs of communities living around gold mining areas by facilitating the granting of mining business permits and then appointing these communities as supervisors of the production process of small-scale gold mining businesses in order to ensure that small-scale gold mining production is carried out by the community in accordance with the regulations imposed by the government.

## 2.Literature Review

In the small-scale gold mining (SSGM) sector, mercury is known as silver water which is one of the most common gold ore binding materials used by traditional miners. The use of mercury in gold processing is the worst practice in SSGM activities. The use of mercury in the SSGM sector can have an impact in the form of pollution and environmental chaos, as well as threatening human health. In general, SSGM miners have low technical skills and limited finances. On the other hand, the miners wanted to earn high-level gold. The gold processing process that uses mercury in logs is very easy to find at all vulnerable points in Indonesia and mercury emissions are one of the serious problems because workers are very vulnerable to inorganic mercury [14]. The processing process of gold ore using mercury is presented in the following Fig. 1.



**Fig. 1. Gold ore processing process using mercury.**

The gold ore is crushed and then bound or amalgamated with mercury after which the results of the amalgamation are then washed and trayed to separate the amalgam (a combination of gold/silver metal with Hg) from the pulp (tailings). The obtained amalgam is processed through burning (crushing) to obtain a combination of gold-silver metal (bullion), then the separation between gold metal (Au) and silver metal (Ag) is carried out using a silver nitrate solution [15]. Mercury (Hg) is one of the heavy metal pollutants and is a natural element that often pollutes the environment and is highly toxic. In the environment, this element is bound to other chemical elements that are scattered in corals, soil, air, water, and even in living organisms. Mercury is rarely found in free form. The distribution of mercury is also influenced by complex geological, physical, chemical, and biological factors. Waste disposal, both containing toxic compounds and heavy metals, is another factor that also affects the quality of plants. These materials come from watersheds and residential areas as well as mining areas that dump waste into rivers.

### 3. Method

The research method used in this study uses a doctrinal legal approach commonly called normative juridical research, which is a series of legal research conducted by researching literature materials or secondary data as basic materials to be researched by studying laws and regulations, theories, concepts related to mining production activities in Indonesia [16].

### 4. Results and Discussion

Indonesia is known as a country rich in abundant natural resources, various natural resources are spread across various regions in Indonesia, and one of them is resources in the mining sector. Natural resources that can be referred to as excavated materials are listed in Article 33 paragraph 3 of the 1945 Constitution as owned and controlled by the state to be used for the prosperity of the people. Part of the mandate of the 1945 Constitution is the foundation for mining and energy development to be able to utilize the potential of natural resources owned by the state, especially mineral and energy resources that can legally support sustainable national development. Some people use these natural wealth products to meet their needs, only the industrial sector also produces mini-style wealth products by exporting mining products which can later build the country's foreign exchange, one example of a large mining company that produces mining products, namely PT. Freeport, PT. Various Mines and many more [17].

Mining business licensing is regulated in the Regulation of the Minister of Energy and Mineral Resources of the Republic of Indonesia No. 19 of 2020 concerning Amendments to the Regulation of the Minister of Energy and Mineral Resources of the Republic of Indonesia No. 25 of 2015 concerning the Delegation of Authority to Grant Permits in the Mineral and Coal Mining Sector in the series of Implementation of One-Stop Integrated Services to the Head of Coordination Investment not all gold mining activities have permits, or commonly abbreviated as PETI. Illegal gold mining is an activity carried out by exploring natural resources and many negative things are caused.

There are 3 impacts carried out by illegal mining, namely in terms of economy, environment, and health. Mining that does not follow legal procedures results in damage to the soil structure to become unstable and cause landslides. In addition, illegal gold mining can also cause large holes that are not closed again, which causes flooding and damage the ecosystem around the mining area. Cyanidation gold processing has been common in large gold mining companies. But in recent years, cyanide has spread from the gold mining industry to mining operations on a smaller scale. The addition of cyanide in the washing process has a major influence on the gold obtained because cyanide forms a complex with gold. Where the gold ore is broken down and then spread into 200 mesh using a ball mill. The homogeneous rock is then cyanate by providing air and stirring in a tank for 48 h to adjust the pH conditions between 10.5 and 11 using lime. Then the adsorption process is carried out by adding activated carbon. The gold absorbed by the carbon is then melted at a temperature of 1000-1200°C. The cyanide added to the washing process has a great effect on the gold obtained, as the cyanide will be complex with the gold. The cyanide waste treatment method has been widely studied by us. These methods can be grouped into natural decomposition, chemical addition under controlled conditions, biological oxidation, cyanide recovery, adsorption, and

electronics. The processing process of gold using cyanide is presented in the following Fig. 2.

