

Original article

Marginalization of a coastal resource-dependent community: A study on Tin Mining in Indonesia

Isma Rosyida*, Wahidullah Khan, Masatoshi Sasaoka

Department of Human System Science, Graduate School of Letters, Hokkaido University, Kita 10, Nishi 7, Kita-ku, Sapporo, Hokkaido, JP 060-0808, Japan

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ABSTRACT

This study, conducted in Bangka Island of Indonesia, reveals how local power dynamics spawn 'grey participation' within local decision-making frameworks and how the imbalanced distribution of impacts and benefits from suction dredger operations shift local people's perceptions, potentially marginalizing them. This study utilized structured and semi-structured questions through household surveys of 80 respondents, 35 key informant interviews, and one focus group discussion to study how large-scale coastal tin mining marginalizes a local community in Bangka Island and how it impacts people's livelihoods. Results show that villagers initially accepted suction dredger operations because they were unaware of the impacts, public consultation meetings did not guarantee active participation in the decision-making process and took advantage of the communities' lack of knowledge and understanding of the purpose of the meetings, and that companies emphasized community benefits rather than the potential adverse impacts caused by suction dredging. The community is marginalized because locals do not have equal access to benefits and because not all impacts are equally shared among all stakeholders. We suggest that locals be given equal opportunities in decision-making ensuring that benefits are fairly received. We encourage good mining governance formation to avoid larger negative impacts on both community and the environment.

1. Introduction

The mining sector plays a profoundly significant role in the Indonesian economy, contributing approximately five percent to the total Indonesian gross domestic product and a much greater share than the regional economies of some resource-rich provinces (IM4DC Action Research Report, 2013). Since 1998, policies and regulations related to the mining sector in Indonesia have undergone considerable changes (Dutton, 2005). For instance, the deregulation of the tin trade that accompanied the introduction of regional autonomy in January 2001 led to a new era in the history of Indonesia's tin mining management (Cribb and Ford, 2009). Consequently, the region's response to the transfer of authority from the centre to the regions and its search for sources of regional revenue were rapid and radical (Erman, 2007a, 2007b). One of the perceived drawbacks of this transfer was legalized offshore tin mining by suction dredging (SD) operations (Ibrahim, 2016). SD operations are used for the underwater excavation of alluvial deposits, and without proper mitigation and monitoring, they can have definite negative environmental impacts, such as sedimentation, the death of nearly 30% of the local coral reef (within one year), water contamination, coastal erosion, and pollution. Operating within 0-6

miles geographical proximity under the authority of the district and provincial government, a suction dredger is capable of digging 70 cubic meters below sea level (Manap, 2008).

However, extractive industries bring significant social, economic, and environmental changes to the regions in which they operate (Aguilera et al., 2007), threatening the sources of peoples' livelihoods (Ashraf et al., 2012). Similarly, Bangka Island SD operations have influenced the livelihoods of many people, particularly fishers whose lives depend on coastal and marine resource availability, such as fish, shrimp, and crabs, and those who work near the SD operating areas (Muslih, 2014). A press report by KIARA (2013) mentioned that the operation of more than 70 SD companies is threatening the livelihoods of 16,000 of the 45,000 fishers on Bangka Island. As a result, operational costs are increasing owing to longer fishing distances, which is time consuming and ultimately leading to a drastic reduction in the average income of fishers in Bangka Island by up to 80%. Income ranges from 400,000 rupiah (USD 25) per day to 1,000,000 rupiah (USD 60) per day per fisher, with an annual loss of approximately 15 billion rupiah. It creates serious conflict of interest issues between mining companies and potentially affected local communities, among which, fishers are considered the most vulnerable (KIARA, 2013).

* Corresponding author.

E-mail addresses: ismarosyida@gmail.com (I. Rosyida), waheedullah@live.in (W. Khan), m.sasaoka@let.hokudai.ac.jp (M. Sasaoka).

In Indonesia, issuing licenses for tin extraction is authorized by state regulations and policies pertaining to sea mining activities, including Decree No. 4 of 2009 (Minerals and Coal) (Mujiyanto and Tiess, 2013), Decree No. 27 of 2007 (Management of Small Islands and Coastal Resources) (Siry, 2011), and Decree No. 32 of 2009 (Protection and Management of the Environment) (Campbell et al., 2012). According to the aforementioned regulations, all mining companies are required to conduct environmental feasibility studies and environmental impact assessments (EIAs) and to pay royalties. A shift from a centralized to a decentralized government encouraged district-level governments to draft their own rules governing natural resources, giving district heads the authority to issue permits for SD operations. Nevertheless, full legal compliance with state environmental regulations has thus become an increasingly insufficient means of satisfying society's expectations with regard to mining issues (Prno and Slocombe, 2012).

