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ZONE ENGINEERING OF PEOPLE'S MINING AREAS AS A LIMITATION ON ENVIRONMENTAL DESTRUCTION IN BANYUMAS INDONESIA

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ABSTRACT

Zoning of the People's Mining Area (PMA) is a product of the Ministry of Energy and Mineral Resources (MEMR) of the Republic of Indonesia. PMA zoning for gold mining in Banyumas Regency decreased in 2017. Actually it was too late from the mining activity itself which had been running for ten years before. Existing gold mining activities run illegally because they are not based on PMA. Because of its illegal status, its existence is also not in accordance with good mining rules. On the other hand, the area used as the location of gold mining far exceeds the width of the PMA zoning which is only 25 hectares. While the area of gold mining in Banyumas Regency is about three times the size of PMA. Therefore, the existing zone is immediately implemented so that the process of legalizing gold mining goes. In addition, the negative impacts of gold mining that develop indefinitely can be minimized. Because the official PMA zones are very limited, additional zone engineering needs to be made to limit the extent of the mining area, as well as the ease of controlling and limiting the spread of environmental destruction.

Keywords: zone engineering; people's mining; environmental destruction.

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1. INTRODUCTION

So far the current gold mining has no signs or description of which location is suitable to be mined. Determining the location or hole of the mine using only intuition. Mining therefore has a geological impact because sometimes miners make mine holes close to houses, roads and other public facilities. To make effective mining results more effective, it would be better if there were spatial boundaries where the exact location of the source of the gold content was located. Excavation of the pit is not too far away both in depth and distance.

Ecological aspects have become accustomed to being victims of human activities in fulfilling their needs, especially traditional and illegal gold mining activities that have no operational standard procedures. Even formal and modern companies often externalize their production costs to the environment, so that the environment bears the burden of production for the company. The environment that bears the externalities of the company as well as the activities of the community, in essence that the environment accepts a burden which if the burden exceeds the threshold then it becomes a negative impact.

Before the existence of gold mining in the mining area, especially in Paningkaban and Cihonje villages, it was included as fertile and full of thick and heavy plants. However, after many mines were dug up on the land, and a lot of tailings were wasted on the surface of the land, which reduced the soil fertility to a lesser extent which in turn reduced existing vegetation. This happens because the remaining tailings are rocks which become difficult for plant media. Figure 1 is a bit of a change in land in the gold mining area.



Figure 1 Tailings covering the land.

Land filled with tailings (unused mine rock) becomes a view around the mine well. Of course the land covered with such rocks becomes less fertile than before the gold mine excavation wells. The area of the land is increasingly widespread as the gold mining runs. For this reason, it can be drawn the proposition that the longer the gold mining runs, the more land is covered with tailings, which in turn reduces soil fertility while reducing the vegetation that grows on the land. [1] study, [2] also produced findings that traditional gold mining is a rampant factor for deforestation. Observing large dry trees and open roots is very common in mining sites. Deforestation is driven by the release of land that provides anchors and the need for underground support and the use of firewood which causes loss of vegetation.

Similarly, the [3] study of communities in the Kahayan countryside experienced a shift in business patterns and significant land use from agriculture to small-scale gold mining. Miners cut down plants that grow on it (including productive rubber plants) and mine gold using suction machines. This business is very destructive for the environment. The structure of the land uncovered due to gold mining cannot be used as agricultural land for at least the next 5 years.

The negative impact seen from gold mining also occurs in the symptoms of damage to existing structures on the surface as a result of uncontrolled underground mining. This is realized by the community as a logical consequence. Even miners do not feel disadvantaged because they have been replaced with mining products that can be used to buy or build new houses. An example of this is a house near which a mine pit was made, so that his house was severely damaged, which was difficult to repair due to the impact of the mine well.

Trustworthy infrastructure damage is a result of gold mining not only in houses, but also in the roads around mine wells. This can occur because excavation in mine quarries is not only vertical but also horizontal. Miners when digging horizontally sometimes encounter diggers from other groups' queries. Horizontal excavation is what is possible to have an effect on the damage to the road, because of the direction without being restricted, the barrier is the vein of the gold content. In addition, many mine holes are dug not far from the road [4].