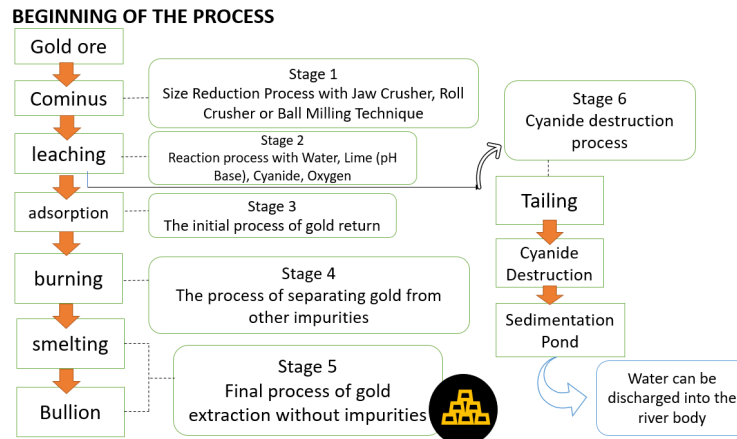


Fig. 2. Gold ore processing process using cyanide.

With this cyanidation technology, it is hoped that can be able to become a conductor for the transfer of knowledge and technology for processing non-mercury gold in Indonesia. Thus, it can be the starting point for the elimination of mercury and the improvement of SSGM conditions in Indonesia [18]. Gold mining production activities have a significant negative impact on the environment and the surrounding natural life ecosystem if not done properly and correctly, including polluting drinking water that affects human and animal health and damaging the natural environment and ecosystem. The very serious negative impact is due to the use of mercury which is a dangerous drug as a means of gold mining production [19]. Synthetic changes essentially affect groundwater and surface water, followed by tangible changes in soil morphology and geography. In addition, microclimate change is caused by variations in wind speed, destruction of biological habitats that are habitats of flora and fauna, and decreased soil productivity that causes land to be deforested or deforested. Referring to these changes, making prevention and recovery efforts is fundamental [20].

In Indonesia the use of mercury, especially in SSGM has been banned since 2019. Mercury can be emitted into the air during the combustion process of amalgam. Thus, exposure to mercury through breathing has the potential to harm health. Mercury can also be released into the environment into water, sediment, and soil media during the mixing process with gold ore and amalgam extraction. During the amalgamation process in the bubble/chanca, the mercury released and emitted into the environment is about 48.98%, consisting of 18.38% released into the tailings, 29.07 emitted during the decomposition of the amalgam, and 1.53% emitted during melting [21].

Mining activities carried out near this settlement have the potential to pollute the surrounding environment, including clean water sources. Mine workers, especially women involved in the rock-breaking process, are exposed to high health risks without adequate protection.[22]. The factors that influence people's decisions

to prevent or not to prevent the use of mercury can be very diverse, including economic, educational, and informational aspects. Gold mining companies need to have awareness to attach importance to the safety and health of mining workers who are close to safety and health risks with the aim that mining companies protect and guarantee work safety from accidents, ensure that every tool or production material used is safe for health and the company's concern for the welfare of mining workers. Mining is a tough job. Thus, companies need to pay attention to the nutritional health of workers, especially those who are directly involved in the gold mine site. Improving the nutritional health of workers is one of the occupational safety goals that is no less important in gold mining this is because nutritional health has a big influence on productivity. [23].

All mining business activities, including small-scale gold mining, both carried out by individuals and cooperatives, must follow Article 67 of Law No. 3 of 2020, Article 62 of Government Regulation No. 96 of 2021, Article 4 of Presidential Regulation No. 55 of 2022, Article 15 of Ministerial Regulation No. 10 of 2023, however, gold mining activities are carried out by the community without regard to applicable laws and regulations. The reason why the community around the mining business runs a business without a license is because it provides opportunities for the economy. These opportunities are in the form of participation in the mining sector, such as investors, gold miners, and workers. There are also various other business opportunities as a result of the mining industry, such as shops, food stalls, and workshops [24].

According to research results, the reason why people run gold mining businesses without a license is that the community of unlicensed miners has enjoyed the benefits of running the business because they have received protection from village officials and other officials who also benefit, including every buyer, both individuals and large/small companies can take advantage of the purchase of gold mining business products without a license [25]. The author offers a solution to encourage small-scale gold miners to have the following permits: for the government to facilitate the issuance of existing small-scale gold mining business licenses. Thus, all small-scale gold mining has permits. Furthermore, the government issued regulations aimed at encouraging supervision of small-scale gold mining businesses. Thus, the gold circulating in the market is legal gold sourced from mining companies that have permits, including small-scale gold mining. The government also encourages to provision of facilitation for the safe and sustainable use of technology to the mining community to always pay attention to occupational safety and health [26].

## **5. Conclusion**

Existing laws and regulations have not accommodated the creation of small-scale gold mining businesses that are environmentally friendly and safe for miners' health, although laws and regulations have changed several times. Because small-scale gold mining communities have enjoyed the economic value of running these businesses, the government needs to facilitate the granting of business permits for small-scale gold mining by issuing legal regulations and involving the community in supervising compliance with the small-scale gold mining production process.

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