Legalization of illegal small-scale mining, as a policy of business guarantee and environmental management

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Abstract. Small-scale mining has a very long history, and the majority operated without permits: coal and almost all kinds of minerals they cultivate. The area of operation covers most of Indonesia. There are grab licensed mining areas. The number of illegal miners is estimated at more than 3.6 million people, about 1.4 million gold miners. This activity has been going on for years, never be solved. The Negative impacts of illegal mining, include the loss of potential state revenue, environmental damage and mercury pollution, mining accidents, social vulnerabilities, conflicts with licensed companies, and no resource conservation. It is time for this issue serious attention of the government to be resolved. Legalization by granting permits can be a business guarantee that will grow responsibility for regulations and become the basis for environmental management. This research is socio-legal research. The role of local governments, associations, and the state-owned company is required in technical guidance on mining and the environment, institutions, business management, and product markets. If the activities can be managed and developed, the negative impacts can be overcome. So, the benefits of their business can become a forum for people's activities in the mining sector, and state revenues can be collected.

1. Introduction
The portrait of mining in Indonesia shows two very different sides. Most of the licensed mining is growing and developing by the existence of large-scale modern mining companies with an export orientation that the government relies on, such as Freeport Indonesia (copper) in Papua, Vale (nickel) in South Sulawesi, PT Aneka Tambang (bauxite), PT Kaltim Prima Coal or Adaro (coal) in East Kalimantan, and others. Behind the sparkle of multinational companies with an export product orientation, there is an under-disclosed fact that Indonesia is also a place bustling with small-scale mining activities which have generally been carried out illegally since ancient times. The number of workers in this sector is much larger than those working in formal or licensed mining companies. The impact of the COVID pandemic has hit all sectors of the economy, including illegal mining carried out by the people. However, behind all that, this type of informal small-scale mining work has become a savior when the economic situation is complex. Many of them depend on "illegal" activities, so it becomes crucial to find a way out for illegal activities [1]. Small-scale mining has a long history in Indonesia. Its activities began before independence days, such as the artisanal tin mine in Bangka and the artisanal gold mine in West Kalimantan and Sumatera. This community mining is generally carried out without a permit in its activities, often known as 'Mining Without Permits/PETI.' The types of minerals used by these illegal miners are coal and almost all kinds of minerals. Small-scale mining is a mining activity limited by area and investment area for local communities or cooperatives whose members are the local community. Small-scale mining commercializes metal, non-metallic, and rock minerals with technology mastered by the local community. Coal is no longer allowed for small-scale mining because it is only possible to
commercialize with heavy equipment and significant capital. Generally, Artisanal Mining (ASM) or small-scale mining conducted by the local community are not immigrants from other areas. Due to their sense of ownership, the local community will manage their area well.

At first, this illegal small-scale mining was not a problem because it was carried out by the local community, only as a side job to meet daily life needs, and the environmental impact was minor. The rise in PETI activity showed a significant amount during the reform era in Indonesia because many miners from outside the region participated in mining in newly discovered gold areas. In a short time, the number of PETI is expected to increase sharply compared to the pre-reform period. During this period, several cases of PETI took, occupied, and controlled areas were mined belonging to licensed mining companies [2]. In some literature, the number of illegal miners is because mining carried out by the people has not received the right and proper place. Setting the permit requirements is the same as medium and large companies [3], and it has not received attention from the government in the form of guidance in technological aspects: mining, capital, institutional, and others [1]. Several studies have defined community mining as small-scale mining that is carried out traditionally but sometimes covers a fairly large area because the local community manages it without being balanced with limited equipment, knowledge, and capital. These limitations are vulnerable to accidents and work safety, social vulnerabilities, and causes pollution and uncontrolled environmental damage [4].

Law No. 4 of 2009 concerning Mineral and Coal Mining rules for the people through small-scale mining permits (Izin Pertambangan Rakyat/IPR) and People's Mining Areas (Wilayah Pertambangan Rakyat/WPR). However, in the arrangement for taking sides with the people, it is not visible. The content of this regulation shows an element of substance that is not clear and does not match the facts. The laws and regulations already regulate permits for community mining in the form of IPR. Still, regulations are difficult to enforce because of the law-making process in preparing of regulations, causing problems in implementing regulations. It is these non-operational regulations that directly affect the mining activities of unlicensed people. In taking action against violations of regulations, there is finally a dilemma because illegal mining is related to community poverty, becoming a job opportunity, and around 77% of these illegal mining actors experience an increase in welfare [6].

The results of general/mainstream research are in line with the attitude and handling of the government so far towards this sector, which places the people's gold mining sector in Indonesia in an unfavorable position [7]. Another factor that increases the number of illegal mining in Indonesia is that it becomes a political commodity. The illegal miner could support potential to specific political goals, especially in any elections. Other factors that come to work, such as the existence of the perception that mining communities are people looking for a livelihood that must be protected, the inability of the local government to provide employment opportunities, and the lack of harmonious relations between the local government and the central government in terms of mining permits. Some of these things have resulted in almost all community mining activities being unlicensed, aka 'illegal' [3].

