

Strengthening community social capital for post-mining land restoration efforts: Study at PT RBT in Penyamun Village, Bangka Belitung Province, Indonesia

Penguatan modal sosial masyarakat terhadap upaya restorasi lahan pasca tambang: Studi di PT RBT Desa Penyamun, Provinsi Bangka Belitung, Indonesia

Herdiyanti*, Putra Pratama Saputra, Citra Asmara Indra, & Bustami Rahman
Sociology Study Program, Faculty of Social and Political Sciences, Bangka Belitung University

Address: Balunujuk Integrated Campus, Merawang District, Bangka Regency, Bangka Belitung 33172

E-mail: vhie_dyan@yahoo.co.id

Article History: Received 26 October 2021; Accepted 07 June 2022; Published Online 17 June 2022

Abstract

Indonesia is still facing various environmental problems due to increasingly massive and inappropriate mining activities. Therefore, land restoration is a basic practice in the rehabilitation of mining damage. This study aims to examine empirically the reality of the relationship between the community and PT RBT and strengthen social capital in carrying out post-mining land restoration activities. This study used the descriptive qualitative method. Data were collected through in-depth interviews and a literature study. The results showed that social relations became the main indicator in supporting the formation of trust, cooperation, and networks. Elements of social capital are packaged in the form of community participation in various post-mining land restoration activities. This is done to minimize the level of environmental damage that has increased massively, marked by the ex-mining pit that occurred in Bangka Belitung. The relationships formed are certainly expected to provide feedback for villages that run post-mining land restoration programs. This study concludes that the existence of bonding and bridging social capital that works well will facilitate the continuity of the post-mining land restoration programs.

Keywords: environmental conservation; land restoration; mining activities; social capital

Abstrak

Indonesia masih menghadapi berbagai masalah lingkungan akibat penambangan yang semakin masif dan tidak tepat. Oleh karena itu, restorasi lahan merupakan praktik pokok dalam upaya rehabilitasi kerusakan akibat penambangan timah. Penelitian ini bertujuan untuk mengkaji secara empiris mengenai realitas relasi antara masyarakat dengan PT RBT dan penguatan modal sosial dalam melakukan aktivitas restorasi lahan pasca tambang. Penelitian ini menggunakan metode kualitatif deskriptif. Pengumpulan data dilakukan melalui wawancara mendalam dan studi literatur. Hasil penelitian menunjukkan bahwa hubungan sosial menjadi indikator utama dalam mendukung terbentuknya kepercayaan, kerjasama, dan networking. Unsur-unsur modal sosial dikemas dalam bentuk partisipasi masyarakat di berbagai aktivitas restorasi lahan pasca tambang. Hal ini dilakukan untuk meminimalisir tingkat kerusakan lingkungan yang semakin masif, ditandai dengan lubang-lubang bekas tambang tanpa aksi keberlanjutan yang terjadi di Bangka Belitung. Relasi yang terbentuk diharapkan dapat memberikan feedback bagi desa-desa yang menjalankan program restorasi lahan pasca tambang. Studi ini menyimpulkan bahwa adanya bonding dan bridging kapital sosial yang bekerja dengan baik memberikan kemudahan dalam keberlangsungan program restorasi lahan pasca tambang.

Kata kunci: pelestarian lingkungan; restorasi lahan; aktivitas penambangan; modal sosial

Introduction

Indonesia is an archipelagic country with numerous natural resources, including the mining sector. The Province of the Bangka Belitung Islands is one of the developing and potential mining sector areas.

The mining sector is the *prima donna* of livelihoods, which the community is still exploring in order to improve the economy and meet community needs. This study is interesting to study because the condition of natural resources is becoming increasingly limited, making people realize the importance of environmental preservation as a result of mining activities. Furthermore, mining is one of the most dominant sectors in demand as a source of livelihood by the community. According to data from the US Geological Survey (2021), Indonesia is the world's second-largest tin producer after China.

Tin mining is one of the mining activities carried out by the people of Bangka Belitung. One of the tin mining activities that has attracted the attention of academics and environmental activists is the Penyamun Village, Pemali District, and Bangka Regency. Penyamun Village is a potential location because it is close to Sungai Liat City and has a diverse population of ethnicities, races, and religions. The distance from the city center to Penyamun Village is approximately 45 minutes. The majority of the population is employed in the mining, rubber, oil palm, and pepper industries. This village is worth investigating because mining activities in Penyamun Village are managed by PT Renifed Bangka Tin (RBT). RBT is a company dedicated to implementing a sustainable reclamation program that includes the planting of forests and food crops that have economic value while also being safe for consumption. Restoration is an effort to repair the land, particularly land damaged by mining activities (Agus et al. 2014). According to Pujawati (2009), reclamation or restoration is an effort to improve the condition of post-mining land. As a result, PT RBT's restoration efforts are carried out in order to revitalize or restore the function of land that is no longer productive due to mining activities. Through this sustainable reclamation program, RBT also aims to teach farming methods that can provide alternative sources of income for communities around mining sites (Rahmawan 2020).

