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# The impact of traditional gold mining in Gumelar Banyumas, Indonesia

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## ABSTRACT

Traditional gold mining that grows without planning and only on the will of the community in order to obtain coffers, then the negative impact cannot be avoided. The gold mining of the people in Gumelar sub-district Banyu as is also part of traditional gold mining. The purpose of this study was to identify the impact of traditional gold mining in Gumelar sub-district Banyumas. The method used is qualitative descriptive. The results show the positive and negative impacts of the traditional gold mining. Positive impacts are more dominant in the economic and social aspects of society such as increased community revenues and emerging job opportunities, as well as the emergence of new business opportunities that follow, as well as increased levels of formal education of the community. Negative impacts are included in environmental and social aspects, such as the environmental pollution phenomenon of mercury waste as part of the mining instrument used and the lifestyle changes of miners leading to hedonistic and consumerism. The suggestion is the minimization of negative impacts and the maximization of positive impacts.

*Key words : Impact, Traditional, Gold mining, Banyumas*

## Introduction

Any activity undertaken by the people in order to fulfill the necessities of life is the right of every citizen. However, activities must always consider the benefits for the actors themselves, the community, and the environment. On the other hand that should be considered is the loss that may arise from an activity, which is not only for the perpetrators of activities but also for the community and the environment.

Gold mining is also one of the activities that clearly have the potential to affect the society and

the environment both on biotic, abiotic and social components. It is generally known that mining activities are classified as activities that directly extract natural resources which are then processed in a process that is not simple, even using chemical components so it is potentially very dangerous and will pollute and damage the environment so that the sustainability of environmental functions will be disrupted.

Act No.32 of 2009 provides guidelines that activities should be oriented towards sustainable development. What is meant is a conscious and planned effort that combines environmental, social and eco-

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4 nomic aspects into a development strategy to ensure the integrity of the environment and the safety, abilities, welfare, and quality of life of present and future generation?

The focus of the impact assessment is Mabel (2014) who stated that small-scale gold mining contributes positively to improving people's lives in terms of employment, income, health, education and basic family needs. However, this mining also negatively impacts the environment. Simbarase (2014) also concluded that gold mining in Zimbabwe Africa positively impacts socioeconomic communities, but has a negative impact on environmental quality. Abraham (2006) states that in general gold mining has a negative image caused by potentially very high pollution, while the cost is internalized to the public, especially miners. Vivian (2011) concluded that gold mining in Ghana resulted in 58% deforestation and 45% lost of agricultural land. Heledd (2006) who reviewed industry-related CSR said that with CSR needs to be put on hold in mining to gain social and environmental endorsement.

#### Research Method

This study was designed as a study with a combined method of qualitative and quantitative (Brannen, 2005). Surely this research is different from the experimental research that requires researcher intervention on the object of study. This research only reveal the phenomena that exist and occur in the community, especially those linked with the existence of traditional gold mining. Therefore, the data collection method were in-depth interview, documentation and observation.

In addition, this research is a qualitative research. However, it is not classified as grounded research, which purely departs from the field with empty hands which then compiles the theory of the findings in the field. This research still departs from the theory that then through the process of deductive thinking moves into the empirical realm which then through the process of inductive thinking leads to the theory of the field again. On the other hand, this study is neither purely qualitative nor absolute without data or quantitative methods. Therefore this research as a research with combined method. Specific research methods are qualitative in nature such as interviews, sometimes quantitative dimensions and data obtained can be analyzed by various methods including quantitative methods (Bullock and Willham, 2005).

The definition of impact is change as effect of an activity, so environment impact is change influence on environmental life which is affected by an effort and/or activity (RI. No.23<sup>th</sup> 2009).

#### Results and Discussion

16 The results show that the presence of traditional gold mining in Gumelar has positive and negative impacts.

##### Positive Impact of Gold Mining

Prominent positive impacts are on the economic and social fields. The indications are apparent, among others;

##### Labor

Traditional gold mining is categorized as labor-intensive; hence its existence absorbs a significant workforce. In real terms accurate data does not exist, but from various sources informants that the absorption of labor from gold mining is quite a lot. The labor involved directly from the clear mining of 2 villages of Paningkaban and Cihonje is about 1500 people. Not to mention the people who work not directly in mining but his work as a multiplier mining activities. Such jobs include food traders, food stalls, grocery stores, timber suppliers for mining needs, gold traders, etc.

