

Synergy of Penta Helix Plus in Reclamation Activities: Study of Mining Strategies in Pasuruan Regency



Misbahul Munir¹, Moh Bisri², Fadillah Putra³

^{1,2,3}Posgraduate Program of Universitas Brawijaya Malang, Veteran Street , Ketawanggede, Lowokwaru, Malang City, East Java, 65145

ABSTRACT: The Penta helix is a part of public policy, but in some cases, the Penta helix can become a standard for handling mining through reclamation. The involvement of Penta helix plus actors in overseeing mining activities to become Sustainable Mining Practices where there is reclamation in ex-mining areas that are beneficial to the surrounding area. This research method uses a mixed-method by combining qualitative data from interviews, documentation, and observations with quantitative data in the form of questions, then conclusions are drawn. This research shows that Penta helix plus is an alternative for handling mining that involves many parties and becomes an ideal new pattern. Penta helix plus offers a new formulation for synergistic public participation in controlling exploitation activities and hoping for reclamation activities. The involvement of the Penta helix plus also cannot be separated from the elements of communication and coordination as the main indicator in synergy.

KEYWORDS: Penta helix plus, reclamation, Sustainable Mining Practices, Environment.

INTRODUCTION

Mining is the largest sector that contributes to the country's economy, including in the states. As explained by Ericsson & Lof (2019) that in several low- and middle-income countries rich in non-fuel mineral resources, mining makes significant contributions to national economic development as measured by the revised Mining Contribution Index (MCI-Wr). But the impact of mining damage is also an aspect that needs to be considered as "some potential environmental impacts of mining: environmental impacts, pollution impacts and occupational health impacts (Katoria, Sehgal, and Kumar, 2013). Although mining is considered the biggest cash supplier, mining companies that carry out exploration often ignore environmental aspects that damage the environment ecosystem.

It is necessary to have mining based on Sustainable Mining Practices as a form of responsibility for mining companies at all levels. Mining is not just exploration but also creates shared values that have responsibility for economic, social, and environmental issues in mining areas (Worlanyo & Jiangfeng, 2021; Sdino, Rosasco, and Dell'Ovo 2021). The main goal of Sustainable Mining Practices is to be able to meet good environmental standards and waste management.

Pasuruan Regency is the area that has the most natural potential in East Java Province. There are around 65 mining locations with various nature's potential that can be utilized by miners or the surrounding community for development. The majority of mining types in Pasuruan are quarry c mining, among which the most are andesite types with a total of 1,183,599,272.00 tons with an area of 1,420.91 hectares and sand mining types with a sum of 872,934,030.00 tons with an area of 776.47 hectares. Of the 65 companies operating to exploit natural resources in the Pasuruan area, 15 mining companies are not responsible for post-mining activities and are still under monitoring and evaluation.

Reclamation is the implementation of Sustainable Mining Practices that are still very minimal in all places. The agenda is part of the process of mining activities. The lack of participation from the public and government officials involved has resulted in negligence in the reclamation process and or restoration of ex-mining areas. As a result, former mines always leave poor environmental sustainability, loss of life and become the cause of natural disasters. Even sand mining carried out brutally affects the quality this of course has an impact on changes in biodiversity (Pereira, 2012).

As many mining companies are still under monitoring and evaluation, there are various reasons why companies do not carry out reclamation or restoration. First, reclamation activities require expensive costs, ranging from stockpiling to raw materials for reclamation, not to mention that the company must bear new workers for this reclamation activity. So, it is not surprising that many companies are very apathetic in this activity. Second, in addition to accepting the consequences of expensive reclamation efforts, the company is asked for a reclamation security deposit of Rp.50 million per hectare cultivated, imagine if the company cultivates tens to hundreds of hectares of mining land, obviously they have to spend quite a lot of money.

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On the other hand, the currently centralized government licensing regulations are an obstacle for local government monitoring activities to mining entrepreneurs. In addition, there is no public participation in ideally overseeing mining activities. So, the possibility of mining companies not doing reclamation is the biggest.

