Social economic feasibility of community’s gold mining in Kertajaya Village, Sukabumi Regency, West Java, Indonesia

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Abstract. Many studies have stated that Community Gold Mining (CGM) activities are considered as poor and unqualified as a profession. CGM is also believed unfeasible for business, and has less impact to state’s economic system. In general, the mainstream theories believed that CGM is unsustainable. But in fact, informal CGM activities still exist everywhere. Is CGM really unsustainable? Is CGM not proper enough to be officially supported by the state? This paper discusses and examines the practice of CGM. The research location was in Kertajaya Village, Sukabumi Regency, West Java, Indonesia. There are thousands of local people working informally as CGM miners, with gold processing units Glundung/Tubes: Trommel Mercury (TM) method. 6 components of the Gold Production System were being discussed along with their production costs. The observation was implied for TM processing units, carried out during 2018 - 2019. The supporting data were taken from CGM site: Cijiwa Block, from 2013 to 2017. The results: CGM business in research location is feasible enough, also has high economic potency for state’s taxation. Community’s Miner is qualifying as a profession, since the miner’s income exceeds the local minimum wage. Apart from the fact that the miners still use mercury, those facts show local CGM activity can be sustained.

1. Introduction
Artisanal and Small-scale Gold Mining (ASGM) or Community Gold Mining (CGM) is a complex phenomenon in most countries with mineral potential. CGM is small in size but has a big in impact [1], but ironically most of CGM in many countries is informal. Over the decades, problems still occurred regarding CGM activity. Mainstream theories even believed that CGM was unsustainable and unfeasible in business. There has been a numerous of researches on environmental dimension at CGM level, involving mineral extracting technologies with mercury use in rolling tubes (TM method) which are used in most of small mining activities. Social dimension is the second favorite articles that is easy to find in journals. But so far there are still few studies that comprehensively discuss the miner as a profession, and also discuss the economic or business aspects within the scope of community gold mining. In fact, it is important to discuss the feasibility of CGM, both in business and in the profession as a small-scale miner in order to reveal the sustainability of this business. The problem is, it is rare
find research with theme of CGM’s feasibility in business and small miner as a profession. Therefore, this study was conducted on site to obtain data.

These discussion themes are related in the effort to solve endless and unsolvable problems in: small-scale gold mine or community’s gold mining that has been happening for decades, in Indonesia. CGM in Indonesia is a neglected sector. Hundreds of thousands or even millions of people in Indonesia are involved in this sector, but in reality most of their activities are informal [2]. There are various problems that have occurred in these activities for example: mercury contamination, unsafe procedures, low health standard and poverty [3–7]. Yet CGM also has not contributed to the state’s economic system as well [6–8]. There are also measures taken by the authority to stop these informal activity, everywhere, and in multiple year [8,9]. But the fact is: CGM activity still exists everywhere in Indonesia, even bigger [10,11]. So, due to those facts, some questions have arisen about CGM existence: Is CGM really unsustainable? Further: is CGM not proper enough to be officially supported by the state?

This paper aims to examine the material processing stage for gold extraction at the location of the CGM area in Kertajaya Village, Sukabumi Regency Indonesia. This economic and related social study is needed to conduct in a general approach to obtain information on miner’s business feasibility, CGM’s economic potential, as well their profession. It is hoped that the research results from this location can be used as preliminary results, that can be used as data for studies and comparisons with subsequent studies conducted in various other regions in Indonesia. Then from there a standard comparative analysis can be taken, which assumptions can be drawn based on the similarity of the research results. Finally, the results of a series of subsequent studies in various community’s gold mining locations can help determine the appropriateness of the sector and the profession of community miners. They could also determine the sustainability of this sector, especially in social and economic dimensions. Further, the results are expected to be used to assess whether this sector can be supported by the government. Should this sector be adopted into the system of the state's economy?