The number of workers absorbed as well as the reduction of unemployment in the absence of mining activities is relatively high because conditions in the village Paningkaban and Cihonje belong to rural areas that are not many job opportunities except the

**Table 1.** Population working in the mining sector in Gumelar sub-district.

No.	Village	Mining	Percentage
1	Cilangkap	13	1.17
2	Cihonje	333	29.97
3	Paningkaban	615	55.36
4	Karangkemojing	20	1.80
5	Gancang	23	2.07
6	Kedungurang	75	6.75
7	Gumelar	19	1.71
8	Tlaga	5	0.45
9	Samudra	2	0.18
10	Samudrakulon	6	0.54
	Total	1,111	100

Source: BPS Banyumas Regency, 2016.

agricultural sector. Agriculture is relatively low because of the lot of land in the form of highland plantations.

Such condition is then before the gold mining, many young people in the village work abroad as migrant workers. After the gold mining the young population did not go abroad, but at work became a gold miner. Data on the number of people working in the mining sector according to Banyumas BPS data can be seen in Table 1.

The data show that the population in Gumelar sub-district working in mining as many as 1.111 people. Although the data do not specifically mention gold mining, it is implicitly in gold mining. This is evident from the highest number of villages in two villages where the gold mines are Cihonje and Paningkaban, 333 and 615 respectively. The remaining workers are those from outside Gumelar sub-districts even outside Banyumas district, such as from Tasikmalaya, Bogor, Yogyakarta and so on. Of the number of workers who are about 1500 people, then the number of people who depend on this gold mining can be 3 or 4 times as much. Assuming 1 family consists of 4 residents then it means there are 6000 of the population whose life depends on the gold mining in Gumelar District Banyumas Regency.

#### New Business Growth

A gold mining activity that involves a lot of people for a long time and generates income, has implications for the economic sector that usually follows.

**Table 2.** Growth of trade facilities (shops/kiosks/stalls) in Gumelar Sub-district.

No	Year	Amount
1	2011	721
2	2012	750
3	2013	886
4	2014	943
5	2015	1.024

Source: BPS Banyumas Regency, 2016.

The types of informal businesses that grow as in the form of shops, kiosks and stalls are an indication of an increase in people's purchasing power. Increased purchasing power also means the increase of people's income. Table 2 above shows that there is a very significant trend of growth of the informal sector in the 5-year period along with the existence

of gold mining activities in the area. No one determines that the cause of such economic activity is purely due to the existence of gold mining, but this can be an indication of the positive impact of gold mining.

#### Increasing Community Revenue

Community revenues that have increased since gold mining activities are recognized by the community as well as outside parties and even local government officials. Quantitative data does not exist, but the results of interviews with various informants all recognize that the existence of gold mining gives the impact of increased incomes of society. The explanation was revealed by a village Head Mr. Sukarmo.

Successfully mine gold, people to build houses, so the house is good. The value of land here is now high, even difficult to find the land sold. This village was classified as a disadvantaged village (IDT), but now its houses are getting better all the way. The growth of major roadside shops has also emerged since mining, and the shop owners are all natives here.

High low income is relative in nature, but how much actual income miners from his work in this gold mining. Miners and other informants can-not be sure how much they spend per day or per month. Only when compared to income from prior work that most of the farms and estates become recognized miners are definitely up.

Their income is uncertain because there is a system like this. When not getting the results is the daily wage of workers, but when getting a percentage, therefore the results up to millions per day. Similarly, told by a miner who has been there for 8 years, his name is Sumanto:

The bottom line of the above information is that their income keeps them working in the mines, although it is difficult to say exactly how much they earn per day or per month. The uncertainty of earning such income seems to have been well recognized by the miners, either for the workers or the owners of their capital. That is why most of the workers in gold mining are people having supplies for themselves and families left behind. In other words though they are as workers but not synonymous with labor. For example the economic condition of the successful population in gold mining can be seen from the condition of their homes. Here's a picture of some of the houses belonging to the resident of

his business in gold mining either as landowner or capital owner.



Fig. 1. The houses of the people involved in gold mining.

The conditions of such luxurious houses are in the Paningkaban village. It seems that the irony in the villages belonging to the villages spread like houses in a big city. No other and not that the owners are the villagers whose income from gold mining, either as landowners, owners of capital, or gold traders of mining products in the village.

#### Religious Social Condition

The social codes of people who appear to be positively affected by gold mining are the level of formal education. The formal education of the population has increased in line with the increase of the people's income. This can be seen from the level of education of mined family children, where parents increase their income so they can send their children to college. As told by Mrs. Astri, an owner of a food stall that daily serves the gold miners.

The existence of gold mining activities here is very beneficial for my family, because my children in one lecture have graduated from BSI in Purwokerto, this younger brother will enter UNSOED this year. I as a parent want to equip high schoolchildren.