RBT is also one of Indonesia's largest producers with a sustainable reclamation program. The company is committed to returning 50 ha of ex-mining land as a land conservation area, agro-tourism, agriculture, and eco-education, as well as teaching local communities how to farm while preserving the environment and supporting government efforts to prevent climate change. Thus far, efforts to restore post-mining land, which is the obligation of mining companies, have had an impact on the community, where people frequently become victims rather than the beneficiary of the development. This frequently leads to disagreements between the community and the mining company. According to Iswahyudi (2013), members of this community group should be more involved and empowered. This effort is made to ensure that the community feels equal to other groups in the reclamation effort for the development of the post-mining area.

PT RBT is one of Indonesia's largest producers carrying out a post-mining land restoration program. The commitment to restore post-mining land is one of the effective moves toward change and reducing environmental damage. The commitment of PT RBT is to return a 50-hectare ex-mining area for use as a land conversion area, agro-tourism, and eco-education. This area is expected to provide farmers with an understanding of how to farm properly and effectively. These actions demonstrate PT RBT's commitment to creating a beautiful environment and reducing environmental damage caused by mining activities.

However, for the time being, PT RBT only operates a 12-hectare restoration program on a former mine in Penyamun Village. The land area is divided into several managements, including seven hectare of land used as a commercial plant, namely *Forestri*, also known as the sea sengon plant. While one hectare is used for public facilities, such as road facilities, 0.6 Ha is used for seasonal crops such as coconut, guava, water, mango, watermelon, longan, grapes, and so on, and the remaining 2.4 hectare is used for the multicultural area. Indeed, not all ex-mining lands are simply abandoned by miners. efforts are being made by the community to restore ex-mining land that has been affected by mining activities by carrying out various activities such as planting various hard trees such as acacia, cypress, or pine, as a form of accountability for the use of mining land. The goal is to re-green the area as a form of restoration. As a result, this study is worth investigating, particularly in light of the land restoration efforts undertaken by PT RBT in collaboration with the village government and the Penyamun Village community. It also

wanted to see how much access to social capital there was in carrying out post-mining land restoration activities.

Many previous studies on land restoration have been conducted. However, studies on land restoration following tin mining are still underresearched. Taking the social context of the COVID-19 pandemic into account, Irzon (2021) explained in his study entitled *Tin mining in Indonesia: history, current status, and future prospect* that the COVID-19 pandemic caused the price of tin to fall compared to metal, which is still an important commodity with lower price predictions. Still, on the same topic, Sukarman et al. (2020) stated that mining activities cause structural damage, texture changes, organic matter loss, and soil fertility loss. Mining activities also result in the extinction of several types of biota that are essential for providing environmental services such as the provision of forest products, soil stability, the maintenance of the hydrological cycle, and carbohydrate absorption. According to Subowo (2011), mining activities with the dominant open conventional system provide many benefits, including changing the landscape and the balance of the land surface ecosystem, resulting in a degradation of soil productivity and environmental quality. In terms of efforts that can be made to mitigate the impact of open-pit mining, the lowest soil slope can be blocked. Furthermore, based on the findings of his study, restorations can be carried out using the terracing method.

A study conducted by Gunawan et al. (2021) found that proper reclamation planning aims to protect the environment from soil fertility loss, soil infertility, and loss of oxygen produced by forests that affect human life in relation to sustainable development principles. As a result, it can become a useful and efficient area in accordance with its designation. Some reclamation planning methods include the SWOT analysis method, Geographic Information System (GIS), fuzzy evaluation method, bibliometric method, and PROMETHEE method. A study conducted by Palupi et al. (2021) demonstrated that determining the effect of giving municipal waste compost with bio activator MOL snails mas and *Trichoderma* can be carried out by studying municipal waste composting. Furthermore, it is possible to do so by increasing the nutrient content of the ex-coal mine soil.

In contrast to the previous study, a study conducted by Herdiyanti (2017) entitled “Identification of Community Social Capital for Post-Mining Land Restoration (Study of the Community of Bukit Kijang Village, Central Bangka Regency)” shows that the restoration efforts of the people of Bukit Kijang Village were ineffective. This condition was caused by a strained relationship between the village government, stakeholders from the Ministry of the Environment, and the local community. Low participation is one of the factors causing the village government’s program to fail to function effectively. Furthermore, the lack of information and communication has hampered the program’s progress in Bukit Kijang Village. Meanwhile, mining activities had an impact on social change. Often the miners and the surrounding community became victims of social change (Indra 2013).

Based on previous studies, it is clear that the study of mine restoration is primarily based on exact sciences. As a result, this study is significant because the findings and conclusions presented can contribute to the advancement of pure and applied science related to the phenomenon of post-mining land restoration. In line with the explanation at the beginning of the paragraph, this study examines the phenomenon of post-mining land restoration using ecocentrism and social capital theory.

This study employed ecosystem theory and social capital theory. According to ecosystem theory, one of the environmental ethics is to focus all attention on ecological ecosystems, whether they are living or not. This theory is not concerned with moral responsibility for all ecological realities. This theory is used to examine how morally responsible humans are for the functioning of their environment. The environment has the right to be preserved in order to create a lovely and beneficial environment for the community. Furthermore, according to Arne Naess’ concept of deep ecology, human environmental protection and rescue stem from the awareness that humans are a part of nature and that environmental sustainability is intended for the entire ecological community (Satmaidi 2015).

