MINING VILLAGE SUSTAINABILITY CHALLENGES IN WEST BANGKA REGENCY

Nurul Ichsan*[1], Akhmad Fauzi[2] and Boedi Tjahjono[3]

[1]Bappeda Provinsi Kepulauan Bangka Belitung, Jl. P. Belitung 2, Pangkalpinang, Bangka Belitung Indonesia.
[2,3]IPB University; Jl. Raya Dramaga, Kota Bogor, Jawa Barat, Indonesia
(E-mail: ihsanplanner@gmail.com)

ABSTRACT

West Bangka Regency is a strategic area for tin mining in the Bangka Belitung Islands Province. This area is one of the centers of tin mining and the site of the largest tin smelting plant in Indonesia. The villages are regional units that are directly exposed to the dynamics of tin mining and its associated impacts. Mining in these villages has increased community income. However, mining causes land degradation, loss of biodiversity, and increases the potential for social conflict. This situation poses a serious challenge to the sustainability of mining villages, particularly due to the depletion of tin reserves. This study aims to analyze the sustainability status of mining villages in West Bangka Regency. The sustainability status of these villages was identified using the Multi-Criteria Analysis (MCA) method with flag analysis. The results of the analysis indicated lower sustainability in 5 out of 13 indicators covering the socio-economic and environmental dimensions in the mining villages. The indicators that have the potential to cause unsustainability in these villages include the percentage of farming households, the percentage of the population aged 20 and over with a high school diploma or equivalent, the number of health workers, the percentage of stunted young children, the ecosystem service index for water supply, and the percentage of degraded land.

Key words: flag analysis, mining village, sustainability

INTRODUCTION

West Bangka Regency is a strategic area for tin mining in the Bangka Belitung Islands Province. This region is a prominent center for tin mining and is home to Indonesia's largest tin smelting plant (Sujitno 2015). This region is a key player in the tin mining industry, significantly contributing to the local economy. This is evidenced by the contribution of the processing industry, which is dominated by tin ore processing, accounting for 45.35% of the economic structure of West Bangka Regency in 2019 (BPS Bangka Barat 2021). However, the area of degraded land in West Bangka Regency continues to increase, rising from 24,200.66 hectares in 2015 to 25,459.64 hectares in 2018. This increase in degraded land is partly due to the proliferation of small-scale mining during this period. In contrast, the reclamation of degraded land from former mines has only reached 2,000 to 3,000 hectares (7.69% to 11.54%) of the total degraded land, which is approximately 26,000 hectares (DLH Bangka Barat 2019). The impacts

of mining are not only visible at the regency level but also at the village level.
Villages are territorial units that are directly affected by the dynamics of tin mining and its associated impacts. They are where ore production begins, which is then linked to the global supply chain of the tin trade. The dynamics of tin mining entered a new phase with the change in mining regulations in 1998 and the demand for regional autonomy following the establishment of the Bangka Belitung Islands Province (Indra 2014; Purnamaweni et al. 2019). This situation coincided with a decline in the price of pepper, a major agricultural commodity in Bangka. This decline became a driving force for the community to engage in open pit mining, leading to a mining boom on Bangka and Belitung Islands (Subiman et al. 2010). Tin production was no longer a monopoly of PT. Timah and PT. Kobatin; other private companies also emerged, including small-scale unconventional mining operations in villages with tin potential. The emergence of small-scale mining has created a complex situation, as individuals and small groups have started mining with traditional equipment throughout the Bangka Belitung region, including West Bangka Regency. This has had a positive impact in the form of significant improvements in family income (Sulista 2019). However, on the social side, mining has also increased conflicts between locals and newcomers, both in the context of onshore and offshore mining. This situation tends to divide village communities into pro-mining and anti-mining factions (Sulista et al. 2019). Meanwhile, from an environmental perspective, mining activities have altered the structure and composition of natural vegetation and degraded water quality (Nurtjahya and Agustina 2015).

In the context of livelihoods, some villagers in West Bangka have made mining their main source of income. This indicates that a significant portion of the community in these villages depends on income from the mining sector. According to statistical data on village potential (BPS Bangka Belitung 2018), there were 20 mining villages were recorded in West Bangka Regency in 2014. However, after the export moratorium on mining in 2018, this number decreased to 14 villages. This demonstrates that the role of the mining sector in these villages in West Bangka Regency has become crucial as an economic driver and source of livelihood for the community.

The conditions described above are closely linked to the sustainability of village life and community livelihoods, particularly in the face of ecological changes and the decline in tin production over time. In this context, mining villages will face significant challenges in transitioning towards sustainability. A critical issue at present is how communities can maintain their livelihoods for the future of their descendants, reduce vulnerability, and find solutions to sustain village life after tin mining.