2. Material and Methods
The study location is in the CGM area of Kertajaya Village, 8 kilometers from Pelabuhan Ratu City, Sukabumi Regency, West Java Province, and 140 kilometers western part from state’s capital city Jakarta, Indonesia. The CGM Kertajaya area was chosen as the location because their mining activity have started in the past 18th century, making it one of the oldest in Indonesia [6]. This CGM area is more accessible than others in transportation access. The population of Kertajaya Village is around 9,000 people [12]. There, in 2018, over a thousand miners worked on hundreds of mine shafts, distributed across several mining blocks and involved thousands of tubes/drums/trommels in hundreds of TM processing units [3]. One of those; Cijiwa block, or Cigaru (Figure 1), had mining activities between 2013 to 2017, with 40 mine shafts in the 5 hectares area of unlicensed gold mining (PETI).

This research used a descriptive method focusing on the economic aspect of gold production unit system. Through the observation and interview, gold production data were collected on every detail of gold production activity, and then the components of costs were economically evaluated economically. This subtopic includes data collection, data processing and data analyzing - compilation.

2.1. Data collecting
Observation, investigation and literature study were used to collect data. Literature study is also a method for compiling and analyzing data. Due to the lack of secondary data, the in-depth interview method and the snowball technic were used. The selection of key informants was carried out by purposive sampling, targeting key people such as owners and miners in the processing unit. This research was carried out in one of the many TM processing units, located in people’s settlements.
2.2. Data processing
Microsoft Office Excel was used as a tool for calculating, and presenting the results. The data used were primary quantitative data from the observation and in-depth interviews, which are part of production costs. The monetary unit used was Rupiah, with the US Dollar as a comparative currency. The assumed currency rates used in this study were Rp 14,000 per US$ 1. A simple formula to calculate profit, consisting of sale of gold and Total Cost (TC). There are 2 components associated with TC: Fixed Cost (FC) and Variable Cost (VC). Fixed costs are costs such as electricity, machinery, workplaces, wages etc. Variable costs are other costs that can vary, such as fuel, chemicals, etc. The formulation is:

\[ TC = FC + VC \]  \hspace{1cm} (1)

\[ \text{Profit} = \text{Gold Sale} - \text{Total Cost} \]  \hspace{1cm} (2)

2.3. Data analysis and compilation
The results would be tested by analyzing and compiling them to the existing facts and phenomenon. In economic aspect, the value of CGM activity would be compiled to regional revenue, and CGM’s business feasibility would be validated with the feasibility formulation. In social aspect, properness of small miner as a profession would be validated by compiling local miner’s wages to regional standard wage rate. In environmental aspect, the use of mercury is still the spotlight for testing any CGM activities around the world. The research location is informal small-scale gold mining that still uses mercury, so the validation would consist of reporting the actual amount of mercury used.
3. Results and Discussion

3.1. Gold Production

3.1.1. Chemical used: Mercury. In mining sector, gold extraction method is a major part of environmental dimension. Glundung mercury, the method of extracting gold using a drum or tube that is rotated/ trommel like, and poured by mercury to collect gold, is called =TM / Trommel Mercury in this study. TM method is generally used by miners in Indonesia, but the use of mercury is prohibited there, also in many other countries [2]. Figure 2 shows the datasheet based on the ISO 14040 Life Cycle (LC) workframe Model which was modified in this research. The mercury was poured into the tubes and mixed with mud and minerals to collect minerals. The total mercury used in the production system was 2500 grams/ day per processing unit. These are not good conditions for the local environment [13,14]. In many TM processing units around the world, the amount of mercury used varies because there is no fixed standard amount. For example, in North Sulawesi, one of several CGM areas in northeast Indonesia, a TM processing unit can reportedly release 5000 grams of mercury in single workday [15]. Interviews and literature data indicate that thousands of grams of mercury are used daily at each processing site. Worse, at the study location there are thousands of TM processing unit Glundung or tubes/drum.

Further observations were held after production stage, focusing on how miners handle the mercury and measuring the amount of mercury used. At the end of production stage, the mud mixed with mercury and the captured minerals was then squeezed out. The unused mercury means mercury that has not captured minerals and is pushed out of parachute cloth squeezer. The minerals contained one stayed and then were roasted to become a metal alloy. Last production process is refining, where the alloy was purified with aqua regia solution, to separate gold from other minerals. The average of mercury that captured minerals divers was between 5 and 10%. This means that out of a total of 2500 kgs of mercury poured in tubes during production process, only 250 grams was actually used to yield metal alloy. What happened with the rest of 90% of mercury? Most of them were collected to be used again in the next production cycle, while a small part of them was discharged into the water stream as muddy water waste.