Figure 2 Road sinking due to lands under it landslides.

Indications of mercury pollution in the environment do not appear in plain view. Even miners still feel they have not felt the impact of mercury on health. However, various studies that have been conducted show that mercury contamination is significantly exposed in traditional gold mining environments in Gumelar District. One study illustrates that mercury pollution occurs in ore minerals, tailings minerals, soil and rocks, river sediments, river water and groundwater [5]. Another study that looked at mercury contamination in gold mining at Gumelar was [6] which concluded that mercury contamination had permeated geological media.

2. MATERIAL AND METHOD

The location and area of this study are traditional gold mining areas in Gumelar District, Banyumas Regency. The object of this study is: 1. Areas that have mine location points marked by mining wells and accompanying mining activities in two villages, namely Paningkaban village and Cihonje village Gumelar sub-district, Banyumas Regency. 2. The map of the people's mining area (PMA), is an area determined by the government via the Ministry of Energy and Mineral Resources (MEMR). 3. The impact of the physical environment, especially the abiotic and biotic aspects that can be observed directly at the mining site.

The method used in this study is a qualitative and quantitative method, which in Brannen's concept is a combination of qualitative and quantitative methods [7]. The qualitative method

used is to rely on interview techniques, observation and documentation which are then analyzed by interactive analysis methods, Mile and Huberman models [8].

The technique of determining and making mining zoning maps is by overlaying the map of the location of the real mining points in the mining area with a map of the PMA that has just dropped in 2017 from the Energy and Mineral Resources Ministry. After overlaying it is then categorized into zoning consisting of dense zones within the PMA, dense zones outside the PMA and less dense zones outside of PMA. Thus it is then determined to be zone A, B and zone C. After the formation of a zoning map, provisions for each zoning are made.

3. RESULT AND DISCUSSION

The results of field studies and analysis show that zoning of mining areas needs to be done as one of the important programs to be carried out. [9] examined by producing mining zoning models in eastern Indonesia. The results of the model made are regional models including zones that can be given permission, zones can be given conditional permits and zones cannot be granted mining business permits. The mining zoning model is used as input for relevant agencies in the context of policy making identification of potential metal and coal minerals in Waropen Regency as the basis for regional development in the area.

The government regulation in this case the MEMR ministerial regulation (2017) also instructs the need for zoning in accordance with the mining business area (MBA) and the community farming area (PMA) that has been set. The People's Mining Area as referred to in the regulation becomes the basis for the issuance of community mining permits by taking into account the criteria in accordance with the provisions of laws and regulations and must be stated in Regional Regulations concerning Provincial Spatial Planning and Regional Regulations concerning Regency / City Spatial Planning.

The results of this study are in the form of zoning for people's gold mining, which is a form of compromise between idealism based on formal juridical provisions and empirical relations with existing mining real conditions [10]. The zoning is offered as a solution to become the basis for legalization and mitigation for the emergence of negative impacts on the environment. For this reason zoning is classified into zones A, B and C. The criteria for determining the zone are at least based on the criteria for potential gold content, as well as the potential to obtain permits from the government so that the status becomes legal. Figure 3 can be used as an illustration of the zoning of traditional gold mining locations by considering the determination of community mining areas which have been determined by MEMR Ministerial Regulation Number 3672 of 2017 concerning Determination of Mining Areas in Java and Bali [11]. The regulation was promulgated on October 13, 2017 signed by Minister Ignasius Jonan.

Zone A is a zone that has been determined as a community mining area (PMA) so that mining in the area has the potential to become legal mining. In addition, zone A is also classified as having a high gold content because the pit is classified as dense in the region. Zone B is a gold mining zone which is classified as having a high content but not including a PMA so that the mining status there tends to be illegal. Zone C is a zone classified as low gold content and does not include PMA, so the status is always illegal.