Deep ecology explains that the ethics of all living things are linked to efforts to solve environmental problems (Keraf 2010). Deep ecology considers not only short-term but also long-term conditions. Environmental ethics' moral responsibility should be translated into real and concrete actions in the field. Naess revealed that three deep ecology action platforms are used to address the major environmental issues. Deep ecology, the first platform of action, is not only theoretical but also practical, with a rapid and transformative movement in response to various social, cultural, political, and economic aspects. It was also explained that humans and ecosystems have intrinsic value, so saving the environment can be accomplished by changing lifestyles or habits, where humans frequently intervene excessively and even harm the environment. The second deep ecology platform is biospheric egalitarianism in parteciple, which states that all living organisms and existing ecosystems have the same dignity and are an inseparable part of nature. In line with ecological principles, humans are not only the rulers of nature but must also participate in it. The third deep ecology platform is the principle of self-relation/symbiosis. Naess states that self-realization is the fulfillment and realization of all abilities and mutual benefit (mutualism). Self-relation is also associated with the concept of ecopolitics, in which political changes have an impact on the economic sector. According to the preceding explanation, the deep ecology attitude action platform focuses on solutions to the primary causes of environmental damage. Deep ecology has a responsibility for the environment and the perception that technology does not always provide solutions for environmental safety. As a result, human intervention in the development of environmental sustainability is required.

The second theory employed is social capital. This theory aims to explain the extent to which relationships develop during post-mining land restoration activities. This study employs Putnam's social capital theory, which states that there are horizontal relationships between individuals, communities, and society. Putnam (1993) believes that relationships are formed as a result of "networks of civic engagements" that are bound and regulated by values and norms in people's lives. According to Putnam (Field 2010), there is a foundation for the formation of social capital, which is the existence of a network that binds and supports one another in order to achieve common goals. Putnam believes that social networks, as a medium for forming a mutual trust, must be accompanied by intense coordination and communication. Trust also has a significant impact on social life. This is demonstrated by the fact that when people have a high level of mutual trust in a social network, a helping attitude emerges naturally. Putnam's final concept of social capital is cooperation. Cooperation is a success indicator that can be achieved by establishing norms and mutual trust among members of the community and groups. Furthermore, Putnam stated that social capital is classified as exclusive or inclusive.

Putnam's theory of social capital is used in this study to explain the restoration efforts of PT RBT and the Penyamun Village community. According to Putnam (1993), there are two types of social capital: bonding social capital and bridging social capital. The use of social capital is beneficial in maintaining societal values formed in society. The manifestation of social capital is the existence of mutual cooperation in maintaining the local values of the community and consistently existing in the midst of the current challenges of modernization. This condition indicates the development of strong emotional bonds between external and internal communities. The author considers this theory relevant in determining the extent to which the relationship formed between the community and PT RBT on post-mining land restoration activities. Finally, this study is expected to reveal the reality of the community's relationship with PT RBT and strengthen social capital in carrying out post-mining land restoration activities.

Research Method

This study employed a qualitative approach. This study aims to investigate the reality of the relationship between the community and PT RBT and the strengthening of social capital in carrying out post-mining land restoration activities in Penyamun Village, Bangka Regency. According to Creswell (2010), qualitative research seeks to discuss various types of case studies that are specifically examined for a reality that occurs in people's lives.

Data for this study were gathered through interviews with six informants: (1) one village head, (2) one village official who is a support team for the land restoration program and understands the village's history and development, (3) two PT RBT employees who directly participate in post-mining land restoration activities, and (4) two residents of Penyamun Village who are actively involved in post-mining land restoration activities.

In this study, data were gathered through in-depth interviews with informants using the aforementioned criteria. The collected data were then transcribed, classified, and categorized in accordance with the research issue. The data were analyzed, dialogued, discussed with relevant previous studies, and theoretically interpreted to produce a new analysis related to the community's relationship with PT RBT and strengthening social capital in carrying out post-mining land restoration activities.

Results and Discussion

This sub-chapter will explain the restoration activities carried out by PT RBT and the Penyamun villagers. Restoration efforts are one of the priority programs carried out by PT RBT to preserve the functioning of the post-mining environment. Furthermore, further information about the social capital mechanism in the Penyamun Village restoration program is provided.

Restoration efforts

Land restoration is the return or restoration of damaged land into a land that can be used and has benefits. PT RBT's restoration program activities involve a variety of stakeholders, including the community surrounding Penyamun Village, as well as the actors involved in PT RBT and the village government. PT RBT is one of the companies involved in the production of tin bars also known as a tin ingots. PT RBT's facilities are classified as very complete, with the support of the vision and mission that drives the restoration effort. The foundation of PT RBT's land restoration program is to promote a healthy living environment (Green for Food).