Some research took to analyse the effect of mining activity, Espinose-Reyes, et al. (2014) in their research about mining impact in district Villa de la Paz, Mexico find that the impact of mining on biotic communities, and the need to take into account the wildlife in the assessment of contaminated sites. Furthermore, Nghargbu & Iyakwari in 2020 took the research about Geopolitical Concern Arising from mining activities in Nigeria and Cameroon. The result of that research is environmental problems due to mining activities in Nigeria and Cameroon have been a source of geopolitical concern. Here, we explore these issues in terms of the balance of economic benefits from mining and ensuring geological site maintenance and enhancement.

From some of research above, find that the mining activities bring some problem and effect. So, the mining reclamation is important ways to solve the problem. For this reason, the Penta helix plus concept need, which become a new idea and formula in alleviating mining problems, namely the government, academia, businessmen, society, media, and religion (plus) as an additional aspect. This is done as a form of public participation in guarding exploitation activities that have fatal consequences and an agreement in carrying out reclamation.

THEORETICAL FRAMEWORK

Reclamation as Sustainable Mining Practice

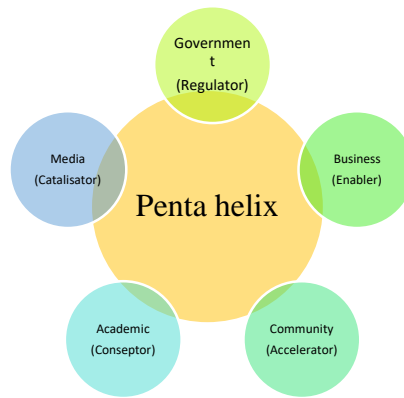
In reclamation mining, it is referred to as mine closing, where the company is responsible for ending exploitation activities by meeting the demands of all elements. Reclamation is known as a post-mining land rehabilitation process carried out to maintain the sustainability and ecosystem of a land. This rehabilitation is carried out as a form of the final program of mining exploration in maintaining a sustainable living environment arrangement (Almeida et al. 2020). The reason why reclamation is an important activity to be carried out is none other than a form of obligation (Każmierczak, Malewski, and Strzałkowski 2019) for all companies and the mandate of Government Regulation No. 78 of 2010 concerning Reclamation and Post Mining Article 2 paragraph 1 which states that holders of Exploration IUP and IUPK are obliged to carry out reclamation.

In line with what Ali and Wulandari said that to reduce the negative impact on the environment from mining activities, a holistic reclamation of ex-mining land is needed which does not only include physical improvement of the environment but is also carried out with community development activities (Kurniawan and Surono 2013). Reclamation activities that are the obligation of miners (Yuniarti, 2019) must of course go through a very in-depth study and not only be limited to aborting obligations but must experience the value of their benefits (Sdino et al. 2020). Planning for reclamation activities must be based on environmental sustainability (Popovic et al. 2015) or long-term use that can be enjoyed by the surrounding community. There are several models for the functioning of post-mining areas for reclamation activities, such as agriculture, forestry, fisheries, construction, and entertainment (Shi et al. 2013).

The idea of Sustainable Mining Practices is what is expected to become something of value and produce useful products. So that mining is no longer considered a negative stigma (Almeida et al. 2020) that harms the surrounding environment and the people living in the area but also has a positive impact on both the government and residents at the mining site (Emmanuel, et al, 2018). First, the opening of an isolated area, with exploration activities and the entry of mining companies, the area will have an impact on the bustle and open access to the area than before. Then with the mining route, it is possible to increase the number of people. Second, Local Original Revenue (PAD) and local communities, with exploration activities having a very good impact on regional income from corporate taxes, especially if the area has a minimal regional budget, will be very helpful. Especially if the ex-mining area is carried out in a sustainable manner which is useful.

Penta Helix Plus Collaboration

The concept of the Penta helix is commonly in public policy (Astuti and Asmarasari, 2020), but explicitly the Penta helix can also be actualized in mining. All the Penta helix actors become evaluators in handling mining. The Penta helix is part of the efforts that can be made for this reclamation activity. Where there are several elements in the concept of the Penta Helix including; Academics, Businesses, Community, Government, and the right Media are used in collaboration (Vishwanath et al. 2014)



Picture 1. The Penta Helix Diagram

Penta helix plus became the standard before carrying out exploitation activities; by involving; First, the government as the holder of policies and permits, including spatial planning. Second, academics with exploring the ideal study of the impacts caused. thirdly, the community as actors who feel the impacts of mining. Fourth, entrepreneurs as shareholders and business actors are responsible for the impacts and consequences that occur. Fifth, the media as a means of publication if in the future there are inequality and violations. The six religions (plus), where religion which is a moral aspect needs to be involved, although this does not apply in all regions. However, at least this concept can provide recommendations from the imbalance in mining implementation that results in natural damage without carrying out post-mining responsibilities, namely reclamation.