Figure 2. Gold production data achieved from the observation.
3.2. Economic valuation

The gold production of the trommel method at the observation site is about 14.5 grams in one production cycle (8-12 hours). Gold yield or recovery varies naturally on the gold content in the material, and also on the effectiveness of the processing method used [16,17].

3.2.1. Cost analysis. From Table 1 the assumption of FC (Fixed Cost), namely the building unit and electricity, is zero, and the Variable Cost/ VC consists of energy, water (assumption is zero), material transport, chemical, logistic, and others. The total Cost (TC) of the TM method, using the Equation (1) is IDR 1,450,000 (US$ 103). In the observation, the gold produced by the TM method is about 14.5 grams on average.

| Time (hour) | FC Rp | VC (Rupiah) | TC (Rupiah) |
|-------------|-------|-------------|-------------|
|             |       | Energy (fuel) | Material transport | Chemical | Logistic (meal) | Others | TOTAL |
| 10h         | 0     | @Rp 8,000/liter | 0 | Rp 150,000 / US$ 10.7 | Rp 100,000 (US$ 7.14) | Rp 100,000 (US$ 7.14) | Rp 1,450,000 (US$ 103) |

3.2.2. Profit. Using Equation (2), the gold price, assumed to be Rp 500,000 (US$ 35.7) per gram at the price of the CGM mining location, is used to calculate the economic value of the gold (gold sales). The total cost (TC) is IDR /Rp 1,450,000 (US$ 103). These data shows that TM method was able to yield Rp 5,800,000 (US$ 414).

| Methods | Gold Yield (gram) | Sale of Gold (Rupiah) | Total Cost/TC (Rupiah) | Profit (Rupiah) |
|---------|-------------------|-----------------------|------------------------|-----------------|
| TM      | 14.5              | Rp 7,250,000 / (US$ 517) | Rp 1,450,000 / (US$ 103) | Rp 5,800,000 / (US$ 414) |

Community's gold mining in Indonesia is a hidden industry [18]. Most of CGM activities in Indonesia are informal, illegal or without permit. Ministry of Energy and Mineral Resources estimated the economic value of gold taken through illegal activities in Indonesia in 2014 to be around 38 trillion rupiahs, or around US$ 2.85 billion. These huge numbers came from both small-scale and industrial scale mining informal activities. The actual amount is believed to be greater than that figure. This is truly a giant value in term of economic potency. However, according to other facts and research, the small-scale gold mining sector is still not well accommodated, especially in the country's economic system. The economic and the social aspects as poverty and the difficulty of finding a job for family income are also believed to be the cause of the growing number of miners and unlicensed activities. Community's gold mining (CGM) also bears the burden of another negative stigma: its adverse effects on the environment, work safety issues, illegal issues and stigma as a cause of loss of state asset from the mining sector [5,7–9]. There is a lack of synchronization. On the one hand, gold mining has great economic potential, and has brought tangible benefits to the surrounding community. But on the other side, the miners have to face the pressure from various negative stigmas, and are neglected as well. From data processing result, let us discuss further the aspects of economy and social, as well the environment issue.
3.3. Sustainability

3.3.1. Environment dimension: Mercury use. The new fact that only 10% mercury is used in gold production stage, is good news for environment. It means that the amount of mercury used and released into nature is not really bad. Especially the rest 90% of mercury used than being collected and reuse in next production cycle. This is local wisdom of people in that village, and it is founded that this practice is also implied in many other CGM around the state.