Previous research shows that there is growing recognition within the extractive sector concerning the importance of obtaining approval from the local community before conducting activities (Franks et al., 2014). Similarly, a study by Lesser et al. (2017) highlighted the significant role of the local community in Finnish Lapland regarding the issuance of social licenses. Both studies demonstrate the widespread recognition of local approval, commonly known as social license, as a community's ongoing acceptance of a company's operations in their area. In parallel with the emergence of the social license, Prno and Slocombe (2012) recognized two different perspectives on the importance of such a license. For mining companies, it reduces social risk and facilitates operations without community conflict, and for local communities, it often implies that they have been meaningfully involved in decision-making and have received sufficient benefits from the project. As Hitch and Fidler (2007) suggested, communities recognize their rights to local resources as a critical way to end dependency and regain control over their livelihoods. Conflicting interests can be the result between different stakeholder groups, which means that the satisfaction of one stakeholder group may be at the expense of another group's well-being. Furthermore, Lesser et al. (2017) also emphasized the urgency of developing social licensing procedures to safeguard the local community, which may be particularly adversely affected, but it is not considered a majority voice. In the context of Indonesia, Spiegel (2012) pointed out that numerous controversies in Bangka Island over tin mining governance occurred because of conflicts between companies and communities, and the resulting environmental and social problems associated with the revenues derived from their regions. Such procedures would encompass the idea of public participation in the decision-making process of issuing social licenses.

However, few empirical field studies have investigated the decision-making process of issuing social licenses with regard to the underlying factors influencing local acceptance of SD operations, along with community perceptions of their impact on local livelihoods. In this paper, we explore how the local people issue social licenses for large-scale coastal tin mining in Bangka Island and how such decision-making affects people's livelihoods through intensive household surveys, in-depth interviews, and an empirical analysis. We then provide some implications for local decision-making on tin mining SD.

This paper is organized as follows. First, we look into the local subsistence dynamics and the history of SD penetration. Then, we describe how local people perceive the benefits and impacts of SD operations, causing them to shift their attitudes toward SD operations. Subsequently, we investigate decision-making processes by describing how SD operation licenses are issued, the roles and responsibilities of the actors involved, and the distribution of compensation and royalties by the SD company. Finally, we suggest several important points that should be considered to make fair and just decisions on tin mining SD.

2. Methods and materials

2.1. Study site

This study was conducted in Desa¹ Y, which is located on Bangka Island in Indonesia and which, from an administrative perspective, consists of five hamlets. This study site, however, covers only one hamlet, Dusun² X. It is geographically remote and isolated from the rest of the *desa* with difficult and time-consuming access owing to a muddy road and no public transportation. People living in the *dusun* are poorly connected to the rest of the *desa*, its market, schools, and the district government. According to a local elder, SP (75 years old), the Bangka Malay are the dominant ethnic group in Dusun X, which is comprised of traditional fisheries and shifting cultivation communities and is characterized by strong mutual cooperation among the people. For locals, fishing is not only an economic activity but also a personal actualization passed down through the generations, and agricultural activities are also passed down from one's ancestors. Subsistence activities in the coastal community of Dusun X are strongly influenced by seasonal conditions, resource availability, and ownership. The *bagan*³ is the primary fishing instrument the *dusun* fishers use. Agriculture is a livelihood source for locals, in which pepper is the most successful and valuable cash crop because it has a relatively stable and high selling price. Therefore, in difficult times, locals can sell it to meet urgent needs. Today, rubber is cultivated with a long-term perspective owing to the depletion of fish stocks.

The introduction of small-scale tin mining in the 2000s shifted the primary source of income, attracting not only locals but also individuals from other regions, and an influx of migrants began. Some local people were driven to mining because of poor crop harvests, stemming from unfavourable weather conditions, and/or to supplement household income following the end of the agricultural season. Thus, shifting modes of production to capital-oriented, small-scale mining activities commenced, followed by large-scale tin extraction using SD, creating socioeconomic dependence on tin resources. The presence of large-scale tin mining companies boosted the *dusun*'s development by providing alternative temporary income sources and improving public infrastructure. Consequently, SD activities have exploited tin resources unsustainably and have destroyed the local marine and coastal ecosystem. The research site was selected based on the local dependence on marine and coastal resources. Historically, people living in Desa Y have engaged in small-scale fishing as the primary economic activity, with subsistence agriculture as a supporting economic activity.

