

Bangka Belitung Islands: Great Potencies of Massive Environmental Impacts

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Abstract. Mining is a very crucial activity of human being and is practiced everywhere in the world, including in Bangka Belitung Province which is rich in tin, making tin is the leading commodity in this area. This study aimed at analyzing the Bangka Belitung profile, tin mining activities in this area and its impact on an environmental conditions in Bangka Belitung Islands. The study applied a descriptive-qualitative method, using data from library study and previous researches dealing with the research topic, as well as data from field observation. It concluded that tin mining has been done since the Dutch era in Bangka Belitung, and is more active today. Therefore, it is concluded that massive environmental degradation will occur should the mining practices are not stopped. The study It is recommended that the government has to strengthen its policy in the form of local regulation on the tin mining activities for erecting a better public administration practices.

Keywords: **tin; mining; environmental degradation; local regulation.**

1 Introduction

1.1 Background

Mining is a very important activity in human life. It yields various materials significant for life, making it impossible to avoid. Spiegel [1] quoted George Orwell who called mining as part of the “metabolism” of civilization. He argued that it can be seen from the major divisions of history which are named in accordance with dominant mineral products the people used in the past, covering such as the Periods of Paleolithic and Neolithic; the Ages of Copper, Bronze, and Iron. Unavoidably, indeed humanity relies on minerals to keep its existence. The speed of transportation, a proliferation of electronic gadgets and games, and delivery of electricity which is the very “blood“ of civilization all depend on mining yields. Spiegel further wrote that global economy depends on at least 91 metals and mineral commodities (such as iron, lead, copper, zinc, tin, mercury, or coal) to power and charge the global economy. In the 1980s, a company such as Intel needed only 11 minerals for its products, however today it requires 60 minerals. Therefore, such development forces a human being to further explore the earth to get materials they need for their numerous purposes.

Mining is opened everywhere on this planet, including in Indonesia is a country that is rich in mining products, such as fossil oil, natural gas, coal, nickel,

bauxite, tin, bronze, gold, silver, asphalt, phosphor, and phosphate. Mining activities in an area has both positive and negative impacts. The mining activities have become the leading factors of the national economy, in particular in the areas whose mining potentials are abundant. Mining is indeed a promising sector with many positive economic impacts [2,3]. Therefore, this sector opens many opportunities to explore. Many areas have been opened for mining all over Indonesia, such as in Bangka Belitung Province, in which tin dominates the mining potencies.

Tin mining activities in Bangka Belitung Province has been existing for years; some sources indicating since the Dutch colonialism era [4]. Since then, the province has been the leading region of tin production in Indonesia.

Historically, tin in Bangka Belitung is classified into three interrelated entities [5]. Bangka Belitung Islands have the largest tin deposit in Indonesia. Accordingly, these islands have become the primary target of interest parties since the VOC (*Vereenigde Oostindische Compagnie*) era of the Dutch. The tin mining in Bangka Island flourishes since the government has promulgated Law No.4/2009 on Minerals and Coal. A significant policy change exists since the new law rescinded tin status as a strategic material. Therefore it lures investors and local people to take part in the mining activities. Furthermore, the local government has a more powerful stance under Law No 23/2014 on Local Government, under which the local government holds authority to issue policies mining permits, frequently with strong economic consideration on increasing local revenue [6].

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Many studies have shown that mining gives not only positive but also negative impacts [7,8,9,10,11]. Therefore, it will be very interesting to analyze the profile of Bangka Belitung Province, tin mining activities in this province, and the potencies of impacts caused by mining to this province based on facts and study results from other areas.

This study focused on mining activities in Bangka Belitung, in which Indonesia is the largest tin producer in the world. Furthermore, this study attempted to provide a brief description of tin mining activities in the Bangka Belitung Islands and the great potencies of its massive environmental impacts.

This study focus to analyze tin mining phenomenon from a public administration point of view. Therefore, it also offers efforts that had to be taken by the local government to prevent further environmental damage as well as sought new alternatives.