3.3.2. Economic aspect of informal or unlicensed small-scale gold mining (PETI) in Kertajaya Village, Sukabumi Regency, West Java, Indonesia. CGM business at Kertajaya CGM location is feasible for capital holder or the miner’s group leader. This is referred to the calculation result in Table 3. The profit was Rp 5,800,000 (US$ 414), funder/ capital holder, who is usually also a team leader, has 60% of it, or around Rp 3,480,000/ US$ 248. For business feasibility calculation of CGM activity, BC ratio was chosen as an instrument.

\[
BC \text{ Ratio } = \frac{\text{Total Revenue}}{\text{Total Cost}}
\]  

If the value result is < 1, then business is not feasible to proceed, 
If the value result is > 1, then business is feasible

From Table 2, it can be seen that Total Revenue of Profit: Rp 5,800,000 (US$ 414), and Total Cost/TC of Rp 1,450,000 (US$ 103). Then the formulation of B/C Ratio feasibility, using Equation (3) is; \( \frac{5,800,000}{1,450,000} = 4 \). CGM business at research location is feasible.

3.3.2.1. The hidden potency of CGM. According to the interview, at least of 500 grams to 1 kg of gold per day was produced from around 40 mine shafts in Cijiwa block in 2016 [6]. Assuming a gold price at that time; Rp 500,000 / US$ 35, an economic value of Rp 250 million/ US$ 17,800 per day will be obtained. Within a year, the economic valuation of Rp 91 billion or US$ 6,5 million could have been yield.

The value of Rp 91 billion per year is very high, especially if it is related to the economic context of the local area. Referring to the Mineral and Coal Law (Minerba Law) Number 4 of 2009, or now the Minerba Law number 3, 2020 [10]; the Government has the right to receive royalties from mining commodities by 10%. Regional Government is designated to have 6% of this royalty, and the remaining 4% is for the Central Government. Then the royalty of 10% of the gold value from CGM Kertajaya in a year will amount to Rp 9.1 billion/ US$ 650 thousand, with the governments of West Java, including Sukabumi Regency receiving 6% around: Rp 6.5 billion/ US$ 464 thousand or average monthly income of Rp 541 million/US$ 38 thousand. A giant value coming from a small CGM area.

Please note, the total revenue of Sukabumi Regency in 2017 was Rp 3.3 billion or US$ 235 thousand [13], and the total revenue of West Java Province in 2017 was Rp 30.5 billion, or around US$ 2,17 million [19,20]. The fact is, a single block Cijiwa with 5 hectares of CGM area in Kertajaya Village has an annual economic value of gold around Rp 9.1 billion/US$ 650 thousand. Thus, CGM of Kertajaya Village could contribute royalties to the Sukabumi Regency government amounting to 300% of the regency’s total annual revenue, and increased nearly 30% of the total revenue of West Java Province in 2017. The comparison of regency’s annual revenue or PAD Regency – province’s annual revenue/ PAD Province to CGM’s economic value of gold produced in a single block Cijiwa is shown in Figure 3. This amount is coming from a single CGM spot in a remote village, and earned from only 5 hectares area; Cijiwa Block. Of course, the value of income for the Regional and Central Government will skyrocket if the other CGM blocks in the regency could also contribute to regional revenue.
3.3.2.2. Economic aspects of community’s gold mining in national scope. In the regional scope, it is estimated that hundreds of tons of gold are produced from Indonesian nature through illegal activities per year. In 2014, the amount of 65-120 tons of gold was estimated by the Ministry of Energy and Mineral Resources, coming from this illegal activity. If the average gold yield of annual production from illegal activities is assumed to be 100 tons and the gold price in 2017 is assumed Rp 500,000/ US$ 35 per gram, then the economic value would be 50 trillion rupiahs or US$ 3.5 billion per year. If the royalty value is calculated at 10%, then in a year: IDR 5 trillion or US$ 357 million might become the state’s income. This is the quantity of gold and the economic value of a giant on a national scale. This is very interesting, especially the results of that size came from small and medium scale mining activities that operated with simple technology, and relatively less capital, and are carried out by miners with low education. But unfortunately, the value of this giant potential is still in the form of losses, leakage of state assets, because that number is the result of illegal or informal activities, so the government does not receive official income from it.