Mining industry issues frequently turn into never-ending debates. The massive tin mining activity has been sparked by a variety of political interests. The mining industry is one of the most important sources of income for the people of Bangka Belitung. Tin mining will undoubtedly harm the environment and other ecosystems. The post-mining land vacated by PT RBT is, of course, intended for the benefit of the post-mining environment for the surrounding community. Among the land restoration efforts undertaken with the aim of restoring land are the following:

Restoration program (Green for good)

In 2017, PT RBT implements one of the long-term programs, Green for Good. The Green for Good program is a long-term effort to create post-mining land with economic value for the local community. Community participation is required to carry out the program. Furthermore, Green for Good aims to restore the fertility level of former mining activities in order for them to become fertile. The program is run through a process of fertility testing and recycling of soil fertility levels by engineers from PT RBT. This is demonstrated by the existence of reforestation activities such as planting various plants, vegetables, fruits, and trees. Reforestation was declared successful after an estimated six to twelve months of restoration activities. PT RBT's 50-hectare land is used for conservation purposes. In the process, PT RBT is required to carry out a 12-hectare restoration program on a former mine in Penyamun Village. The land is then divided into several managements, including (1) seven hectares used for commercial plants, such as Forestri or sea sengon plants. Meanwhile, one hectare serves as a public road facility, (2) 0.6 hectares serve as seasonal planting areas for coconut, guava, mango, watermelon, jelengkeng, grapes, and other crops, and (3) 2.4 hectares serve as multi-cultural areas.

Based on the distribution of mine restoration described in the preceding paragraph, it is evident that not all ex-mining lands are simply abandoned by PT RBT miners. Meanwhile, following the success of the previous program, land restoration activities for the remaining 38 hectares were carried out. Fruits and vegetables are among the plants grown by PT RBT on former mining sites. Planting fruits and vegetables on former mining land takes into account soil fertility, pH, and nutrients from organic fertilizers and plants. This condition is consistent with what Setyowati et al. (2017) stated, that revegetation activities must focus on the selected plants and the conditions for plant growth. Furthermore, planting must take into account land conditions. This is done so that the success of land restoration can be achieved, as stated by AWI, one of the engineers of PT RBT: "This program cannot be implemented directly; rather, it must be studied further in relation to soil fertility, as soil fertility can affect what types of plants can be planted."

According to the statement of AWI, it can be seen that nutrients will affect the fertility level of ex-mining land and the quality of the yields of plant species. Based on the commitment and implementation of the land restoration program, PT RBT responded by giving the community the power to continue the restoration program through cooperatives. PT RBT invites the community to actively participate by appointing them as managers and members of cooperatives. The social practices that have been established then have the consequence of community synergy with PT RBT. This synergy then makes all post-mining land reclamation processes easier. Cooperatives exist as a forum for the sustainability of land restoration programs, according to a study conducted by Rivera et al. (2017), where cooperatives are local, collective, and inclusive thinking ideas. As a result of the existence of community and community identity values, these three ideas become machines capable of generating sustainable development for the community. Cooperatives provide convenience for the community and stakeholders PT RBT to manage and develop the program, making it more developed and sustainable. Cooperatives are a late decision made by PT RBT. This condition was confirmed by AWI, who is in charge of the restoration program, as stated below: "Cooperatives are a concept of sustainability that we use to ensure that the community of Penyamun Village can continue to benefit from this program in the future."

Sustainability is the ultimate goal of land restoration programs, while moral responsibility is crucial to apply to any conditions associated with environmental sustainability. Ecocentrism is one of the relevant theories in discussing the sustainability of moral responsibility that cannot be separated in people's lives. This study strengthens the statement published by the Environmental and Forestry Instrument Standardization Agency (Badan Standardisasi Instrumen Lingkungan Hidup dan Kehutanan 2021) that investment in land restoration through the principles of restoring degraded lands on a large scale and engaging and empowering people to use forests sustainably is a key step toward positive change as a solution to the environmental crisis. With the principles held comprehensively, it can accommodate a broader range of environmental ethics. The theory of ecocentrism targets not only living things but also dead subjects and ecological realities. This green paradigm has the potential to strengthen the flow of sustainable development by balancing economic, social, and environmental aspects.

Regarding the mine restoration program through Green for Good run by PT RBT, it differs from the findings of a study conducted by Palupi et al. (2021) where the program carried out in the process of ex-mining land restoration is by giving municipal waste compost through the bio activator *MOL* snail mas and *Trichoderma* sp. The previous study differs from this study in that the solution direction is more focused on chemical soil analysis, whereas this study tends to lead to a social and economic point of view. According to Rahmawan's (2020) study, even though the program being implemented is the same, namely Green for Good, in practice, however, the study was carried out by planting ecotourism and fish cultivation on reclaimed land. This study's program is based on publications published by Rochmayanto et al. (2021) regarding Strategies and Techniques for Restoration of the Peat Swamp Forest Ecosystem to be one of the same programs, namely agriculture on peatland (paludiculture), fisheries (aquaculture), and ecotourism.

EIA activities (Restoration land sustainability)

Environmental Impact Assessment (EIA) is an activity that aims to make environmental benefits measurable and directed while causing no negative effects on the environment or non-living damage. The Bangka Regency Government provides assistance to PT RBT's restoration efforts. One of PT RBT's stakeholders admits that when planting vegetables, fruits, and trees, the company uses fertilizers that are not arbitrary. The fertilizers used are 25% organic compost, 25% elephant dung sent directly from Way Kambas, 25% polinter bags, and SNN and SAC, both of which are RBT products. This environmental impact analysis is the best strategy for PT RBT and is aided by the government because it is committed to environmental sustainability. In this regard, the Penyamun Village Head stated: "This EIA activity is important because if this program is carried out through a series of procedures, it will certainly succeed through the EIA. This EIA is crucial for us to do to avoid things we don't want to happen in the future."