The above concept was built based on face-to-face dialogue between stakeholders to create a sense of mutual trust and oriented to "this communication" that can be carried out between fellow policy stakeholders for common goals. face-to-face dialogue is not just a negotiation, but the core of collaborative governance processes to remove stereotypes and communication barriers. Face-to-face dialogue is based on mutual respect, trust, and commitment because of describes the ideal processes for collaborative activities (Novita 2018).

Table 1. Collaborative Activities in Mining Case

Eksplorasi (Environmental Plan)	Exploitation	Mine Closure (Reclamation and Rehabilitation)
Stakeholder dialogue for: <ul style="list-style-type: none"> Identifying environmental impacts due to mining activities Identify the role of each stakeholder Create an external system that involves all stakeholders 	<ul style="list-style-type: none"> Stakeholder dialogue in the context of monitoring and evaluating environmental impacts that arise Building collaborative actions in mitigating environmental impacts 	<ul style="list-style-type: none"> Stakeholder dialogue in building agreement on the points and processes of management and reclamation, rehabilitation and restoration Stakeholder collaboration in the process of reclamation of water, land etc

The Penta helix theory is ideal and strategic if it is used as a foothold in dealing with mining, but it seems that one more element needs to be added which can become a new perspective in handling mining, this element is religion (plus). Because the Penta Helix theory has not yet been touched on as a preventive mining effort. As for religion, as a plus element of the Penta Helix, it provides an up-to-date view that the influence of religion in handling mining is not only a theological point of view. However, religion also provides clues to the limits of exploration in mining that are not excessive.

The reasons for the religious sector being involved in perfecting the Penta helix are: first, Indonesia is a religious country, where religion is believed to be a guide to life as well as a moral value among the people. Second, in mining, religion regulates in detail the implementation of zakat as a form of purification of wealth and a sense of empathy for the surrounding community, because in every wealth that humans have there are other people's rights that must be given. Third, religion is a social control (social control) where the role of religion in regulating the social order is very large, besides that religion can also be a reducer of conflict in the dynamics of society. It means that the existence of religion in the synergy of Penta Helix is morally needed in mining activities so that the exploration process is truly following religious and moral guidelines so that the paradigm of sentiment towards mining can be suppressed.

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Table 2. Description of Actor Function

No	Actor Penta Helix Plus	Fungsi
1	Government	The government has the right to make policies and regulations
2	Academics	Conceptors and consultants in mining studies
3	Businessman	Carry out environmental responsibility including reclamation activities
4	Media	Publications and information related to mal-administration and exploitation violations
5	Public	Control and obtain rights for the damage caused
6	Religion	as social control, conflict reducer and a theological-normative moral guide, so that the process of exploitation activities is carried out in standard ways and is not excessive.

The concept of synergy arises because of the need to build mutually beneficial cooperation based on rational thinking. To support the ideal synergy, indicators are needed to establish relationships between actors in achieving common interests. According to (Najiyati and Susilo 2011) said there are at least two indicators that can be used in building an ideal and harmonious synergy:

First, communication, this aspect is an important aspect for synergizing between actors in an organization (Budhi, et al, 2022) for that in general communication is considered as a constitution in organizations because communication is a way in which organizations are established, structured, designed, and maintained collaboratively (Cooren, 2018; Ahlf, et al, 2019). Because it is said, that the result of communication (work relations) is the achievement of coordination in a way that is effective and efficient (effective and efficient). Complex communication models demonstrate the need to deal with value-based conflict, to seek the representation of interests (not groups), to recognize the role of interaction in creating the individual and collective identities of others, and to value creative outcomes over “commonality” or consensus. Yusuf, et.al (2022) said that interpersonal communication has the following aspects:

- a. Openness, openness is an important thing in communication. The openness in question is a willingness to acknowledge feelings and thoughts as belonging to everyone and must be responsible for them;
- b. Empathy is a person's ability to know what other people are experiencing at a certain moment;
- c. Support (supportiveness), is an effort to reduce defensive communication attitudes that can occur due to factors such as anxiety, fear, and even threats. Supportiveness can also be defined as a tentative and open-minded attitude and willingness to hear opposing views and willingness to change positions if circumstances require. When a person acts provisionally i.e. with an open mind, with the full awareness that others may be wrong, and with a willingness to change his attitude and opinion, then that person can be encouraged or supported.
- d. Positive attitude (positiveness), which means that the parties involved in communication activities must have feelings for mutual respect and positive thinking, not excite and suspicious;
- e. Equality, meaning that there must be a tacit acknowledgment between the two parties who have different views to contribute together. Equality does not mean that one must accept and agree to all verbal and non-verbal behavior. Equality is a way of accepting the other party as an interlocutor or equality asking someone to give unconditional positive respect to the other party.
- f. Second, coordination is defined as an activity to put managerial order in place so that there are no inequalities and conflicts when each actor carries out his duties, so it is hoped that this coordination can be aimed at the waypoints of achieving goals efficiently. Coordination according to (Dwijayanti 2012) namely, coordination as the achievement of orderly group efforts, and unity action is the pursuit of common purpose (coordination is the achievement of group efforts regularly, and unity of action is an effort to achieve common goals). Coordination is intended as an effort to unite the perceptions of the actor units or work units so that the organization moves as a unified unit to carry out organizational tasks to achieve goals. As for the aspects that can be implemented coordination:
 - g. Unity of action, coordination is needed so that each member adjusts and understands his duties. In addition, so that members and organizational units do not run alone. The most important thing in this aspect is to unite perceptions to achieve the expected mission.
 - h. Division of work, is a breakdown of the main tasks and functions so that each actor in the organization is responsible for carrying out a limited set of activities.
 - i. Sense of cooperation (sense of cooperation)

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- j. Discipline is an effort to increase awareness and willingness of actors and groups to obey every regulation that has become the organizational principle and applicable norms

Table 3. Collaboration Aspect

No	Indicator	Aspect
1	Communication	1. Openness 2. Empathy 3. Support (supportiveness) 4. Positive attitude 5. Equality
2	Coordination	1. Unity of action 2. Division of work 3. Sense of Cooperation (sense of cooperation) 4. Discipline

It can be understood that synergy is a condition that connects or involves actors to achieve common goals. Of course, this common goal will be achieved if the collaboration can include communication and coordination as an ideal step.