Regarding the data on the number of licensed and illegal community mining as well as the location of its operation, there are differences between several ministries/government agencies. Based on data from the Directorate General of Mineral and Coal (DJMC) in 2019 and reports from the provincial government, the distribution of PETI is relatively even in Indonesia from Sabang to Merauke. Meanwhile, the reported IPRs are only 89 IPRs in 7 provinces, with the highest number in the Special Region of Yogyakarta. According to data from the Research and Development Center for Mineral and Coal Technology in 2000, there are 77,000 mining operations in nearly all minerals for the industry with a value of about 58 million US dollars per year. Still, only 3% are carried out with permits [4]. Meanwhile, PETI data is still based on the location of its operations, namely: there are 22 locations (3 provinces) that plunder the coal concession areas of PKP2B and IUP, 18 locations (14 provinces) that operate in the mineral permit area of KK and IUP, and whose activities are in
outside the permit area are in 12 provinces [8]. According to APRI submitted to the Directorate General of Mineral and Coal, the number of miners in Indonesia is more than 3.6 million people, of which 1.4 million of them are gold miners with total gold production of ± 120 tons of gold/year and hundreds of gold miners, thousand for rock mining (class C) for construction, coal, tin, galena, and copper [9].

The impact of illegal small-scale mining is very significant in the potential loss of state revenue and the adverse effects on social and environmental problems. On a national scale, in 2014, the foreign exchange losses from gold due to illegal activities, both the people's and the industry's scale, amounted to IDR 32 trillion, uncalled royalties of IDR 1.2 trillion, and taxes IDR 4.8 trillion [10]. While the 2018 data, KLHK data shows that the potential loss of state revenue from illegal gold mining activities reaches IDR 38 trillion every year and non-gold around IDR 315 billion per year. This amount does not take into account the cost of rehabilitation for environmental damage caused by PETI. In addition to environmental damage such as fires, acid mine drainage, and mercury pollution to the environment, PETI activities also cause fatalities due to accidents during mining activities that result in the death of PETI workers. At the PETI location located within the Mining Business Permit Area, the resources and reserves owned by the company also decreased significantly. They disrupted the development of mining activities carried out by the company [11].

The legality of the permit for this IPR is a policy to side with the mining people. In addition, it is a form of guarantee for the people to do business in the mining sector and become the basis for implementing environmental management activities. Legalization through the granting of permits is a process of formalizing illegal mining. In the case of Peru, it is carried out through six main stages, namely: (1) the declaration of commitment to follow the process within the mining corridor, (2) accreditation of ownership of concession or contract with a concessionaire, (3) authorization for the use of land with no conflicts over rights, (4) authorization for the use of water, (5) environmental impact mitigation and correction instrument, and (6) authorization to initiate the mining operations [12].

So far, the process of approaching the legalization of illegal small-scale mining in Indonesia has never been carried out, especially regarding the implications of licensing on the emergence of problems downstream of the activities carried out by illegal small-scale mining above. Therefore, this paper will examine how the legalization of illegal small-scale mining can reduce various problems downstream. The positive impact of legalization will result in multiple benefits, including implementation of good mining practices to minimize adverse environmental impacts, state revenues from mining taxes can be collected, conflicts and social vulnerabilities in the community can be managed, people's participation in mining is accommodated, people's prosperity more realizable, and so on.

2. Data and Method
The collected primary and secondary data are from various research conducted by the author, competent institutions/agencies. Data and information collection is carried out by taking an inventory of regulations and examining library materials, including writings and scientific papers. In addition, research was also carried out on other material sources such as reports and exposures related to the problems in this paper [13].

The research method is a descriptive-analytical one. In descriptive research, it is carried out to reveal a problem and situation as it is. The descriptive research steps are data collection, classification, processing or analysis, making conclusions and suggestions [14]. In other words, analytical descriptive research takes problems or focuses attention on problems when the research is carried out. The results of the research are then processed and analyzed to be finally concluded [15].

This research is socio-legal research that has the following characteristics: 1) textual studies, articles on laws and regulations, and community mining policies with critical analysis of the highest regulations to operational regulations and their implications for the legal subjects of community mining; and 2) developing new analyzes by combining legal and social science methods [16].
3. Small-scale mining conditions and problems

3.1. Era before Law No. 11 of 1967 and the Dutch colonial period
The era before Law No. 11 of 1967 was partly the period of Dutch colonial rule. In 1899 the Dutch colonial government issued a basic mining regulation regulated in the Indische Mijn Wet of 1899 Staatsblad 241. The Indische Mijn Wet of 1899 was later added and amended in 1910, 1918, and 1906. Major mines included coal mines in Ombilin, and the state carries out tin mining in Bangka. At the same time, in several areas, small-scale mining was growing, although there was no regulation on small-scale mining. At that time, the local authorities granted small-scale mining permits with the scope of mining materials such as tin, gold, and diamonds. Especially for diamond mining, the Dutch colonial government issued Ordonantie on 25 November 1923 Staatsblats 1923 No. 565, which revoked the Ordonantie dated 7 June 1990 Staatsblats 1990 No. 174 [17].

3.2. The Era of Law No. 11 of 1967
In the era of Law No. 11 of 1967 concerning Basic Provisions of Mining are grouped into three categories of excavated materials as regulated in Article 3, namely: a) strategic excavated materials group; b) vital excavated materials group; and c) class of excavated materials not included in the group a) or b). The definition of small-scale mining is a mining business to mine all excavated materials from all categories a, b, and c which the local people carry out on a small basis or in cooperation with simple tools for their livelihoods.