The same thing with Mrs. Astri was also admitted by other citizens who told her that she could afford to pay her child until college was because there was a result of gold mining.

Another social condition that is positively affected is religious social activity. The practice of religious teachings such as alms, fingers, including high-cost worship services such as Umrah and Hajj is increasingly being done by villagers Cihonje and Paningkaban. Obviously this is said by Mrs. Nuriya, a gold mining field owner.

The positive economic impact that I had tell me earlier, it is very prominent, education of children,

formerly only junior graduates, now at the bachelor. Before the most mines of high school, now have many scholars. The welfare of the family is also clearly increasing, a lot of the pilgrims and umrah. The nice house on the road to Karangalang belongs to the owners of the mine. The contribution of mining to the village, the construction of the village hall was also built partly from the donation of mining products. The mosques in this village also helped from the mine. Material donation for mosque construction from mining group of cement 30 bags, ceramic, etc.

#### Negative Impacts of Gold Mining

The negative impacts of traditional gold mining occurring in Gumelar sub-district appear on the environmental and social aspects. Negative impacts include;

##### Land Change

Prior to the existence of gold mining in the mining area, especially in Paningkaban and Cihonje villages including a fertile and full of hard and dense plants. However, after the mining dug in the land as well as many tailings are wasted on the surface of the land so that a little more reduce the existing vegetation. This happens because the remaining tailings are rocks that become difficult for plant media. The following figure shows little change in land in the gold mining area.



Fig. 2. The solid land surface of the tailings is infertile.

The land is packed with unused mining rock tailings into views around the wells. Of course the land covered with such rocks becomes less fertile than before the gold dug wells. The size of the land is thus wider as the gold mining runs. For that to be drawn the longer the proposition of gold mining goes, the more land is covered with tailings, which in turn reduces soil fertility while reducing the vegetation growing on the land. Hagos *et al.* (2016) con-

clude that the traditional gold mining was rampant factor for deforestation. Observing dried and root exposed indigenous big trees were very common in the mining sites. The deforestation was driven by the taking off the soil which gives anchorages and the need for underground support props and use of fuel wood leading to vegetation loss.

#### Infra-Structure

Gold mining activities that potentially impact on infra-structure are related to the excavation and location of the mine well. The mine well was dug up with irregularities. Sometimes there is one plot of land dug in more than one well even until 2 and 3 holes. The position of the aperture does not seem to consider the risks to the house or road building. Why the mine is irregular because the basis of consideration is the points of exploration that had been done, and intuitive considerations obtained from people who are considered clever. Thus, not least the location of the mine well near his home.

Negative impacts seen from the gold mining also occur on the symptoms of damaged infra-structure on the surface as a result of uncontrolled underground mining. This is realized by the community as a logical consequence. In fact they are also no problem yet been replaced with mining results that can to replace it or build a new one. An example of this is a house nearby which is made into a quarry pits, so that the house is cracked which is difficult to be repaired because of the impact of the wells. The following figure shows a cracked house.

Damage infrastructure that is believed to be due to gold mining not only in building houses, but also to the existing road around the wells mine. This can happen because the excavation in the well is not only vertical but also horizontal. One of the mining



**Fig. 3.** Houses that are cracked and impacts close to the wells.

wells for example was dug vertically as deep as 17 m, then the two-way horizontal each direction 15 meters, then vertical again as deep as 5 meters, continue horizontally again as far as 20 meters. Sometimes even in passing a digger from someone else's well. In addition, many mine holes are excavated not far from the road. The gold mining area in Gumelar is a road that divides the village of Paningkaban and Cihonje village, where the two villages are gold mining areas with many wells. Here is one of the landslide road images of his landscape.

#### Mercury Contamination

Indications of mercury contamination in the environment are not visible to the eyes. Even miners also feel that they have not felt the impact of mercury on their health. However, various studies have shown that mercury contamination is significantly exposed in the mining environment. One study conducted to know the mercury contamination of gold mining in Gumelar, illustrated that mercury contamination is present in many minerals; tailings minerals, soils and rocks, river sediments, river water and groundwater (Fahmi *et al.*, 2014). Mercury grade and mercury in Mineral Ore, the result of mercury level measurement on 3 samples of ore minerals with sample code of PWT 02A, PWT 02B, and PWT 03 showed varied values respectively 0.007 ppm, 0.012 ppm, and 0.005 ppm. Of the three samples, the average value is 0.008 ppm.