The statement from the village head is critical in understanding that EIA is a must in carrying out a sustainable development program. The EIA activity is one of the movements carried out by PT RBT and the village community in changing mindsets, more specifically changing patterns of responding to the environment, and more specifically environmental ethics becoming something that is urgently applied in environmental management. When the environment is recognized as a commodity that can provide benefits to humans, humans can also provide benefits for environmental sustainability. It is in line with what was conveyed by Sutoyo (2019) that the environmental crisis that occurred philosophically was caused by a fundamental error or way of thinking as well as the human perspective on nature. As a result, a fundamental shift in human perception of the environment as an inseparable and mutually sustainable unit is required. The environment, which is currently undergoing restoration, is in a state of crisis, so efforts are being made to preserve the environment for the benefit of the community. The environmental crisis that occurred in Penyamun Village cannot be separated from the intervention of the local community as well as PT RBT, which conducts mining operations in the local environment.

Previously, there were pros and cons to the restoration program that was carried out, as stated by MOH (Secretary of the Penyamun Village): "The community here had pros and cons at first, but after being educated by the village government, those who were opposed realized the importance of post-mining land restoration."

According to the information provided by the informant, a village official, the local community's response initially raised pros and cons regarding the post-mining land restoration program. The attitude of the people who are pro certainly sees the benefits of the environment in the future if the restoration activity is carried out. Conflicts of interest, on the other hand, are undoubtedly a factor that causes some people to oppose it. However, those who were opposed did not last long, and in the end, they opened up and accepted the programs offered by PT RBT. The community recognizes that the restoration program has the potential to boost the local economy, reduce unemployment, and so on. This condition is also accompanied by a mutually trusting cooperative relationship formed between the community and PT RBT:

"The first thing we did was establish mutual trust. It is difficult to win the hearts of the villagers. We require hard work. Alhamdulillah, our efforts to persuade the community began to be successful. In essence, mutual trust is the key to this restoration program's success."
(Informant AWI).

The information conveyed by the informant above is a form of persuasive action. Various efforts made by PT RBT brought success. The community began to understand the importance of having mutual trust in one another so that they could form a solid team to be able to work together in carrying out post-mining land restoration activities. This is one of the strategies used by PT RBT to increase mutual trust and cooperation in carrying out restoration activities. Besides, PT RBT also provides assistance with two cows annually to the village as well as basic necessities for the local community.

This study strengthens the study conducted by Sari (2018) and Alhakim and Lubis (2021) in which EIA is used to maintain sustainable development. EIA ensures that the development process follows the principles of sustainable development. The goal of EIA planning is to prevent environmental pollution and ensure sustainable development. EIA as a resource for the community to learn about the potential consequences of a business plan and activity. Furthermore, EIA can be regarded as a material for developing an area in accordance with the principle of environmentally sound sustainable development. EIA can inform the public about the future impacts that will occur after the business or activity is completed, allowing EIA to protect the environment from damage and pollution. Reffis (2017) also conducted an EIA study in which the mechanism was used in the process of restoring mangrove forests and the downstream Musi watershed. The presence of ecological restoration through EIA is expected to be able to restore the function and role of the mangrove ecosystem and the downstream Musi watershed.

The restoration activities were examined through the lens of environmental ethics, specifically anthropocentrism. This research looks at humans as the center of the environment. Essentially, anthropocentrism focuses on the antecedent of ecocentrism with the concept of deep ecology in which humans have morals for environmental sustainability in order for humans to be able to make the environment a dignified environment without any conflict of interests based on development in the era of modernization or globalization. That way humans have power over the massive exploitation of nature and the environment. It is because humans prioritize human interests over environmental conditions in this world, where humans are at the center of everything. According to this viewpoint, humans have a natural right to exploit tin mines. As a result, it is critical to use the concept of deep ecology as a form of human moral responsibility for environmental damage.

Livelihood diversification

Diversification refers to a community effort to increase income. Diversification, according to Noveria and Malamassam (2015), is a livelihood pattern that is carried out as an additional income in order to live a prosperous life. The community of Penyamun Village does the same thing with the post-mining land restoration activity, which is an opportunity for the community to increase additional income through the agricultural sector.

Rural communities' economic growth is not solely focused on the agricultural sector, but on various sectors that can be used in the development of livelihood sources. This condition is known as livelihood diversification as a survival strategy (Ellis 2000). Agriculture, according to (Rai 2021), is a sector that is thought to play an important role in increasing income. Income from agricultural sector is related to social and economic stability (Tan & Peng 2018, Chen 2019).

The diversity of livelihoods is, of course, adjusted to the control of assets or village potentials. The people of Penyamun Village have their own source of income, but that the community is expanding the land that has been granted access by PT RBT to carry out farming activities on ex-mining land. This is reinforced by the statement of one of the villagers (MN) as follows: "This activity is beneficial to us. This means that we can clear land to plant various crops, and then the crop production results are included in the cooperative to share up to 80% of the profits with the community and 20% with PT RBT."