If the amount of strategic excavated materials sediment is so small that in the opinion of the Minister of Mining, it would be more profitable if it was cultivated in a simple or small commercialized, then the excavated materials sediment could be commercialized by small-scale mining. The state may only exploit excavated materials but allow the private sector or local people to commercialize it for the interests of the state economy or mining development among many people. However, the state will only commercialize strategic excavated materials related to state security and cannot be transferred to the private sector or small-scale mining.

Implementing Law No. 11 of 1967 is Government Regulation No. 32 of 1969 stated that limit for the area for one small-scale mining permit could not exceed five hectares. The total area of the small-scale mining permits granted to individuals or non-cooperative entities does not exceed 25 hectares.

3.3. The Era of Law No. 4 of 2009 and Its Amendments in Law No. 3 of 2020

3.3.1 The Era of Law No. 4 of 2009. According to Law No. 4 of 2009 concerning Mineral and Coal Mining (Law No. 4 of 2009), the definition of small-scale mining permit (IPR) means a permit to conduct mining business within a small-scale mining area with limited area size and investment. A small-scale mining area (WPR) is part of mining zones where small-scale mining activities are carried out.

In this era, the regents/mayors publicly announce the WPR planning before the WPR is determined. Before determining the WPR, the regents/mayors must first consult with the Regional House of Representatives of districts/cities. There are several criteria for determining a WPR: primary metal or coal deposits at a maximum depth of 25 meters. The maximum area shall be 25 hectares and have been working on it for at least 15 years. Article 24 of Law No. 4 of 2009 mentions small-scale mining areas or sites that have been worked on but have not yet been determined as WPR shall be prioritized to be determined as WPR.

3.3.2 The Era of Law No. 3 of 2020 (Amendment to Law No. 4 of 2009). During its development, the permit provisions for small-scale mining in Law No. 4 of 2009 have answered the problems and actual conditions. Therefore, in 2020 a re-regulation of permits for small-scale mining was issued through Law No. 3 of 2020 concerning amendments to Law No. 4 of 2009 (Law No. 3 of 2020). The re-regulation of permits represents a change in government policy in the small-scale mining sector. Several provisions related to small-scale mining in Law No. 4 of 2009 were amended and added in this era. The provision that the regent/mayor determines WPR after consultation with the Regional
District/Cities Representative is deleted. However, article 24 as the basis for the legalization of PETI still exists in Law No. 3 of 2020.

The provisions of the WPR criteria were amended to be:

a. Having secondary mineral deposit found in rivers and/or between two banks of the river;
b. Having primary metal minerals at a maximum depth of 100 meters;
c. Having terraces deposit, floodplains, and paleochannels;
d. Having the maximum area of the WPR is 100 hectares;
e. Mentioning the type of commodity to be mined; and/or
f. Fulfilling the criteria for spatial and area utilization for commercialized mining activities according to statutory regulations.

Article 35 stated that IPR is one of the business permits from the central government, and the central government can delegate the authority to grant business permits to provincial governments. This era also issued a new permit concept related to exploiting of certain rock types or for particular purposes through a Rock Mining Permit (Surat Izin Penambangan Batuan /SIPB). Apart from that, Law No. 3 of 2020 regulates that there is no more IPR for coal commodities, the deletion of areas that have been worked on for at least 15 years, remove the IPR of community groups, and introduce the concept of the small-scale mining fee (iuran pertambangan rakyat/Ipera).

Law No. 3 of 2020 was issued coincidentally with Law No. 11 of 2020 concerning Cipta Kerja/Job Creation. The nuance of permits in this era is centralization, which the central government issues, as stated in Article 35 above. The authority of the provincial government to manage mineral and coal mining remains in effect for a maximum period of six months from Law No. 3 of 2020 effectiveness or until the issuance of the ancillary regulations. However, within the said period of six months, the Minister of Energy and Mineral Resources (EMR) or the governor cannot issue new permits.

Practical, since the issuance of Law No. 3 of 2020 on June 10, 2020, there has been a vacancy in the issuance of new permits for small-scale mining. The regulatory vacuum also occurred because Law No. 3 of 2009 has not implemented regulating small-scale mining administratively and technically. Regulations ancillary to Law No. 3 of 2020 have not been published, so the authority delegated to the regions (provinces) is only limited to management, not for the issuance of new permits. The provincial government cannot regulate small-scale mining permits through Law No. 3 of 2020 to formulate regional regulations.

To fill in the vacuum of ancillary regulations to Law No. 3 of 2020, the Ministry of EMR submitted Letter Number 1481/30.01/DJB /2020 dated 8 December 2020 concerning the mineral and coal mining management authority to all governors Indonesia. Moreover, the Ministry of EMR also submitted Letter Number 1482/30.01/DJB/2020 concerning the delegation of authority to issue mineral and coal sub-Sector permits to the Head of Investment Coordinating Board.

3.4. The main issue of small-scale mining from time to time

Small-scale mining is a classic one since there has been no comprehensive solution due to a proper legal understanding. The same problems can be found generally in various regions and even in various parts of the world. Small-scale mining has existed for generations since the beginning of this nation’s history and because of various problems related to social conflicts and the necessities of life or public welfare, employment, and others.