More details Fahmi *et al.*, (2014) describes the mercury content obtained from tailings media has a



**Fig. 4.** Land slide under the road

high value, which is in the range of 7,49-604,00 ppm. Content and Mercury Distribution on Soil and Rocks. The data show that S-1, S-10, and S-6 measurement values show almost the same results, ranging from 48.0-62.0 ppm. High levels of mercury were found in S-5 and S-8 samples of 97.0 ppm and 102.0 ppm, respectively. Content and Mercury Distribution on River Sediments. The results of mercury level measurements on river sediments in the Tajum River, which are located around the traditional gold mining sites in Cihonje Village and Paningkaban Village have a range of 6,993-11,886 ppm. Mercury Level and Mercury on River Water, mercury contents from water samples of Tajum River in Cihonje and Paningkaban Villages have a range of values from 0.479-1.928 ppm. Levels and Mercury Distribution in Ground Water, the results of measurements of mercury in ground water in Cihonje and Paningkaban Villages gave results ranging from 0.219 ppm to 1.574 ppm from 7 water ground samples. The average value of the seven soil samples is 0.867 ppm.

Result of the second study conducted by Widiadi (2013) also shows that mercury contamination in gold mining in Gumelar is spread along Tajumriver with value exceeding environmental quality standard that is 0.002 mg /L. The highest Hg concentration at the first sample point (1.891.5 mg /L) followed by the second sample point (0.028 mg/L), the third sample point (0.010 mg /L), the fourth sample point (0.008 mg/L) and the fifth sample point 0.003 mg /L). Hg levels in the highest sediments at the first sample point (0,513 mg /L) were followed at the second sample point (0.074 mg/L), the third sample point (0.048 mg/L), the fourth sample point (0.041 mg/L) and the fifth sample point (0.037 mg/L).

Another study that looked at mercury contamination in similar gold mining was Fraga *et al.*, (2014) who researched in Gumelar Banyumas also concluded that the mercury contamination had seeped on the geological media. Mirdat *et al.*, (2013) who concluded that mercury contamination is very high in the Poboya gold mine of central Sulawesi. Even abroad, as Hilson (2002) studies in Ghana conclude that excessive mercury pollution occurs in small-scale gold mining in the country.

### Lifestyle

Lifestyle is difficult to determine that the change is caused solely by the existence of gold mining. How-

ever, from various information obtained that the improvement of socio-economic conditions is recognized has increased since gold mining. Prior to mining there were many people who did not work or worked in agriculture and plantations that were mostly irregular and erratic work, so that unemployment was high. After gold mining, almost all of the unemployed population remain directly or indirectly involved in mining activities.

Changes in the rhythm of life that was from non-technical agrarian directly to the industry and even a kind of mass / household industry, then a little more influence on their lifestyle. Social activities that were still thick lost because their free time that they have increasingly narrow. Social activities as part of the manifestation of the values *gotongroyong* no longer because time and energy has become a very valuable production factor and make money. Patterns of social solidarity that are *peguyuban/gemeinschaft* increasingly faded. On the contrary the pattern of *patembayan/gesellschaft* society is increasingly prominent in which solidarity is built on the basis of economic interests and industrial relations (Sztompka, 2004).

As the lifestyles of industrial society are running out for work, then on holidays they use to rest and refreshing. This pattern also became commonplace done by gold miners especially young ones, filling the time of Friday to refreshing the negative as drinking, gambling and disco/*dugem*. As informed by Mrs. Nuriya's informant;

Among miners if the gamble is now not there, there used to be but continue to be caught and continue to disappear. If there is a drink there may be but it is not far outside in this village. I also heard that every Friday night is a mine worker's holiday, in Baturraden where crowds are visited by miners. There was even a word "Puriwisata a night entertainment place like karaoke and discotheque in Baturraden Purwokerto, if Friday night dominated by the paningkaban people".

This means that the negative impact on the social aspects of gold mining can-not be denied. If it is not classified as negative, at least shows there is a change in lifestyle of people who become familiar with hedonist lifestyle.

### Conclusion

The existence of gold mining in GumelarBanyumas has positive and negative impacts. Positive impacts

are on social and economic aspects consisting of; high employment of local workers, while also reducing unemployment for the population. Recalling the incomes of society which in turn warned the well-being of their lives. The growth of new businesses as a multiplier effect of gold mining activities. The social condition of the community also increases, especially in the increasing field of formal education of the population, as well as increased religious social activities as well.

Negative impacts that occur in the environmental and social aspects. The once fertile and vegetation-laden land conversion is now becoming barren due to the large amount of unused mine tailings rocks. The presence of damaged infra-structure is also the effect of gold mining because mining excavations are not controlled either inside or direction. Mercury pollution is exposed to soil, sediment, ground water and river water. The hedonic lifestyle and faded old values that have been considered as the legacy of his ancestors.

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