1.2 Research Method

This study applied a descriptive qualitative method with mostly secondary data collected through library study on Bangka Belitung islands. It also collected data on environmental damage due to mining activities in various places and therefore to analyze potencies of such impacts in Bangka Belitung Province. These secondary data were taken from journals, research results of previous studies, books, as well as news from various media (both written and online). In addition, quantitative data were also necessary to support narrative in order to provide a more comprehensive analysis.

These secondary data was added with primary observation in Bangka and Belitung islands, during the pre-observation activity of the study. The phenomenon covers Bangka Belitung profile, tin mining in Bangka Belitung, and its great impact on the environment.

1.3 Discussions

1.3.1 Bangka Belitung Profile

Bangka Belitung is an archipelagic province which has been known as a tin producer since the ancient time. The province also has great potential in socio-cultural life [12]. Bangka Belitung Islands consists of two islands with seven regencies and one municipality (see Fig. 1). Bangka Island consist of four regencies (Bangka, West Bangka, South Bangka, and Central Bangka). Meanwhile, Belitung Island consists of Belitung and East Belitung regencies. Pangkalpinang municipality as the capital of this islands is located in Bangka Island.

In 2018 Bangka Belitung Province had 1,343,881 population [13]. Those in the productive age were around 1.048.000 or more than 50% with an open unemployment rate of around 3.78 %. Economic potencies are agriculture, fishery, trade, tourism, and mining. However, the two dominant economic sectors are agriculture and mining. Around 219.002 people work in agricultural sector, while 91.438 people work in mining. For decades, mining has been the most important source of living for many families in this province.

Bangka Belitung Province is indeed abundant in terms of forest, plantation, fishery, and mining. However, approximately 13% of the economic life in the islands is nowhere of further acceleration due to mining production.

For almost 300 hundred years Bangka Belitung Province has been the largest tin producer. This sector continues to contribute the largest portion of local income.

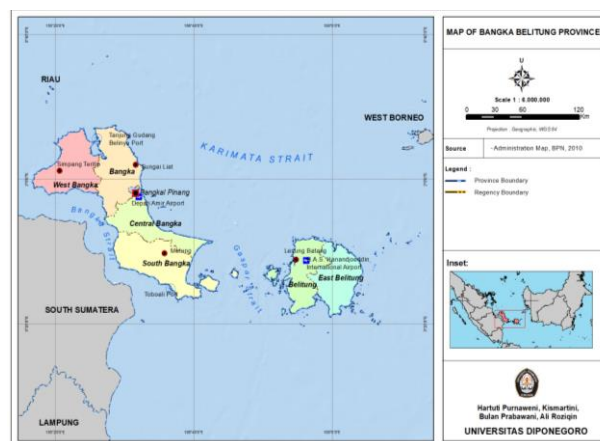


Fig. 1. Map of Bangka Belitung Islands

Nevertheless, in spite of having abundant natural potentials, Bangka Belitung Province is still considered high in poverty rate (Fig 2), which means there is a problematic social environment in terms of socio-political condition.

The poverty is caused by the inadequacy of the social structure of the local community in making use of natural resource management, in which things such as inadequate education and knowledge is deemed responsible for such underdeveloped feature.

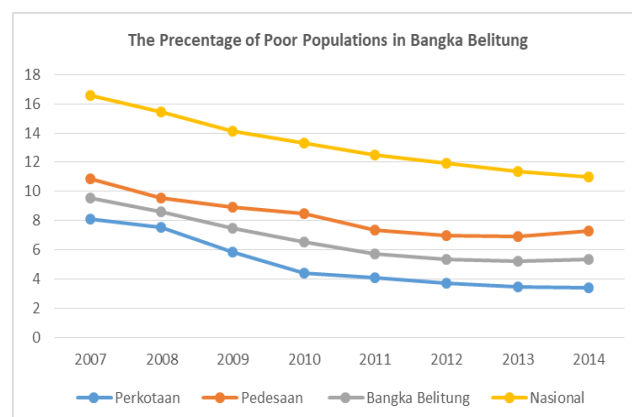


Fig. 2. The Percentage of Poor Populations at Bangka Belitung Source: [14]

The role of food commodity to Poverty Line in Bangka Belitung is far above the role of non-food commodities (housing, clothing, education, and health). Food Poverty Line Contribution to Poverty Line in March 2019 was 72.70% [15].