3.3.3. Social dimension. In the social dimension, Table 3 shows that the Kertajaya’s miner income of Rp 3,425,000/US$ 245 per month is interesting, because this income is higher than regional minimum wage (UMR) of Sukabumi Regency in 2018 of Rp 2,583,556 /US$ 185 [13]. Gold miners in the village of Kertajaya only have the highest education level of senior high school, and have no certification and other specifications. The Income and revenue of CGM business are good enough to raise the standard minimum wage/UMR at the district level of Sukabumi Regency.

Table 3. Income and revenue of CGM activity

| No | Method | Miner’s revenue per day (Rupiah) | Miner’s revenue per month (25 working days) | Standard UMR (Minimum Rate of Wage in Sukabumi Regency) |
|----|--------|----------------------------------|---------------------------------------------|--------------------------------------------------------|
| 1  | TM     | Rp 137,000 (US$ 9.8)             | Rp 3,425,000 (US$ 245)                      | Rp 2,583,556. (US$ 185)                                |

So small miner is proper to become an official profession like the others such as farmer, fisherman, banker, civil servant, police, soldier etc. Furthermore, miners could earn big city’s middle-class wage with only middle school diploma, even some of them have only elementary school diploma. CGM activities in Cijiwa block also could provide jobs for 1,000 people or 10% of total population. This 10%
becomes miners that could then feed their families, assuming 3 family members, which means 40% of population of the village who have secured their life. So it can be said that the unlicensed gold mining activity in Kertajaya Village can support at least 4000 residents. Table 3 shows the amount of monthly miner’s revenue exceeds the local regency’s minimum wage. There is also a multiplier effect as many sectors related to CGM activities also coexist within CGM. For example: logistics, transportation, communication, daily needs, etc. so, the multiplier effects of CGM to the village is estimated to be doubled to 80% of population.

3.4. Research summary of CGM Kertajaya

In some elements of the social dimension of sustainability, CGM Kertajaya Village activities can be categorized: Sustain. First, the absorption of labor is high, 1000 people in a narrow area of 5 hectares. This number exists in 1 Cijiwa Block area, meanwhile there are several blocks in a district. Moreover, there is the ease of participation as workers, namely the absence of certification requirements and minimum educational standards [21–25], as are generally the requirement to apply for work in all places. In general, the higher education of miners is senior high school graduated, most of them are elementary and junior high school graduates.

That amount excludes many other people who make a living from business cycles related with CGM activity, such as: logistics, chemical supply, timber supply for shaft construction, transportation etc. From this study, it is estimated that more than 80% of economic activity of 9,000 people living in Kertajaya village is involved in small-scale gold mining activity. And those activities unfortunately are informal. From an in-depth interview, most of miners do not intend to become eternal illegal miners, they are welcome to license program, but the problem they face is a lack of socialization, and complicated procedure. The Kertajaya Village gold mining activity is a great potential for the economic and social aspects, but unfortunately the local government has not been able to use it, due to the unlicensed status of Kertajaya CGM.

There are linkages and causal relationships between components and between stakeholders in the community's gold mining. For example, in Kertajaya CGM, driven by economic needs, people then became a miner. Yet, because of its unlicensed status, the environmental dimensions of mining activities are not recorded, not monitored and uncontrolled. So that it will cause harm to all stakeholders socio-economically, and losses to the natural environment in the event of degradation of environmental quality and pollution of mercury waste [11,13].

From an in-depth interview with patron of miners, there is a practice of informal retribution coming from many sources, whether governmental persons or non-governmental ones. The amount of those illegal retributions is sometimes reached 50% of miner’s revenue. So, we can see the comparison between miner’s revenue originally and those that had been cut 50%, at Figure 3. Then Table 4 shows that the original amount of miner’s revenue exceeded the regional minimum wage standard in amount of Rp 2,583,556/ US$ 185, by the original revenue amount of Rp 3,425,000 / US$ 245. But after being hit by 50% illegal retribution, miner’s revenue then fell below the amount of the regional minimum wage to Rp 1,712,500 (US$ 122).