The information conveyed by the informant above must have gone through several lengthy discussions in order to educate the public, which resulted in an agreement. The formed agreement has invigorated the community to carry out various agricultural activities on the land provided by PT RBT to the community. The community plants a variety of crops/vegetables on land provided by PT RBT. Mustard greens, cayenne pepper, corn, onions, and other vegetables are among them. This condition is one example of the community's diversification activities in supporting the economic value of the family; by doubling the sources of livelihood, the community becomes much more prosperous. In line with previous research, Herdiyanti et al. (2021) explained that diversification can improve people's living conditions and that people's reliance on a single source of income is no longer a priority source of income. This statement is

consistent with the circumstances that occurred in Penyamun Village, where the community attempted to separate itself so that it would not be dependent on a single source of income.

Strengthening social capital

Humans are not rulers, but rather protectors of nature. This condition corresponds to the concept of ecological wisdom. This is demonstrated by the community and PT RBT through the Penyamun Village community's participation and awareness. Third, the principle of self-relation, in Naess' view, self-realization is the fulfillment and realization of all its various abilities. This is an example of a naturally formed access to social capital. According to Rela et al. (2020), social capital is access that must be owned by the community in order for the community to be empowered in dealing with all societal changes. The actions taken are aimed at achieving a more civilized change in terms of mindset and physical environment changes, as well as achieving justice for the environment itself.

Based on the information found in the field, the informant with the initials (AW) explained that "without a harmonious relationship and awareness of the environmental damage that has occurred, this cooperation and relationship will not work properly, therefore we as representative of PT RBT hopes that this relationship can be harmonious." The information conveyed by the informants emphasized that raising awareness is the most important priority in carrying out the restoration program. Humans and nature are, in essence, two sides of the same coin that cannot be separated. Furthermore, people recognize that they can only be human in a unity that is inextricably linked to nature. This demonstrates that there is a mutually beneficial symbiotic relationship, as well as a disadvantage between various parties. Relationships are formed not only between humans and nature, but also by the extent to which human relations with other humans, communities, and other communities. The relationships formed in post-mining land restoration activities are as follows:

Bonding social capital

Relationships are one of the indicators of PT RBT's success in carrying out post-mining land restoration efforts as a strategy to create a beneficial environment for the local community. One of the informants, an engineer of PT RBT (AWI), explained that "previously, the relationship of PT RBT with the community was not going well. However, over time, it improved through various educations that we carried out in collaboration with the village government." The information conveyed is a form of internal relationship that indirectly forms on its own. This is referred to as bonding social capital.

Bonding social capital is an indicator of a strong relationship developed within the local community's internal environment. The relationship established between the community and stakeholders by PT RBT in seeking restoration activities is carried out through community participation or involvement in the restoration activities carried out. According to Mendelson et al. (2010), an individual's participation can influence access to information channels and increase social support through the formation of social networks. Of course, participation is formed in this condition because of the same goal of empowering the environment to become a wise and beneficial environment. Participation is one indicator of bonding social capital that is formed naturally without realizing it is internalized during the restoration process.

The involvement of the community in carrying out these activities is very participatory and communicative. The community's willingness to accept the cooperation offered by PT RBT to be involved is an example of successful access to social capital in the restoration efforts. Furthermore, the community is given numerous opportunities to farm and plant various types of plants that can be useful for the community's survival as well as have the financial potential for the local community. Of course, this condition is advantageous to the community's way of life. With this condition, the level of trust between the community and PT RBT is getting stronger.

Bridging social capital

This study demonstrates that social relations are growing from various social networks outside of the bonding relationships that have been formed. The social relationships that have developed include those between PT RBT and the internal village community, as well as those between PT RBT and outside middlemen who take/purchase the production resulting from post-mining land restoration activities. This condition demonstrates that the relationship is built on cooperation and mutual goals. This is, of course, a shared goal that benefits both the Penyamun Village community and PT RBT, which is the initiating actor in the post-mining land restoration program.

Several middlemen frequently visited Penyamun Village only to purchase agricultural products produced through land restoration activities. The middlemen who arrived did not come from the Penyamun Village, but from other villages, and there were even middlemen from the city. Because of this circumstance, the village head decided to help the community by establishing a market. Its goal is to make it easier for the community to distribute its agricultural products. This condition is a type of bridging relationship that develops between the village community and the community outside the village, as well as the reciprocity that is formed as a result of cooperation and the trust principle between the two parties. The relationship established provides an avenue for the community and PT RBT to market crops grown as a result of ongoing post-mining land restoration activities.

Based on the data described above, this study discovered that the bonding and bridging social capital formed between the community and PT RBT were effective. This is one type of social capital effectiveness that works very well in the mechanism for carrying out restoration activities. In line with what was conveyed by Wynne (2007), social capital is considered effective, when there is a balance of power between bonding and bridging social capital in one frequency. The synergy between the community and PT RBT has certainly made the community realize how critical it is that environmental sustainability is maintained even though it is full of various activities that must be completed. Furthermore, the community realizes that the mining sector will not always be the prima donna of livelihood for them.