As a region with great potential, the future stance of Bangka Belitung is actually projected as a national economic power where many policy agendas can be put in practice.

1.3.2 Tin Mining in Bangka Belitung

One of the most highly mineralized countries in the world is Indonesia. Indonesia is one of the largest tin countries and relies on its mining extractive industry [16]. Indonesia has a large tin deposit spanning over 800 kilometers namely the Indonesian Tin Belt. Bangka Belitung is the largest tin deposit in Indonesia [17].

Tin mining in Bangka Belitung has become a traditional activity for generations. The most dominating islets for mining are Bangka, Belitung, and Singkep islands. Of these islands, Bangka Belitung Island becomes the largest tin producer in Indonesia. Of the total area 1,294,050 hectares, the island contributes 27.56% of its area to the mining sites under tin Mining Authority (*Kuasa Penambangan*) operated by PT. Tambang Timah (the subsidiary for PT Timah Tbk.). This corporation holds the 321,577 hectares area. Another corporation, PT Kobatin, holds 35,063 hectares area [18]. Both corporations have been operating since the Old Order era under the presidency of Suharto [4].

Besides these two corporations, the government issues a license of the Mining Authority to private companies under the Decree of the Minister of Industry and Commerce No.558/MPP/Kep/12/1998 on General Requirement for Export, which does not contain tin as the commodity under its export regulation. The regulation is then followed by the Decree of the Minister of Industry and Commerce No.146/MPP/Kep/4/1999 containing a revision of the state-owned strategic commodities. The tin implications are yet to be regulated and under surveillance of both regulations, therefore opportunities are opened to either corporations or individuals to perform the mining [19].

By 2007, there had been 101 business licenses to be endorsed on 320,219 hectares, in which 6,084 hectares to be mined [18];[20]. The figure then continues to rise. In 2014 the PT Timah Mining Authority extended up to 360,000 hectares or 25% of the total landmass of Bangka Island. PT Timah, which is also a state-owned corporate body (BUMN) has the terrestrial Mining Authority of Belitung Island up to 126,455 hectares, or approximately 30% of the total landmass of the island. Whereas, PT Kobatin was authorized to hold 41,000 hectares area. Outside the PT Timah Tbk Mining Authority and Work Contract (*Kontrak Karya, KK*) of PT Kobatin, the mining was also then made possible for in conventional and traditional mining [21].

According to Febri and Budi [11], some 144,435.68 hectares (60.39%) of land in Bangka Belitung area in 2011 were changed into other purposes, compared to only the remaining unchartered area of 94,718.67 hectares (39.61%) in 2004. This shift was mostly due to either conventional or nonconventional mining practices.

The overwhelming tin conventional and nonconventional mining activities have indeed caused various environmental damage in Bangka Belitung [8].

1.3.3 Greater Potencies of Environmental Damage

Continued human activities sometimes unconsciously cause decline in environmental quality where the activities

are taking place, leading to environmental degradation. The mining impacts on ecosystems and conservation are global, and major concern because of their related to other drivers of ecosystem changes [22]. Overwhelming economic activities in Indonesia have caused environmental pollution and damage. According to Law No.32/2009 on Environmental Protection and Management, environmental damage is a direct or an indirect change in physical, chemical, and biological characteristics, which beyond the threshold criteria for environmental damage.

Bangka Belitung Province with its plenty of tin mining activities, either conducted legally or illegally, has come into a critical line in terms of environmental damage. The mining activities previously done only by PT Timah (a state-owned company) has grown more openly under the Local Decree of Bangka Regency No.6/2001 on General Mining Management, which allows individuals to mine [19].

Initially, the mining sites were focused only on terrestrial areas, but lately, they extend towards the aquatic area, diminishing exoticism of the islets in the province, which are rich in distinctive granite rocks [23]. The environmental damage due to tin mining then affected the aquatic realm [22]. Therefore, catch rate of the local fishermen suffered a dramatical decline up to 80% lesser than the previous figure [24].

Off-shore mining has now a much greater potential to severely pollute the sea, which undeniably greatly threat the aquatic species and its ecosystem.