The Ministry of Environment and Forestry (Kementerian Lingkungan Hidup dan Kehutanan/KLHK) communication channel has stated that thousands of mining locations without permits or illegal mining (PETI) were involved around two million miners throughout Indonesia in 2015. The KLHK verification shows that 302 locations consist of 225 PETI, 40 mining permits (Izin Usaha Pertambangan/IUP), and 8 IPR locations spread in 31 provinces. Miner composed of 62% residents and 38% immigrants, increasing welfare for 77% miners. The labor issue shows that child labor finds in 36 locations, while the elderly and women are in 53 locations, with social conflicts are in 84 locations [18].
Based on the Ombudsman's study, there were significant losses due to illegal mining activities, material losses for the state and the environment [19]. State losses for illegal mining activities reached more than IDR 100 trillion [20].

According to data of Directorate General of Mineral and Coal (2019), PETI operation can be mapped into 3 groups, namely 1). PETI operating in the area of coal contracts (Perjanjian Karya Pengusahaan Pertambangan Batubara/PKP2B), IUP or IUP foreign investment (Penanaman Modal Asing/PMA) coal include 22 locations, among others: PT Taniot Harum, PT Santan Batubara, PT Manambang Muara Enim, PT Bukit Asam, PT Selo Argokencono, PT Selo Argodedali, PT Barasentosa Lestari, PT Wahana Baratama Mining, PT Banjar Intan Mandiri, PT Gerbang Daya Mandiri, CV Mulianan Jaya, PT Arutmin Indonesia, PT Jorong Baratama Greston and others. 2) PETI operating in the area of contracts of works (Kontrak Karya/KK), IUP atau IUP PMA Mineral include 18 locations among others in area: PT Woyla Aceh Mineral, PT Sorikmas Mining, PT Agincourt Resources, PT Timah tbk, PT Indomuro Kencana, PT Mindoro Tiris Emas, PT Amman Mineral Nusa Tenggara, PT Kalimantan Surya Kencana, PT Gorontalo Sejahtera Mining, PT Gorontalo Mineral, PT Tambang Mas Sangihe, PT Nusa Halmahera Mineral, PT J Resources Bolaang Mongondow, PT Freeport Indonesia, and others. 3) PETI operating outside the mineral and coal mining business permit area [8].

People’s mining is often understood only as small-scale mining that has a permit. Meanwhile, small-scale mining without permits is considered non-existent, implying problems solution based on law enforcement only. On the other hand, this fosters the practice of backing, extortion, thuggery, and smuggling of small-scale mining products. The Indonesian People's Miners Association (APRI) said that small-scale miners have to pay illegal fees and tribute on average 40% to 60% of their work.

The main issue is how much small-scale mining is in the form of PETI. PETI is the main problem that mainly occurs due to their illegal status. It makes real existing activities become problems that are unreachability even by the presence of the state/government as in the 4th Nawacita mandatory, "Strengthening the presence of the State in carrying out system reform and law enforcement that is free of corruption, with dignity and reliable" and in the 7th Nawacita mandatory, "Realizing economic independence by moving the strategic sectors of the domestic economy".

The importance of the state's presence on PETI is a formal legal status for small-scale mining and its business guarantees and many downstream issues that can be resolved. Some of the downstream problems include the environmental impact. Conditions in illegal mining have caused severe damage and adverse impacts such as flash floods and river pollution [21]. Excavation techniques that are not under the guidelines and waste disposal can damage the environment, such as increasing soil toxicity and polluting rivers, even endangering the health of local communities, as exemplified in the Minamata mine. Other problems that have occurred include the riots in mining areas due to neglected environmental claims and community rights [22].

Apart from downstream issues, several upstream problems also exist in small-scale mining, such as issues of access and range of bureaucracy, permits and requirements, and the capital and facilities framework. This paper focuses on efforts to legalize PETI as the root of all existing issues.

4. Results and Discussion

4.1. Legality function of small-scale mining permits
Legalizing illegal mining is carried out based on the nature of its activities, the area of operation, and the socio-economic and environmental impacts. Based on the nature of its activities, small-scale mining is divided into several categories as follows: [23]

1) Traditional, in areas where gold has been known for generations, small-scale mining is considered an essential part of traditional livelihoods in the area. These activities often involve family members where traditional knowledge and mining rights are inherited through family ties. In addition to its livelihood function, small-scale mining can also be considered a cultural tradition.

2) Seasonal, small-scale mining is often combined with other livelihoods such as agriculture, where farmers turn to the farm to become miners.
3) Permanent co-existence, small-scale mining operations may also be in the area of a licensed mining company, where workers work in areas that have been abandoned by the company or in areas where the existing mineral deposits are no longer suitable for the company's operations. These miners are residents. This category allows for conflict to arise, so it needs to be managed.

4) Shock, local communities can be encouraged to carry out mining activities to obtain a new income after experiencing shocks, such as drought, crop failure, economic downturn, commodity price fluctuations, conflicts, the closing of licensed mining companies (IUP) located in the area, the sudden increase in unemployment, for example, due to the COVID-19 pandemic.

5) Influx of migrants, when gold reserves suitable for small-scale mining activities are found in an area, there will be many immigrant miners who then create community mining communities, from only a few to thousands, in just a few months. Over time, this type of community mining can become a permanent co-existence, leading to conflict with local communities in the area.

WPR must meet the criteria under Article 22 of Law No. 3 of 2020 and space and areas for mining business activities following the provisions of laws and regulations. Proposing WPR is carried out by considering the suitability of spatial planning, environmental support capacity, activities, and observing Article 24 of Law No. 4 of 2009. Figure 1 shows the WPR and IPR process flow.