Table 4. Comparison of original miner’s revenue, and 50% amputated revenue by illegal retribution, compared to regional minimum wage/UMR.

| Method  | Miner’s revenue per person per day (Rupiah) | Miner’s revenue per person per month (Rupiah), (25 working days) | Regency’s Minimum Wage Standard/ UMR (PP No78/2015 : Wages) | Revenue per miner, After illegal retribution 50%. |
|---------|------------------------------------------|-------------------------------------------------|-------------------------------------------------|----------------------------------------|
| TM      | Rp 137,000 (US$ 9.8)                     | Rp 3,425,000 (US$ 245)                          | Rp 2,583,556. (US$ 185)                         | Rp 1,712,500 (US$ 122)                |

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This simulation clearly shows that the fact; people of Kertajaya have worked hard in mining area, and their revenue was good, overturning the regional minimum wage, it means economically and socially, CGM activity at research location was also **sustained or sustaining**, people were wealthy. But unfortunately, the reductions of their revenue caused by illegal retribution acts by bad guys, have turned those conditions to: **unsustainable**. Because of that, people must work harder, to fulfill their daily needs. People’s revenue from mining activity used to be enough, but after pseudo retribution it is no longer enough to sustain economically and socially. In other word; the unsustainability there, is caused by illegal retribution, executed by bad guys, whether they come from governmental or non-governmental institutions.

3.5. **Problems in the community’s gold mining in Indonesia**

First, there is a lack of data on the scope of the CGM, especially on the economic aspect, and the lack of action taken by the government so far in the social aspects. Whether this happened because of the intentional omission of government officials or not. This condition clearly has caused a huge loss, from the leakage of assets from the country of origin of the mining commodity. And this condition, has been going on for decades without being resolved. Indirectly, this condition also answers the phenomenon of "dead mice in the barn", namely the fact that areas with large potential mining commodities are socio-economically recorded as the poorest regions in Indonesia.

In macro dimension, the role of the mining industry should be able to encourage the strengthening of economic aspects and aspects of countries in the world including in Indonesia. But in fact, statistical data shows that mining-producing regions, for example, Riau Province, which accounts for more than 50 percent of total production and foreign exchange of petroleum and other mining commodities, the Food Security Council of Riau Province recorded 663 villages in Riau with food insecurity status. The poverty rate of Riau Province is also high: 22.19% of the total population. In West Papua Province, poverty rate reached 36.8%, in Papua Province it was 34.88%, and in Aceh Province it was 20.98 percent. This is sad irony.

Recently, there is quite a lot of research was carried out with the theme of small-scale mining or Community Mining (CM), and specifically Community Gold Mining (CGM). This includes research that took place in Indonesia. But very few of them discuss economic aspects. In general, the research discusses the technical aspects of mining technology, waste management, toxic waste contamination, and aspects of occupational safety and health. Research that addresses social aspects is also low, especially the themes related to legal aspects, mining policies and regulations.

Domestically, researchers of the community's mining experts Erwiza Erman and Zulkarnain from Indonesian Institute of Science (LIPI), who intensely research people's mining, have written numbers of papers on social, cultural and technical aspects. An important issue as the initial cause of mining activities without permits as well as the causes of ongoing activities are economic and social factors. Poverty in the surrounding community and social inequality according to many kinds of researches are considered to be the triggers for the beginning of the vicious cycle of the problem of the community's gold mining sector [3]. People need money for their family’s livelihoods, difficulty in finding a job and lack of capital cause many of them to become part of small-scale mining activities, even though they are forced to become extortionists and sometimes receive improper wages from bad investors, and some other times were improperly treated by police officers [9].

In Indonesia, the main problem in the small-scale mining sector is usually related to the social aspects of licensing [3,9]. There are 3 types of basic mining permits [10]: location/ land permits, called Community Mining Areas (WPR), activity permits called Community Mining Permits (IPR), and 3) environmental permits called Environmental Impact Assessments (AMDAL). At the Kertajaya location, Sukabumi Regency, the same problems also occurred at various small-scale mining sites in Indonesia and in other countries. Secondly, the problem occurred from illegal acts of bad guys hitting miners. They are most responsible for the vicious cycle of small-scale gold mining problems for decades. Specifically at research location, they are the stakeholder that benefit the most in informal small-scale gold mining circumstances. First, they get the highest percentage of revenue, then they get it without proper effort
and less capital. That is how they sail the ocean waves smoothly and harmlessly, while harvesting fishes from fishermen below.