Bangka Belitung has great potential in the tourism industry, therefore these serious efforts must be taken to give a positive response to these two different issues.

1.3.4 Efforts should be taken by the government

As the key stakeholders in the public administration realm, the government is the most responsible party to solve public issues. Using its policy agenda, the government is required to have the capacity to develop strategic efforts to respond to the current problems. Efforts to be taken or not to be taken by the government are stated in public policy.

Public policy is the one made by governmental institutions and officers to solve the public-related problems [25]. The public problem in this study is meant to be social issues that create negative impacts on the community, which is environmental damage due to tin mining activities in Bangka Belitung.

The government is responsible for developing the appropriate policy to stop the environmental damage in Bangka Belitung and seeking alternatives towards the development in the province:

1. Local government is necessary to apply principles of environmental management comprehensively. It can be performed by principles of POAC management, i.e. Planning, Organising, Actuating, and Controlling [25,26]. In other words, the local government should have an activity plan for environmental management to stop environmental damage. Organizing means to organize the environmental damage management with stakeholders according to their major duties and

functions. Actuating means activity implementation as planned. Controlling deals with surveillance of the activity to be performed effectively and efficiently.

2. Formulate local decree that restricts anyone from extensive tin mining to guarantee restoration and reclamation after the tin mining activities have completed. Sanction must be applied thereof should there any violation.
3. Local government should develop other economic activities that are environmentally friendly, such as creative economy and tourism industry since they have great potential. Such alternatives are expected to mobilize local economy and to decrease dependency on the tin mining.

2 Conclusion

Mining activities in Bangka Belitung has been giving significant economic impacts and also negative impacts to the environment of these islands. The environmental damage became more severe as the regulation loosens the intention of the mining activities, such as extending the option not only in the terrestrial environment. Nowadays, mining activities have extended to the aquatic environment.

The local government must be more aware of the negative impacts of the mining activities. However, complicated interests might have been stronger factors for problem-solving. Environmental damage in the future will be less prevented except the mining sites across Bangka Belitung are restricted. It is also important to notice that nature's capability to replenish itself, i.e. restoring its environmental condition, takes time, or even impossible when the damage had severely occurred.

The government should formulate an effective and efficient strategy for environmental management to overcome the damage. It must strengthen its authority in giving sanction and taking concrete efforts to stop environmental damages.

The government is also responsible for formulating a regulation, which explains and guarantee ecosystem sustainability. Tourism potential has not been optimally exploited. As a matter of fact, Bangka Belitung Province has a great opportunity to become the leading region in tourism industry, which is expected to suspend the local community dependency on the tin mining activities. Environmental-friendly policies must be applied to manage Bangka Belitung's economic potentials.

References

1. J. Spiegel, *Governance Institutions, Resources Rights Regimes, and the Informal Mining Sector. Regulatory Complexities in Indonesia*, World Development **40**, 1, pp. 189–205 (2012)
2. Wibowo, Agus Harto, Sudharto P Hadi, Hartuti Purnaweni, *A Collaborative Management on Small-Scale Mining in Pemalang Regency*, Advance Science Letter, **23**, 3, March, pp. 2539-2541(3), (2017)
3. Mojo, Endrat, Sudharto PH, Hartuti Purnaweni, *Sedulur Sikep's Environmental Wisdom Rejected the*

Plan of Cement Industries in Karst Kendeng Mountains Sukolilo, Pati, Central Java, by Advanced Science Letters, **23**, 3, March, pp. 2504-2506(3), (2017)