![Figure 1. WPR and IPR process flow](15)

Of the 34 Provinces in Indonesia, 25 Provinces have determined WPR (Table 1), and several regions are still proposing to determine WPR, such as West Java Province, which has not yet been determined. The total number of WPR is 3,329 blocks with an area of 580,712 hectares. While the number of IPR throughout Indonesia, the data recorded at the Directorate General of Mineral and Coal as of November 2020 is still small, only 16 IPR [24][25].

**Table 1. Recapitulation of WPR data in Indonesia**

| No. | Province | Total of WPR | Area (hectares) | No. | Province | Total of WPR | Area (hectares) |
|-----|----------|--------------|-----------------|-----|----------|--------------|-----------------|
| 1   | Aceh     | 2            | 1,020           | 14  | Kalbar   | 254          | 13.96           |
| 2   | Jambi    | 363          | 66.341          | 15  | Kalsel   | 81           | 27.89           |
| 3   | Kep. Babel | 207         | 19.918          | 16  | Kalteng  | 227          | 35.08           |
| 4   | Kep. Riau | 203          | 4.371           | 17  | Kaltim   | 43           | 18.85           |
| 5   | Lampung  | 94           | 1.572           | 18  | Malut    | 3            | 64              |
| 6   | Riau     | 44           | 25.172          | 19  | Papua    | 45           | 3.57            |
| 7   | Sumbar   | 8            | 16.219          | 20  | Gorontalo | 57           | 8.99            |
| 8   | Sumsel   | 347          | 8.675           | 21  | Sulbar   | 44           | 3.53            |
The legalization of PETI must be understood as an effort to grant permits for PETI. It means that every small-scale mining must obtain permits as much as possible, either in the form of IPR or SIPB. In addition to providing guarantees for people's businesses in the mining sector, this legalization can also strengthen the foundation of the state's presence in peripheral communities.

By having a permit, small-scale mining will get guidance and supervision from the central and regional governments through related institutions. The local government will monitor various problems in waste management and the environment, such as ex-dug pits, and a joint solution can be sought to overcome them.

Various other downstream problems such as child labor, the elderly and women, backing problems and illegal fees, and exploitation by rogue entrepreneurs can be minimized. Indonesia can follow the legalization efforts made by several countries such as Colombia and Congo. The governments of Colombia and Congo have a strong political will by overhauling the bureaucracy so that the legalization process is decentralized to the level of local government with an obvious role in every part. Another example is Mongolia's extraordinary deregulation effort so that small-scale mining can become the backbone of the rural economy and solve gender problems [25].

Legalizing PETI can also help miners with upstream issues, particularly capital and work facilities, which are based on the criteria of Law No. 3 of 2020, requires financing and work tools that are no longer simple manuals. International Institute for Sustainable Development (IISD) (2018) mentions six key factors that need to be considered in the process of legalizing small-scale mining, namely:

a. develop a conducive and comprehensive legal framework;

b. provides access to geological data;

c. ensuring access to capital;

d. provide access to equipment;

e. develop more capacity building; and

f. activate dialogue between artisanal and small-scale mining (ASM) stakeholders [25–27].

The granting of permits through legalization is the final approach to the legal process that prioritizes utilitarianism or contextuality policies, and ultimum remedium law enforcement that applies non-penal law enforcement or outside criminal law, namely the government conducts guidance and supervision of illegal activities into a legitimate business. Law enforcement with criminal law as the ultimum remedium to illegal miners who do not understand the regulations will injure their equal rights before the law in the nation. Legal action will be counterproductive because it does not take sides and is supported by the wider community, the victims and losses are not clear, legal action will cause even more significant losses and others. Therefore, legal issues must be placed in the context of a broader policy, namely social policy consisting of policies for the welfare of the wider community and protecting human rights [6].

4.2. Institutional and role of small-scale mining association
Small-scale mining in the form of companies, individuals, or cooperatives, of course, can be appropriately facilitated by the government and associations, in this case, APRI. Institutional formation as an effort to strengthen small-scale legal mining is really needed so that miners can easily access permits.

Small-scale mining institutions can be based on various things such as legal entity status, location or area position, and similarity in types of mining materials. The most important thing is that this institutional effort should stick to its goal: to facilitate small-scale miners to obtain legality and all its implications. It needs to be maintained that this people’s mining institution or organization does
not become a separate mafia which ultimately sacrifices its main objective for the welfare of the miners.

APRI is expected to play a role as a partner for both the miner community and government. APRI's role includes facilitating (being a facilitator) of the permit and mentoring in mining operations. Community organizations can also play an active role in supporting small-scale mining, such as assisting legal efforts, labor, and the environment to work comfortably without being trapped in thuggery. If everything can go according to the role and portion, then what Jeremy Betham called the greatest happiness of the greatest number principles will be fulfilled. Small-scale miners will experience better livelihoods, increased prosperity, equality in law, security in doing business [6].

4.3. Role of central and local government
Since the era of Law No. 11 of 1967, the central and local government started to establish new policies in the mineral and coal mining sector, including small-scale mining, replacing the regulation issued by Dutch Colonial. As previously mentioned, because the provisions of the permits for small-scale mining in Law No. 4 of 2009 have not been able to answer the problems and actual conditions that occurred, then the government re-regulated the permits through Law No. 3 of 2020. This condition shows that the central and local governments always try to carry out their roles to improve policies in the small-scale mining sector.