Zone A as a PMA zone complies with government regulations, so it should be legalized by the government. Such as [12] which showed the results of his research that the location of people's mines was allocated to the People's Mining Area, because it is based on the District Spatial Plan. In determining the People's Mining Area, the District Government pays attention to the consideration of the Regency Mining and Energy Office as the technical implementation service in the area. The People's Mining Area which has been established, was publicly announced and followed by the issuance of the People's Mining Permit. The District

Government has the responsibility to manage and develop the people's mining business in the location of the People's Mining Area.

The area of each zone for gold mining in Gumelar District, Banyumas Regency is as follows.

Table 1 Zoning of gold mining at Gumelar Banyumas

No.	Zone	Luas	Percentage	Color
1.	A	247.737 m ² / 24,77 ha	42,33	Green
2.	B	253.624 m ² / 25,36 ha	43,35	Yellow
3.	C	83.853 m ² / 8,38 ha	14,32	Red

Zone A area is the most ideal land for mining because in addition to being legal, the gold content is also high. Zone B is an illegal area and the gold content is still high. Zone C is a land that is not legal for mining, and also has a small gold content. With the zoning of such mining areas, mining is only expected to be present in zone A as the best zone for mining. This will be effective, for example government assistance is also directed at mining with legal status.

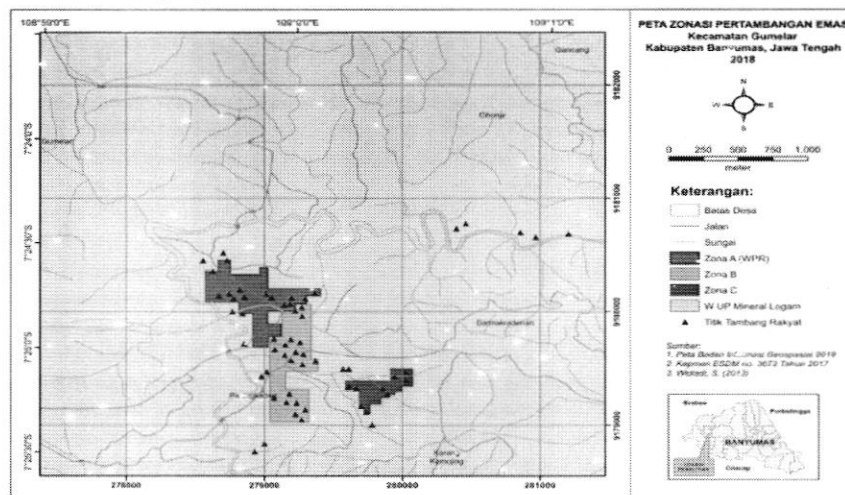


Figure 3 Engineering of people mining zone in Banyumas

Considering that in all zones it still has the potential to have a negative impact, miners must comply with the guidelines which include.

- The mine location must be inside the mine zone. During that time there was a mine pit in a location with no gold content so the results were very low and no one was even left behind.
- The mine location is not close to houses, buildings and other building facilities. Cases that occur in the field that the location of many mine holes is close to the house inhabited by residents or the owner of the mine itself.
- Mine locations are not adjacent to public roads, both district roads and village roads. The existing case was allegedly a mine pit until it crossed under the road, causing the road to experience land subsidence.

- d. The mine location is also not close to springs and waterways. This needs to be considered so that when there is chemical contamination it does not enter and spread through the water flow.

The importance of mining zoning is also indicated by [13] investigating the existence of mining conflict occurring in mining areas in Sumbawa Regency. Based on the results of his research that conflict occurs because there is no mining zoning. The decision of the District Head regarding the granting of a mining business permit (MBP) is carried out not in accordance with the normative procedures and requirements for submitting an MBP. Meanwhile, the formulation of a community mining permit (CMP) policy was colored by the desire of legislators to build a political image and see the dynamics of community mining as a promising trend in the future.

4. CONCLUSION

The zoning of the people mining area (PMA) in Banyumas is an instrument that can be used to regulate and limit the growth and development of people's gold mining. With zoning, it can also be the basis for the process of legalizing existing mining. In addition, the PMA zoning also serves to limit the widespread environmental damage caused by gold mining activities, because the fact is that traditional gold mining has caused environmental damage and pollution.

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