4. Ibrahim, *Bangka Tin, and the Collapse of the State Power*, in GTSF Journal of Law and Social Sciences (JLSS), **5** No. 1, pp. 1-7. (2016).
5. Darwance, Sigit Nugroho, dan Yokotani, *Strategi Pengelolaan Sumber Daya Alam Pengaturan Pertimahan di Provinsi Kepulauan Bangka Belitung: Dari Zaman VOC hingga Indonesia Merdeka*. Prosiding Seminar Nasional Ekonomi dan Bisnis. Universitas Jember, e-Proceeding, [S.l.], p. 536-549, January (2018).
6. Permatasari, Dian & Imam Buchori, *Efektivitas Program Reklamasi Pasca Tambang Timah di Kecamatan Merawang Kabupaten Bangka*, Jurnal Pembangunan Wilayah dan Kota, **11**, 3, pp. 299-312, September (2015).
7. Anne Tolvanen, Pasi Eilu, Artti Juutinen, Katja Kangas, Mari Kivinen, Mira Markovaara-Koivisto, Arto Naskali, Veera Salonkannel, Seija Tuulentie, Jukka Simila, *Mining in The Arctic Environment – A review from ecological, socioeconomic and legal perspectives*, Journal of Environment Management, **233**, pp 832-844. (2019)
8. Rusfiana, Yudi dan Dadang Hermawan, *Potensi Bencana Alam Pasca Penambangan Timah Inkonsvensional di Kabupaten Bangka Tengah, Provinsi Kepulauan Bangka Belitung: Perspektif Ketahanan Wilayah*. Jurnal Konstituen, **1**, pp 59-76, (2019).
9. Emmanuel Aboka Yaw, Cobbina Samuel Jerry, Doke Adzo Dzigbodi, *Review of Environmental and Health Impacts of Mining in Ghana* (2017)
10. Mishra, Niharranjan, Nabanita Das, *Coal Mining and Local Environment: A study in Talcher Coalfield of India*. Air, Soil and Water Research, **10** pp. 1-12. (2017)
11. Pirwanda, Febri; Budi H. Pirgadie, *Dampak Kegiatan Tambang Timah Terhadap Perubahan Guna Lahan di Kabupaten Belitung*, Jurnal Planologi Unpas, **2**, 3. (2015).
12. Purnaweni, Hartuti, Kismartini, Hesti Lestari, *Potential for the Development of Ecotourism of Begadung Island, Bangka Regency*, Proceeding of ICOMA, (2018).
13. BPS (Statistic Bureau), (2018)
14. BPS, 2014
15. BPS, 2019.
16. O'Callaghan, T, *Patience is a virtue: Problems of Regulatory Governance in The Indonesia Mining Sector*, Policy **35** (3), 218-225 (2010).
17. Susanto, *Daerah Kolong Timah di Bangka Belitung Dengan Data Satelit Spot_6*. Seminar Nasional Sains dan Teknologi, Fakultas Teknik Universitas Muhammadiyah Jakarta. 17 November (2015)
18. Harahap, Ftri Ramdhani, *Restorasi Lahan Pasca Tambang Timah di Pulau Bangka*, Journal Society, **VI** nomor 1, June (2016).
19. Indra, Citra Asmara, *Implikasi Terbitnya Regulasi Tentang Pertimahan Terhadap Dinamika*

- Pertambangan Timah Inkonvensional di Pulau Bangka*, Jurnal Society, **11**, 11, June (2014).
20. Inonu, Ismed, *Pengelolaan Lahan Tailing Timah di Pulau Bangka: Penelitian yang Telah Dilakukan dan Prospek ke Depan* (2013)
 21. Bappenas, Seri Analisis Pembangunan Wilayah Provinsi Bangka Belitung. (2015)
 22. Isma Rosyida, Masatoshi Sasaoka, *Local Political Dynamics of Coastal and Marine Resource Governance: A Case Study of tin-mining at a coastal community in Indonesia*, Environmental Development **26**, 12-22 (2018)
 23. Adiatma, Ira, AN Bambang, H. Purnaweni, *Peralihan mata pencaharian sebagai bentuk adaptasi (Studi kasus: Desa Batu Belubang, Bangka)*, Jurnal Teknik, **34**, 2, pp 123-133, (2013)
 24. Tribunnews, *Kerusakan Akibat Tambang Timah Makin Parah* (2013).
 25. Hartuti Purnaweni, *Kebijakan Pengelolaan Lingkungan di Kawasan Kendeng Utara Provinsi Jawa Tengah*, Jurnal Ilmu Lingkungan, **12**, Issue 1, pp. 53-65 (2014)
 26. Asdak, Chay, *Hidrologi dan Pengelolaan Daerah Aliran Sungai*, Yogyakarta: Gadjah Mada University Press (2004)