Under the law's mandate, the central government should be able to be a good facilitator and regulator in carrying out its role and authority. One of these powers is to issue policies, including laws and regulations such as government regulations, presidential regulations, and ministerial regulations that support the PETI legalization process. Issuance of laws and regulations must reflect the debureaucratization of small-scale mining permits and requirements. Legalization is the best way for a business form to guarantee people and increasing the environment quality. In Article 24 of Law No. 4 of 2009, the government's role in legalizing the small-scale mining area or sites that have been worked on shall be prioritized to be determined as WPR. Article 24 becomes the basis for the legalization of illegal small-scale mining. After determined as WPR, then IPR will be issued [27].

The central government must also move quickly in collecting data from the regions. The more time delays, the bigger the problem of PETI in the downstream. In turn, the central government must delegate the management of small-scale mining to regional (provincial) governments. This delegation can take the form of data collection, guidance, supervision, and guidance. If it is deemed necessary, data collection can be delegated to the village level.

4.4. Potential state revenue
Economically, the legalization of PETI can boost the growth of gross domestic product (GDP). The assumption released by the Directorate General of Mineral and Coal states that around 120 tons of gold are generated by the people each year from 1 million miners [25]. Based on Directorate General of Mineral and Coal’s estimates of the potential state revenue from the gold IPR fixed fee of IDR 10 billion per year, assuming the area of WPR in 514 districts/cities is 410,882 ha. Meanwhile, royalty revenue for the small-scale gold mining per year is IDR 2.713 trillion (gold royalty rate 3.75%), assuming that gold production per year is 80,400 kg for IDR 900,000 per gram.

Meanwhile, according to APRI, the potential for PETI, if legalized, will absorb 4.2 million direct workers with an average wage of IDR 5 million/month. A total of 8.4 million were employment that affected, directly and indirectly, ensuring the welfare of 43.2 million Indonesians throughout the archipelago. In addition, it also increases the district or city’s revenue (Pendapatan Asli Daerah/PAD) by IDR 25-50 billion/year/district. The state will receive state revenue for IDR 10-20 trillion/year. Everything is intact, using only 100,000 hectares of land throughout Indonesia [9].

Directorate of Mineral and Coal Program Development, Directorate General of Mineral and Coal, Ministry of Energy and Mineral Resources, based on studies in 2020, in terms of employment, assumed that 1 IPR could open 500 job vacancies, then with 15 IPRs according to incoming data it is estimated that there are 7,500 workers are directly involved in existing IPR activities. This potential can, of course, be used as a simple basis for calculating. For example, in Indonesia, there are 514 districts. Suppose 400 districts issue IPRs, the number of workers that can be absorbed is 400 districts x 15 IPR x 500 vacancies = 3,000,000 workers directly involved in small-scale mining [24].
the growth of supporting industries around the mine such as restaurants, delivery services, buying, and selling, IPR activities will provide an even more significant multiplier effect and directly and indirectly affect the local economy.

4.5. Small-scale mining and environmental

Indonesian small-scale mining regulations require monitoring and control in mining operations, and impacts on aquatic ecosystems management are often not monitored at all. Indonesia's participation has ratified the mercury legally binding, which has consequences in giving extreme attention to Artisanal and Small-Scale Gold Mining (ASGM). Fundamentally, governments in developing countries included Indonesia, which has ASGM activities, in the case in Banyumas, Central Jawa, and other areas [28], general lack of the institutional and technical capacity to provide adequate assistance to assess the impact or enforce compliance, especially at the local and regional levels. Limitations in the information and data of ASGM practices will be the challenge in applying environmental management principles and their due diligence activities. Many miners and ASGM sites, combined with the poor understanding of temporal and spatial variability of the impacts on aquatic ecosystems, make it difficult for local and regional environmental management to regulate activities [29].

In ASGM, which generally still uses mercury, the Governing Council of the United Nations Environment Programme (UNEP GC) decided to develop a global legally binding instrument on mercury to reduce risks to human health and the environment. The UNEP GC noted that mercury is a substance of global concern due to its long-range transport, persistence, ability to bioaccumulate, and toxicity. Gold recovery processes that use mercury for amalgamation in ball mills are easily found in almost all of Indonesia's ASGM hotspots, including their residential areas [30].

To eliminate mercury from gold processing, KLHK has built seven pilot facilities for non-mercury gold processing during 2017-2019. The facility is still on a pilot project scale so that the environmental permit is still in the form of UPL/UKL from the Regional Government [31]. However, until now, there are still obstacles in the formalization of small-scale mining. In addition, GOLD ISMIA is conducting a mentoring program for six small-scale mining locations, namely: North Gorontalo, North Minahasa, Kuantan Singingi, Kulon Progo, West Lombok, and South Halmahera. This program aims to reduce/eliminate mercury in small-scale mining by providing technical assistance, technology transfer, private-public partnerships, and access to funding for the purchase of gold processing equipment without mercury [32].

In Indonesia, while a mechanism of licensing, permitting, management, and control of small-scale mining is not in detail stipulated, the management and control of ASGM are decentralized to regional governments. In Indonesia, mercury in mining is illegal after the signatory to the 2013 UNEP International Treaty on Mercury. In Indonesia, PETI grew from 50,000 miners operated in 576 areas in 2006 to 250,000 miners operated in about 800 areas in 22 provinces in 2010 [30]. The decentralization of authority to the local governments in Indonesia was seen as a significant contributing factor to the unintended growth in PETI [29].