3.6. National economic relations with the gold mining sector, especially small-scale mining
There are numbers of important factors that strongly influenced the condition of Indonesia's economic downturn in the mining sector during the 2014 financial crisis. In 2014, government revenues from the mining sector, namely oil and minerals including coal nationally dropped to -10%. This happened during the world monetary crisis which had drastic impact on the decline in world oil prices and other mining commodities [26]. Meanwhile, the small-scale mining sector, especially the gold commodity, continues to grow, even the number of miners and their locations tends to increase, even though they move without permit [27].

On the other side, in 1998, during the world monetary crisis that resulted in massive layoffs in Indonesia, and the fall of the New Order regime, in fact, it was at that time that there was a massive influx of small gold miners as newcomers in various locations of CGM around Indonesian territory [28]. We can read this condition at a glance; those facts have proven that the small-scale mining is feasible or economically viable, and also durable in unstable conditions. CGM can survive through various uncertain conditions and through several crises, although they have to continue to move with heavy struggle to bear the burden of negative stigma and always up against the official bad guys who also share the miners' income illegally.

3.7. The important role of government
The government plays an important role, both in licensing [10], and assistance to small miners in order to achieve K3 or work safety standards as well as protect the environment [10]. Currently, in Indonesia the small scale community mining sector still does not get a adequate status, especially in terms of government policy and legal factors [2,3,6,7]. In 2009, the Minerba Act No. 4 was published, which accommodates small-scale mining. The licensing process for WPR and IPR is stipulated for small scale / community mining and IUP and WIUP for company scale [10]. However, it is generally deemed that the regulation of the Minerba Act is not to be able to accommodate the community's mining sector. So this problem is inseparable from the social aspects, especially the weaknesses in regulations that cannot accommodate CGM properly. Recent MINERBA Act 3, 2020 has better content that could support CGM, but it is not enough. The real action is needed urgently from government, focusing on licensing, accelerating the legalization or formalization of community’s mining throughout the country.

Under the Minerba Act [10], the Regional Government was authorized to process these permit, but now in 2021, central government is in control. This is a good move. However, up to now, nearly 80% of provincial governments do not yet have a designated WPR location in their RTRW (regional spatial plan). Whereas the requirement for the issuance of IPR is the existence of WPR [10]. So far, the number of small miners and locations opened for unlicensed mining activities (PETI) continues to increase over time. During this time there also been an increased in social conflict and losses in the economic and environmental aspects. This condition continues to occur, because people need to earn a living quickly and daily, while it is very difficult to obtain an IPR permit, so they continue to work illegally [29], and whatever they have to collude with the officers.

Indonesia will someday experience urgent conditions, where the use of more mining potential will become the main option for survival. Some of the components that cause this pressure are: bonus demographic factors, the decline in natural resources, and so on which will lead to increasingly fierce competition in the world countries. The demographic bonus is closely related to the need for jobs, food, energy and water. Under these conditions, large capital holders will tend to win the competition. Also the holder of superior technology, and natural resources. For this reason the urgent need is capitals, namely human capital, natural capital, built capital and social capital accompanied by economic capital [3,30]. All these capitals should ideally be functioned to achieve domestic political stability, economic improvement, and so on. From its huge economic potential, the small-scale gold mining sector will be the main option. Because this sector is labor intensive, absorbs a lot of workforces, is instant and easy
to carry so it does not require high requirements to be able to work in this sector. It is relatively easy to take work from nature, process the material and within 1-2 days can make money and other advantages. This is inversely proportional to mining companies. Large capital is needed, little labor, high requirements for work, and so on. Small gold mining can provide welfare and socio-economic advantages for communities around the mine [29], play a role in local development and can reduce urbanization flows to cities [27]. In order to be a contributing factor to prosperity, the people's scale of gold mining needs to be better organized and managed.