This study aims to assess the sustainability status of mining villages in West Bangka Regency. In this study, the sustainability analysis was carried out by comparing mining villages with non-mining villages. The selection of mining villages was based on the criteria that (1) the selected village is a village with the largest mining area and (2) mining activities in the village have been ongoing for more than 30 years. In addition, for the non-mining villages, villages were selected that had a population density and land area ratio similar or close to that of the selected mining village.The analysis will evaluate 13 indicators across three dimensions: economic, environmental, and social.The economic indicators include the percentage of farming households, the number of micro-industries, and the number of grocery shops. The social indicators encompass the percentage people aged 20 and over who had completed at least high school, the number of health workers, access to health facilities, the percentage of social security

coverage, the prevalence of stunting, the percentage of the low-income population, and access to electricity. The environmental indicators consist of the water provisioning index, the food provisioning index, and the percentage of degraded land.

MAIN RESULTS

Based on the analysis of the sustainability status, the mining villages are indicated as less sustainable in 5 of the 13 indicators on the economic, social, and environmental dimensions. The indicators that have the potential to cause the mining village to be unsustainable are the percentage of farming households, the percentage people aged 20 and over who had completed at least high school, the number of health workers, the prevalence of stunting, the water provisioning index, and the percentage of degraded land. The result is shown in Figure 1.

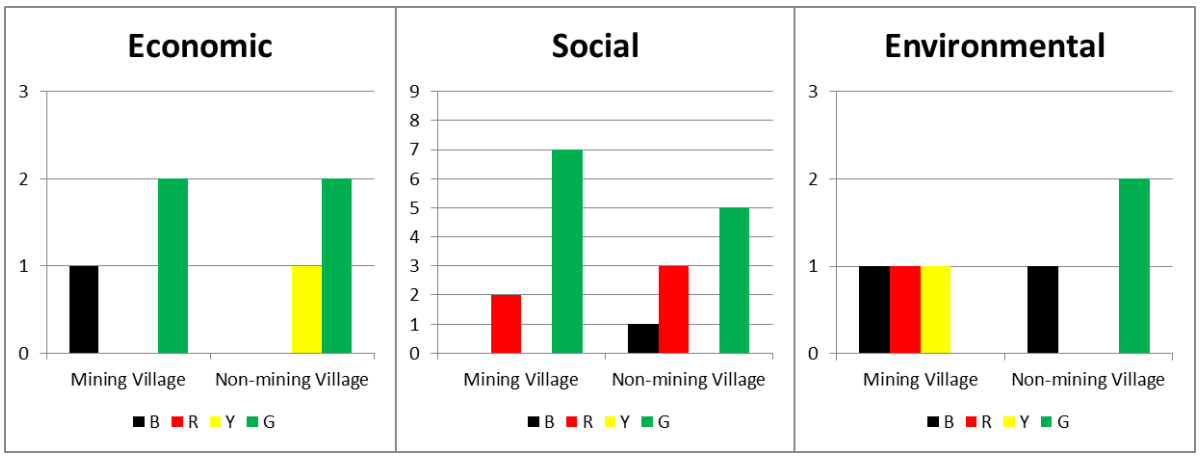

Figure 1. Flag scores for sustainability dimensions

In the economic dimension, the indicator of concern in mining villages is the percentage of households engaged in agriculture. This indicates that mining activities have reduced the agricultural intensity among some residents. Sulista (2019) found that over a 15-year period, from 2002 to 2017, the increase in tin mining activities was accompanied by a decrease in the number of people working in the agricultural sector. Consequently, this temporary shift led to a decline in agricultural productivity. However, this trend was reversed when tin prices fell again, prompting miners to return to farming their land.

The repeated shifts in livelihoods between mining and agriculture make the management of plantation land less than optimal (Kotey and Adusei, 2009). When agricultural land is mismanaged, as is often the case, agricultural yields do not meet expected targets. In addition, abandoned land is often contested by speculators, leading to land conflicts (Sudirman et al., 2012).

In the social dimension, the rampant mining activities in the study area have become a strong attraction for the community, significantly influencing the desire of young people to pursue education. The availability of abundant natural resources and easy access has fostered a pragmatic attitude among the mining village communities, leading them to exploit tin on a massive scale without considering the future. According to Rahma (2020), this condition will

reduce the incentive for individuals to invest in education, as they may be satisfied with the high wages or income derived from the natural resources they exploit. The indicators relating to the percentage of the population with a high school education and the number of health workers should be prioritised for future improvement, as both indicators show poor values in both types of villages (mining and non-mining).

In the environmental dimension, mining has led to an increase in the degraded land area. Tin mining activities have caused significant loss of vegetation and damage to the soil layer (Putra et al., 2017). Sutono et al. (2018) noted that the texture of former tin mining land is predominantly sandy, characterised by a sand fraction composition of 81-94%, dust content of 2-10%, and clay content of 2-12%. This sandy soil texture results in minimal or no water-holding capacity. The condition of former tin mining land, as described above, indicates that plants will struggle to grow and develop properly unless land reclamation is undertaken.

CONCLUSION

This analysis reveals key findings about the sustainability of mining villages: (1) The decline in ecosystem service value and the local community's dependence on mining activities will reduce the sustainability potential of these villages (2) The social dimension, particularly education and health services, is a crucial aspect that requires special attention to promote the sustainability of both mining and non-mining villages in West Bangka Regency. Tin production is no longer a monopoly of state-owned companies; it also involves other private companies whose supply chains begin with small-scale and artisanal mining in villages with tin potential.

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