By granting a permit (legalization) to PETI will minimize negative impacts on the environment and socio-culture. On the other hand, small-scale mining in Indonesia could be benefiting the economy. With the mapping of concession area provided by the central and/or local government and the impact management process conducted by the company and monitored by the government and community volunteers, small-scale mining could protect the environment. PETI could be avoided as the small-scale mining operators could apply for the permit easily since accountable practices were implemented. The fiscal and economy of the country could be benefitted if the small-scale mining licensed practices were registered. Through the value chain of small scale practices, good governance could be issued a "sustainable gold commodity," Finally, the small-scale mining practices would maximize its benefits and minimize its harms [33].

The Legalization by granting permits under Article 24 of Law no. 3 of 2020 manifests the state presence in the people's mining business. After issuing permits as business guarantees and environmental management, it is necessary to have institutional roles such as APRI and the government to guide and develop people's businesses in technical aspects of mining, the environment, non-mercury processing technology, business management, and market business.
Thus, community mining can be managed and developed so that on the downstream side, it will have a positive impact on the community (local people's businesses based on natural resources in their area) and the state (taxes and royalties, reclamation, and post-mining).

5. Conclusions and Recommendations

5.1. Conclusions
Small-scale mining has existed since the time of the Dutch colonial. This existence certainly cannot be ignored. Therefore, along with the times, small-scale mining needs special attention so that it again has a significant role in efforts to improve the welfare of society and a source of state revenue.

The many problems in small-scale mining lead to the absence of legalization to become wild and out of control. Therefore, the legalization of PETI is vital and urgent/immediate to guarantee the people's business in the mining sector, which will increase the responsibility of the community miners to the regulations that are enforced.

Legalization requires a change in the small-scale mining regulatory policy towards an implementation that considers the actual conditions on the ground. The legalization process is carried out using a 6-key approach: developing a conducive and comprehensive legal framework, providing access to geological data, capital, and equipment, capacity building, and activating dialogue among the stakeholders involved. The role of local governments, associations, and the state-owned company is required in technical guidance on mining and the environment, institutions, business management, and product markets.

PETI legalization will minimize various downstream problems that exist and become a stigma for small-scale mining. Of course, this cross-sectoral and regional downstream issue of community mining can only be properly resolved through the PETI legalization process. With a permit, the small-scale mining contribution can be realized in opening up job opportunities, state revenue from taxes and royalties, a forum for the people's role in the mining sector, and others.

5.2. Recommendations
The results of this study recommend the following:

a. It is necessary to immediately issue a government regulation as Law No. 3 of 2020, accommodating the maximum effort to legalize PETI.

b. PR and SIPB as solutions for small-scale mining permits need to simplify requirements, processes, and bureaucratic ranges, not to be confused with other mining permit processes.

c. AMDAL or environmental documents are no longer a requirement in legalizing PETI but become an obligation after the permit is granted so that community mining can operate immediately without time-consuming constraints.

d. The government must be more proactive in setting policies, especially the PETI legalization process, involving the regional government down to the village level.

e. The cases of Colombia, Congo, and Mongolia can be examples or references to legalize PETI in Indonesia.

f. Six key factors can become a reference for all stakeholders, APRI and NGOs can become strategic partners.

g. Under changes in the regulation of small-scale mining that can manage up to a depth of 100 meters, to make it feasible, a license to use heavy equipment is required.

References

[1] Nugroho H 2020 Pandemi Covid-19: Tinjau ulang kebijakan mengenai PETI (pertambangan tanpa izin) di Indonesia J. Perenc. Pembang. Indones. J. Dev. Plan. 4 117–25

[2] Budimanta A 2002 Potret pertambangan rakyat di Pulau Bangka The 2nd International Symposium of Journal Antropologi Indonesia, Globalization and Local Culture: A Dialectic Towards the New Indonesia (Bali: Departemen Antropolog Indonesia-Jakarta) pp 1–24

[3] Yunianto B and Saleh R 2011 Persoalan pertambangan rakyat pasca pemberlakuan Undang-Undang No. 4 Tahun 2009 J. Teknol. Miner. dan Batubara 7 145–56
Redi A 2016 Dilema penegakan hukum penambang mineral dan batubara tanpa izin pada pertambangan skala kecil J. Rechts Vinding, Media Pembin. Huk. Nas. 5 399–420

[5] Suryaningtyas 2017 Ekstensi negara atas pengelolaan dan pengusahaan sumber daya mineral dan batubara ed S Malian (Yogyakarta: Krasi Total Media)

[6] Pratama N W and Ismunarno 2019 Pertanggungjawaban pidana bagi pelaku penambangan tanpa izin pertambangan rakyat (IPR) berdasarkan Undang-Undang Nomor 4 Tahun 2009 tentang pertambangan mineral dan batubara Recidiv. J. Huk. Pidana dan penanggulangan Kejahatan 8 13–20

[7] Prabawa F Y 2020 Pemodelan sistem pertambangan emas rakyat menuju pertambangan berkelanjutan; Studi penambangan emas rakyat Desa Kertajaya Kecamatan Simpenan Kabupaten Sukabumi Jawa Barat (Universitas Indonesia)

[8] Directorate General of Mineral and Coal 2019 Penanganan penambangan tanpa izin (Jakarta: Directorate General of Mineral and Coal)