The Small-Scale Gold Mining (ASGM) or Community Gold Mining (CGM), especially in Indonesia, is a giant with huge economic potential. But for the government, the giant is sleeping, when the giant wakes up, he will walk as usually to the black market, passing only the government, without turning around nor stopping. This means that there is no income from the community's gold mining activity for government, this is a big loss. While out there, the giant always distributes his gold purse to people around him and to the black market. This condition has been going on for decades, and the problem has not been resolved. So, the government should open the path for access, and try by all means, so that the giant is willing to enter and pass through their path. So that the presence of the golden giant can bring wider benefits, especially in this right/formal legal path, in a win-win solution condition. Many benefits are obtained by various stakeholders from CGM activity, but there are also disadvantages and problems that must be anticipated. These various problems must be dealt with. If there is no immediate effort to alleviate the problem in this sector, then potential for enormous economic losses will continue, and large amounts of gold as well as its economic value will continue to emerge from within the country.

These are all problems that exists generally in the gold mining sector of the people in Indonesia. And these problems have not been resolved until now. It is not possible to stop miners or to transform their mining culture to other ways of making a living [3,9,26,28]. They will continue to do mining activities in any way. Because of the mining heritage that has run inside their blood for thousands of years old and because it is driven by the family's livelihood needs, in the midst of increasingly difficult conditions in this country [3,6,9].

4. Conclusion
CGM activities at Kertajaya village, Sukabumi Regency are proven by research, economically and socially: SUSTAIN. The exception is, in environmental aspect: miners are still using mercury. Miner, or small-scale miner, specifically at research location, as a profession = Proper. CGM business in research location is feasible, could be a useful new source of income for government. So, CGM by the result of this research, is proper enough to be officially supported by the state, as well it could be a useful new economic source. However, the fact of informal levies that ensnare miners, which make up 50% of miner’s revenue, had posed them to be far below any standards of living, both economically and socially. It is an irony, that the final conclusion is, CGM activity at research location, became factually UNSUSTAIN.

4.1. Recommendation
Subsequent research can take the cause side due to the occurrence of problems in the small-scale gold mining sector which is still negative and continuous, with the illegal retribution, such as the endless vicious cycle. Next, a study of how the concept is applied as an effort to accommodate community miners, and can be a foundation for continuing the study to explore how to integrate this community's scale gold mining sector into the country's legal system. The principle remains consistent with this paper: win-win solution to all stakeholders, and in the context of sustainability. If all these are achieved and is done well, it is predicted that the community's scale gold mining sector will become a locomotive that can boost many other fields in the country to move forward together [3].

It's not easy to categorize these small-scale mines, but I believe Indonesia can get more from small-scale mining by regulating, adopting or accommodate them in state’s official system. Small-scale mining is the only alternative to exploit small mineral reserves and can be done with small capital. Those are things that mining enterprises could not do, nor are interested in. Concerning mercury contamination,
there are various methods that could be implied as to the alternative. The success story of the implications of the Density Method in combination with the use of Borax (DB Method) or Gravity Borax (GB Method) in several areas of CGM in the Philippines [3,30–33] as a substitute for the use of mercury should be a good example for CGM Indonesia to be applied in its operational system. This action is to achieve more benefits in the economy in line with the environment preservation [31].

Nowadays, it is time that the legal and technical systems of the mining sector in Indonesia to refer to the 5 principles of Sustainable Mining Practices/SMP [3,34,35], to practice mining in sustainable conditions with a positive impact on the pillars: Efficiency - Economy - Environment - Society and Safety. Thus, these operations, which actually make an important contribution to economic development, need to be fully integrated into their respective economies [36]. Further, it is proven in this study, that the huge economic value of the community’s gold mining, will be able to play a significant role in the progress of development and the economic system at the national level, if CGM is managed properly. Last, ending the discussion on theme problems in CGM that have occurred for decades that have not been resolved, becoming a vicious-cycle, it is time to support CGM as the resolution. The government is a key player to guide this revolution, by formalization of CGM, and research location is recommended to be a pilot project.

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