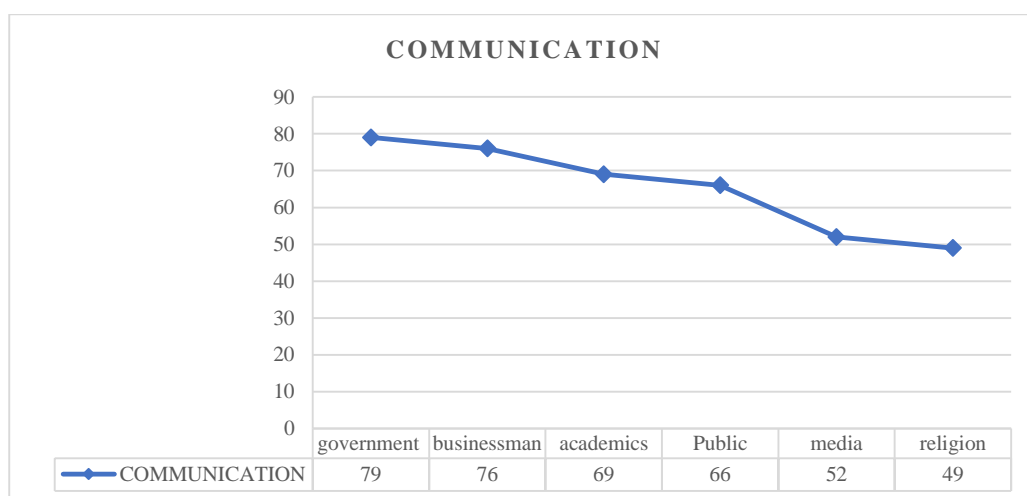
METHOD

This study uses a mixed-method, where the implementation of the research combines qualitative and quantitative methods. This research is referred to as mixed research which is a procedure for collecting, analysing, and mixing qualitative and quantitative methods in a study or series to understand the problems in research (Cresswell, 2015). In line with what was stated (Johnson & Christensen, 2014: 488) that the mixed method is a level of a research study where a researcher combines qualitative research with quantitative techniques in a single research study. This research is used to describe a more actual and complex phenomenon to be able to provide a more accurate comparison of qualitative and quantitative.

This type of mixed-method uses a sequential explanatory strategy, namely data collection and analysis using qualitative, followed by quantitative collection and analysis with an emphasis on qualitative data.

RESULT AND FINDING

As an area rich in natural resources (SDA), Pasuruan Regency has succeeded in creating a positive image of the ex-mining area through something useful (Sustainable Mining Practices). One of these successes by PT. H. Misbahul Munir (Mas Munir) created a positive atmosphere from a former mining area into an international horse racing arena. This cannot be separated from the way the company establishes good communication so that the communication gives birth to ideas and ideas for useful reclamation

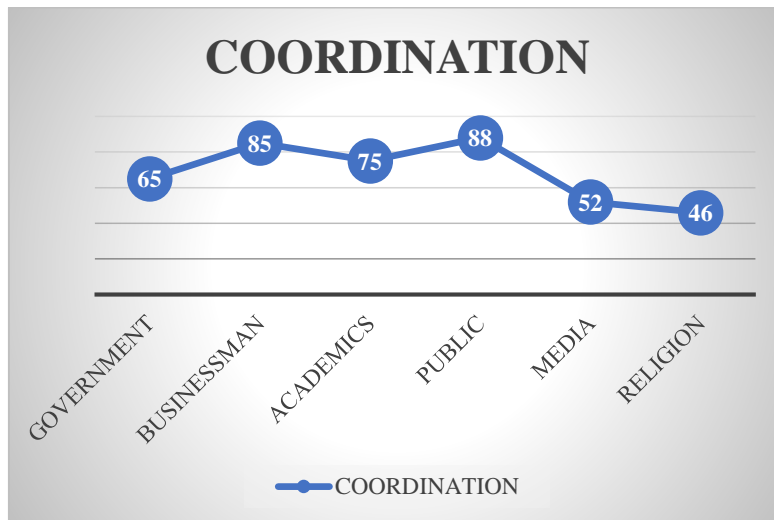


Picture 2. Communication Values

The diagram above shows that the synergy that exists is very well established. The communication carried out by all the Penta helix actors is fairly stable and conducive, even though religion is in the least position. However, religious actors (plus) have a role that is quite helpful in handling mines as social control and moral-religiosity of the surrounding community. Then the community

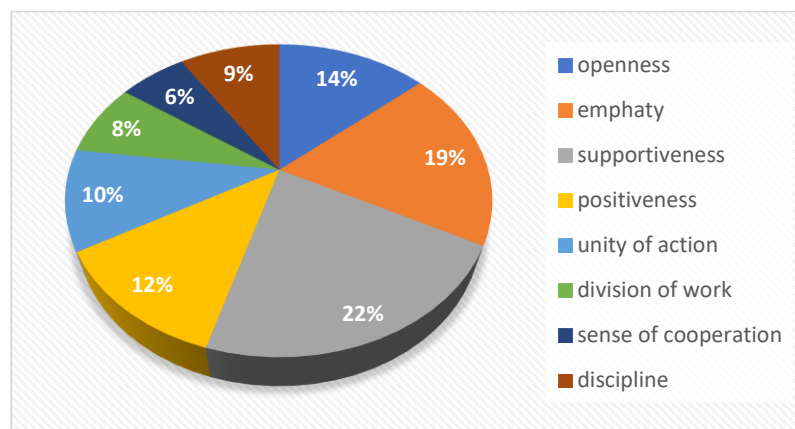
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actors get the 4th rank after academics. This shows that communication to the community is very important after a study by academics and licensing to the government have been carried out. Then in the Penta helix plus synergy. Then the next step is coordination.