[9] APRI 2020 Tambang rakyat Indonesia, potensi, masalah dan solusinya, Bahan koordinasi APRI kepada Pemerintah (Jakarta)

[10] Sukhyar R 2014 2014 Kerugian akibat Tambang Emas Ilegal capai 38 Triliyun per Tahun Sinarharapan.com 1

[11] Mulyana R N and Handoyo 2018 KLHK: Terindikasi pertambangan ilegal, negara rugi lebih dari Rp 38 triliun per tahun Kontan.co.id 1

[12] Salo M, Hiedanpää J, Karlsson T, Cárcamo Ávila L, Kotilainen J, Jounel P and Rumrill García R 2016 Local perspectives on the formalization of artisanal and small-scale mining in the Madre de Dios gold fields, Peru Extr. Ind. Soc. 3 1058–66

[13] Wibowo W 2020 Hubungan penelitian dan analisis kebijakan dalam pembuatan rekomendasi kebijakan pada Badan Penelitian dan Pengembangan Hukum dan HAM J. Ilm. Kebijak. Huk. 14 75–90

[14] Ishaq H 2017 Metode penelitian hukum dan penulisan skripsi, tesis serta disertasi (Bandung: Alfabeta)

[15] Sugiyono 2009 Metode penelitian kuantitatif, kualitatif dan R&D (Bandung: Alfabeta)

[16] Irianto S 2012 Memperkenalkan kajian sosio-legal dan implikasi metodologisnya Kajian Sosio-Legal ed A W Bedner, S Irianto, J M Otto and T D Wirastri (Denpasar: Pustaka Larasan) pp 1–18

[17] Miharja M O H, Setyo A D and Hadi H P 2015 Implikasi hukum terkait pertambangan rakyat dalam bidang minerba di Indonesia Priv. Law 7 97–103

[18] KLHK 2017 Deklarasi pengendalian pencemaran dan kerusakan lingkungan akibat pertambangan kanalkomunikasi.pskl.menlhk.go.id 1

[19] Ombudsman 2020 Ombudsman: Tambang Ilegal Timbulkan Kerugian Negara dan Lingkungan ombudsman.go.id 1

[20] Ombudsman 2019 Ombudsman Gelar Diskusi Pengawasan Pertambangan ombudsman.go.id 1

[21] Agency of Energy and Mineral Resources of the Government of Aceh 2021 Mahdirun: Temuan GeRAK akan ditindaklanjuti dengan operasi penertiban esdm.acehprov.go.id 1

[22] Adi D P and Zuhairi A 2016 Konsep hukum pertambangan rakyat (studi di Kabupaten Lombok Barat) J. IUS Kaji. Huk. dan Keadilan IV 178–91

[23] de Haan J, Turner B, Aubynn T, Barreto L, Brambilla M, Sánchez-Moreno M C, Dales K, Geenen S, Hilson G, Knoote F, Maréchal L, Musskopf F, Soho A, Stylo M and Tudev E 2018 Handbook: Developing national ASGM formalization strategies within national action plans (Geneva: UNITAR & UN Environment)

[24] Directorate of Mineral and Coal Program Development 2020 Kajian regulasi dan kebijakan pengelolaan pertambangan rakyat sebagai dasar penyusunan pedoman pelaksanaan kegiatan pertambangan rakyat (Jakarta: Directorate of Mineral and Coal Program Development, Directorate General of Mineral and Coal, Ministry of Energy and Mineral Resources)

[25] Singo P and Seguin K 2018 Best practice: Formalization and due diligence in artisanal and small-scale mining ed Z Danielski and B Eboule (IMPACT Transforming Natural Resource Management)
[26] Yunianto B 2015 Pengalokasian wilayah pertambangan rakyat: Kasus tambang dolomit di Kecamatan Palang-Kabupaten Tuban J. Teknol. Miner. dan Batubara 11 29–48

[27] International Institute for Sustainable Development 2018 Six key factors in formalizing artisanal and small-scale mining iisd.org 1

[28] Aziz M 2014 Model pertambangan emas rakyat dan pengelolaan lingkungan tambang di wilayah Desa Paningkaban, Kecamatan Gumelar, Kabupaten Banyumas, Jawa Tengah Din. Rekayasa 10 20–8

[29] Macdonald F K F, Lund M, Blanchette M and McCullough C 2014 Regulation of artisanal small scale gold mining (ASGM) in Ghana and Indonesia as currently implemented fails to adequately protect aquatic ecosystems An Interdisciplinary Response to Mine Water Challenges ed S Sui and Wang (Xuzhou: China University of Mining and Technology Press) pp 401–5

[30] Ismawati Y, Petrlik J and DiGangi J 2013 Mercury Hotspots in Indonesia (Denpasar: ASGM sites: Poboya and Sekotong in Indonesia, IPEN Mercury-Free Campaign Report)

[31] Ditjen B3 2020 Alternatif solusi penggunaan bahan kimia untuk pengolahan emas non merkuri (Jakarta: KLHK)

[32] Planet Gold Indonesia 2020 Peran project Gold ISMIA dalam membantu PESK (Jakarta: GOLD ISMIA)

[33] Mursanti E and Maryam Y 2016 Formalizing Indonesian artisanal and small-scale gold mining ways forward Community Mining in Indonesia: Minimising Harm, Maximising Benefits Conference (Program and Abstract Book (Jakarta: A Government Partnerships for Development Project, Artisanal Mining for Development in Eastern Indonesia.) pp 16–8

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