This study also discovers that other types of relationships formed while carrying out environmental restoration include several government networks run by local communities. Furthermore, there is collaboration in the formation of cooperatives as a forum for distributing and storing plantation products on ex-mining land. Outside support will undoubtedly broaden the social network. Social capital is defined as access that can be used to broaden one's network. This supports Herdiyanti et al.'s (2019) findings that social capital is a support for the community in carrying out various movements or changes to achieve a better life.

Conclusion

This study reveals that the reclamation efforts of PT RBT in Penyamun Village, which has been taken over and managed by PT Smelter, can be studied in terms of ecocentrism and social capital. The principles of restoration take into account the interests and conditions of environmental damage. Restoration based on implemented principles can apply the existence of more interest and attention to environmental damage conditions. According to ecocentrism theory, moral responsibility and obligations of living beings are not limited to individuals or societies but apply to all ecological realities that exist in society. Excessive human intervention has exacerbated and caused massive environmental damage. This is one of the fundamentals of carrying out restoration in the process of repairing environmental damage caused by human greed in utilizing nature without regard for future generations.

This study found that social relationships are the main indicator in supporting the formation of trust, cooperation, and networking. The three components of social capital are packaged as community involvement in various post-mining land restoration activities. This is done to reduce the increasingly massive level of environmental damage caused by ex-mining holes with no sustainable actions in

Bangka Belitung. The formed relationships are expected to provide feedback to villages that run post-mining land restoration programs. Restoration efforts are accompanied by stakeholder and actor access to social capital in post-mining land restoration activities. Social capital bonding and bridging work extremely well. Access to owned social capital makes it easy for the sustainability of the post-mining land restoration program to be carried out.

References

- Agus C, Pradipa E, Wulandari D, Supriyo H, Saridi, & Herika D (2014) Peran revegetasi terhadap restorasi tanah pada lahan rehabilitasi tambang batubara di daerah tropika. *Jurnal Manusia dan Lingkungan* 21 (1):60-66.
- Alhakim A & Lubis YP (2021) Analisis mengenai dampak lingkungan (Amdal) oleh perusahaan di kota Batam menurut Undang-Undang Nomor 32 Tahun 2009. In *CoMBInES-Conference on Management, Business, Innovation, Education and Social Sciences* 1 (1):341-351.
- Badan Standarisasi Instrumen Lingkungan Hidup dan Kehutanan (2021) Babak baru restorasi ekosistem. [Accessed 27 May 2022]. <https://bsilhk.menlhk.go.id/index.php/2021/08/02/babak-baru-restorasi-ekosistem/>.
- Chen Q (2019) An empirical analysis of the relationship between farmers' income and economic growth in Fujian. 4 th International Conference on Economy, Judicature, Administration, and Humanitarian Projects 94. 796-798.
- Creswell JW (2010) *Research Design Qualitative, Quantitative, and Mixed Methods Approaches*, Terj. Achmad Fawaid, *Research Design Pendekatan Kualitatif, Kuantitatif, dan Mixed*. Yogyakarta: Pustaka Pelajar.
- Ellis F (2000) *Rural Livelihoods and Diversity in Developing Countries*. Oxford: Oxford University Press.
- Field J (2010) *Modal Sosial*. Translated from the Original Title of *Social Capital*. Bantul: Kreasi Wacana.
- Gunawan R, Nurkhamim, & Izza RF (2021) Overview metode perencanaan pengelolaan lahan bekas penambangan. *Prosiding Seminar Nasional ReTII ke-16*. 345-350.
- Herdiyanti (2017) Identifikasi modal sosial masyarakat terhadap restorasi lahan pasca tambang: (Studi masyarakat Desa Bukit Kijang, Kecamatan Namang, Kabupaten Bangka Tengah). *Society* 5 (1):13-21.
- Herdiyanti H, Sulaiman A, Hayati L, & Dedoe A (2021) The role of social capital on the livelihood strategy of the pengkalen Batu Community, Payung Sub-district, South Bangka Regency. *Society* 9 (1):241-251.
- Herdiyanti, Cholilah J, & Wilujeng PR (2019) Livelihood strategy of the riding panjang post-tin village community (study of riding panjang village community, Merawang District, Bangka Regency). *Advances in Engineering Research* 167. In: *Proceedings of the International Conference on Maritime and Archipelago (ICoMA 2018)*. <https://www.atlantis-press.com/proceedings/icoma-18/125917214>.
- Indra CA (2013) Dampak dari penambangan timah inkonvensional di desa lampur Kabupaten Bangka Tengah. *Jurnal Society* 1(2):148-164. <https://doi.org/10.33019/society.v1i2.48>.
- Irzon R (2021) Tin mining in Indonesia: history, current status, and future prospect. *Jurnal Teknologi Mineral dan Batubara* 17(3):179-189. <http://dx.doi.org/10.30556/jtmb.Vol17.No3.2021.1183>.
- Iswahyudi M, Wahyu W, Shiddiq M, & Erhaka ME (2013) Masyarakat lokal dan program reklamasi lahan bekas tambang di Desa Banjar Sari Kecamatan Angsana. *EnviroScienteeae* 9 (3):177-185.
- Keraf S (2010) *Etika Lingkungan Hidup*. Jakarta: PT Kompas Media Nusantara.
- Mendelson T, Turner AK, & Tandon S D (2010) Sosial Class as Moderator of the Relationship Between (Dis)Empowering Processes and Psychological Empowerment. *Sodality: Jurnal Sosiologi Pedesaan* 8 (10):170-182.
- Noveria M & Malamassam MA (2015) Penciptaan mata pencaharian alternatif: Strategi pengurangan kemiskinan dan perlindungan sumberdaya laut (Studi kasus Kota Batam dan Kabupaten Pangkajene dan Kepulauan). *Jurnal Kependudukan Indonesia* 10 (2):139-150. <https://doi.org/10.14203/jki.v10i2.73>.