Picture 3. Coordination Values

The data above shows that coordination is always carried out to maximize reclamation planning in the ex-mining area of PT. H Munir. In coordination, community actors, on the other hand, are more involved in the preparation of reclamation activities, this shows that the community has the right to get their rights back after the exploitation activity is carried out, namely beneficial reclamation. The depiction of the coordinates of each actor in the above analysis has an ideal level of synergy. So it can be concluded that the Penta helix plus synergy has the right communication and coordination pattern in implementing Sustainable Mining Practices, namely in the form of reclamation.



Picture 4. Penta Helix Elements

The diagram above clearly shows that the derivative elements of communication and coordination are going very well, resulting in optimal synergy. For this reason, communication and coordination are efforts for synergy in each actor who can build the expected goals collaboratively. In addition, coordination is needed to maintain relationships between stakeholders, both vertically, horizontally, command, and partnership relationships. Communication is the exchange of information that involves various parties. Several positive values affect the synergy process, namely: trust, openness, transparency, mutual respect, recognition, friendship, and sincerity.

Therefore, it can be understood that synergy is a condition that connects or involves actors in order to achieve common goals. Of course, this common goal will be achieved if it can include communication and coordination as an ideal step.

DISCUSSION

The Penta helix plus synergy in Pasuruan Regency has succeeded in creating a new color in mining management through reclamation. The Penta helix model is a transformation of the Triple Helix which involves various elements of society or non-profit organizations in realizing innovation (Putnam & Nicotera, 2009). Then this definition is known as a synchronization model for the development of various parties including the association of actors in the cooperation (Van den Broek, 2018). In line with what

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Bascope, et al (2019) said, one of the drivers of sustainable development must be carried out with collaboration that has a participatory orientation where the community is one of the actors that must be focused on.

In the Pasuruan district itself, this collaboration has been carried out for a long time, where all actors are involved in handling mining. For example, mine owner H. Munir (Mas Munir) is an andesite mining company with an area of 30 hectares. As a form of responsibility for the mining file area, the company makes a reclamation of the type of tourism, namely an international standard horse race which is an arena for horse racing lovers, besides that the former mine is also used as a tourist spot and outbound. This is done not only as a form of responsibility for the environment that has been widely exploited (Swab et al. 2017) but also as an effort to improve the welfare of the surrounding community and to brand the area with characteristics that can attract the attention of tourists.



Picture 5. Horse Racetrack Pictures

Source: detik.com

The success of the Penta helix plus cannot be separated from the communication and coordination made by all actors. The results above show that coordination and communication are in a balanced position, meaning that the Penta helix plus collaboration has been going well so far. As (Hardianto, et al, 2019) said there are at least two indicators that can be used to build an ideal and harmonious synergy. Similarly, Stipanović et.al (2019) explains that synergy can be achieved through communication and coordination. For this reason, communication and coordination are efforts for synergy in each actor who can build the expected goals collaboratively. In addition, coordination is needed to maintain relationships between stakeholders, both vertically, horizontally, command, and partnership relationships. Communication is the exchange of information that involves various parties.

H. Munir's company, which from the beginning involved Penta helix plus actors, has succeeded in becoming a representation of mine management as sustainable mining practices and until now the benefits of ex-mining areas can be enjoyed by all groups and attract many tourists. This Penta helix concept becomes a new formulation if the handling of mining so far is considered unsatisfactory and a recommendation for central policymakers. This helix plus map is used as a form of public participation to oversee the sustainability of exploitation activities so that reclamation is carried out.

CONCLUSIONS

The concept of Penta helix plus is not only used in public policy but in certain cases, this concept can be realized in handling mining involving many actors as a form of public participation. Reclamation with the Penta helix plus approach transforms a new and ideal handling model. So that reclamation is not just fulfilling obligations, but for the sake of environmental sustainability in the form of restoration and post-mining utilization in the form of reclamation (Sustainable Mining). The most fundamental thing about the success of the Penta helix plus is the establishment of intense communication and coordination from all actors to design and carry out the reclamation according to the plan.

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