- Palupi NP, Kesumaningwati R, & Widodo B (2021) Perbaikan kualitas tanah bekas tambang batu bara melalui aplikasi kompos sampah kota dengan bioktivor mikroorganism keong mas dan trihoderma sp. *Jurnal Agroekoteknologi Tropika Lembab* 4 (1):1-12.
- Pujawati ED (2009) Jenis-jenis fungi tanah pada areal revegetasi acacia mangium willd di Kecamatan Cempaka Banjarbaru. *Jurnal Hutan Tropis Borneo* 10 (28):305-312.
- Putnam R (1993) *The Prosperous Community: Social Capital and Public Life*. *The American Prospect* 13 (Spring 1993):35-42.
- Rahmawan AD (2020) Keterlibatan masyarakat lokal dalam restorasi kawasan pasca tambang timah oleh PT. Refined Bangka Tin di Desa Penyamun Kabupaten Bangka. *Sosiologi Nusantara* 6 (2):123-134. <https://doi.org/10.33369/jsn.6.2.123-134>.
- Rai A (2021) The effect of income of farmers and farm laborers on agricultural economic growth. *Jurnal Ekonomi Pembangunan* 19 (2):70-80. <https://doi.org/10.22219/jep.v19i02.18328>.
- Reflis (2017) Reklamasi dan restorasi ekologi Kawasan Api-Api Provinsi Sumatera Selatan. *AGRISEP* 16 (1):57-70. <https://doi.org/10.31186/jagrisep.16.1.57-70>.
- Rela IZ, Awang AH, Ramli Z, Taufik Y, Sum SM, & Muhammad M (2020) Effect of corporate social responsibility on community resilience: Empirical evidence in the nickel mining industry in Southeast Sulawesi, Indonesia. *Sustainability (Switzerland)* 12 (4):1-16.
- Riadi E (2016) *Statistika penelitian (Analisis Manual dan IBM SPSS)*. Yogyakarta: And Offset.
- Rivera, Solís V, Cordero PM, Rojas DC, & O'Riordan B (2017) Institutions and collective action in a costa rican small-scale fisheries cooperative: The case of CoopeTárcoles R.L. *Maritime Studies* 16 (1):1-19.
- Rochmayanto Y, Priatna D, & Muttaqin MZ (2021) *Strategi dan Teknik restorasi ekosistem hutan rawa gambut*. Bogor: PT Penerbit IPB Press.
- Sari I (2018) Amdal sebagai instrument dalam mempertahankan sustainable development yang berwawasan lingkungan. *Jurnal Ilmiah Hukum Dirgantara* 8 (2):59-79. <https://doi.org/10.35968/jh.v8i2.255>.
- Satmaidi E (2015) Konsep deep ecology dalam pengaturan hukum lingkungan. *Supremasi hukum: Jurnal Penelitian Hukum* 24 (2):192-205. <https://doi.org/10.33369/jsh.24.2.192-105>.
- Setyowati DN, Amalia NA, & Aini NU (2017) Studi pemilihan tanaman revegetasi untuk keberhasilan reklamasi lahan bekas tambang. *Al-Ard: Jurnal Teknik Lingkungan* 3 (1):14-20.
- Subowo G (2011) Penambangan sistem terbuka ramah lingkungan dan upaya reklamasi pasca tambang untuk memperbaiki kualitas sumberdaya lahan dan hayati tanah. *Jurnal Sumberdaya Lahan* 5 (2):83-94.
- Sukarman S, Gani RA, & Asmarhansyah A (2020) Tin mining process and its effects on soil in Bangka Belitung Islands Province, Indonesia. *SAINS TANAH-Journal of Soil Science and Agroclimatology* 17 (2):180-189. <http://dx.doi.org/10.20961/stjssa.v17i2.37606>.
- Sutoyo (2019) Paradigma perlindungan lingkungan hidup. *ADIL: Jurnal Hukum* 4 (1):192-206.
- Tan F & Peng Y (2018) Correlation of urbanization, economic growth and farmer income. *Journal of Human Agricultural University (Social Science)* 19 (5):94-100.
- US Geological Survey (2021) *Mineral commodity summaries 2021*. Reston, VA: U.S. Geological Survey. <https://doi.org/10.3133/mcs2021>.
- Wynne BG (2007) Social capital and social economy in sub-national island jurisdictions. *Island Studies Journal* 2 (1):115-132.