2.2. Data collection techniques

This study employed structured and semi-structured questions in household surveys (80 respondents), key informant interviews (35 informants), and one focus group discussion (FGD) involving 25 participants. Among the information collected via household surveys, we specifically asked about household characteristics, household subsistence and livelihoods assets, dependency on coastal resources, perceptions of SD operations, compensation and royalties, perceived impacts of SD on local resources, participation in Public Consultation Meetings (PCMs), tin loading activities, and committee involvement. We interviewed 85 respondents in total and excluded five respondents from the analysis as they were not permanent residents of the study

¹ A term used for 'village' in the Indonesian language.

² A term used for 'hamlet' in the Indonesian language.

³ 'Bagan' is locally defined as one of the fishing instruments in the form of a lift net that is linked to a bamboo frame building and that is normally operated at night because it uses lamp light as a means of attracting the fish. The area of operation for the installation of a bagan is a clear aqueous coastal water, having a depth of 7–10 meters. The distance from the beach is 2–4 miles and the distance between from one bagan to other is 200–300 meters.

area.

A total of 35 key informant interviews, both male and female, were conducted to gather information on the historical trajectory of the desa and SD activities, mining license procedures, actors involved in SD mining permit decision-making, and mechanisms for compensation and royalty distribution. These interviews targeted mainly knowledgeable people in the desa, such as the desa officers, the dusun chief, local elders, mining committee members, and representative fishers, farmers, miners, and religious leaders. Interviews with female informants were primarily focused on changes in the availability and consumption of fish resources and how they adapted to such changes. We also conducted interviews with informants from other dusuns in the same desa to explore their views on the impacts of SD and the economic benefits provided by SD companies.

An FGD with both male and female participants was arranged to address several topics, such as trends in local resource utilization, changes in the socioeconomics and ecological settings due to mining activity, the mechanism used to issue SD operating licenses, and the impacts and benefits of SD on locals. Finally, we investigated local perceptions of the future of SD. Discussions with villagers who supported SD and those who were against it were conducted separately to avoid conflicts of interest. Field observations were also conducted to clarify survey, key informant, and group responses. In addition, an extensive literature review (from internet-based journals, books, theses, and other documents) was conducted and was supported by secondary documents from locals, the government, and private institutions.

3. Findings

3.1. The history of SD penetration

Mining activities in Dusun X began in early 2002. Numerous small-scale mines, commonly called ‘unconventional mines’, emerged and were supported by outside investors. This shifted the mode of production to capital-oriented, small-scale land tin mining activities by the inhabitants of Dusun X, followed by large-scale tin extraction using SD, which unofficially began in 2009 without formal consent from the local and regional government and which reduced the number of locals who were engaged in small-scale tin mining (see Table 1).

SD operations lasted for approximately two years until the end of 2010. During this period, SDs extracted tin resources in an unsustainable manner. At the beginning of March 2011 (in what is known locally as the ‘east wind season’), SD companies obtained official permission from the district government along with local consent. In 2014, SD activity stopped owing to a border conflict over an ambiguity on the official desa map. The conflict concerned the right of access and ownership of the coastal area and who was eligible to receive royalties and compensation from SD activities, as well as who would receive compensation and royalty shares for authorizing small-scale mining activity.

In the early stage of operation, most of the villagers agreed to SD

operations (95%) because of the economic benefits offered by the company and the provision of services, such as the construction of new roads, bridges, and a mosque; electricity; and vehicles for community use. As illustrated in Fig. 1, there were significant changes during the research period (2015) in the community’s response to SD operations.

Along with the rapid depletion of fishing yields and fluctuation of fish prices, the majority of villagers rejected SD operations (43%) as they began to realize that SDs were bringing more harm than good, both individually and to the community as a whole. One local fisher, TH (42 years old), stated: ‘Previously, locals were told that suction dredgers’ operations would not disturb fisher activities. However, with the increase in the number of suction dredgers, fishing grounds became scarce, resulting in drastic income depletion’.

Similarly, another local fisher, YT (35 years old), emphasized,

Before suction dredger operations, we were able to buy fish within our neighbourhoods at cheap prices and due to the abundance, occasionally were offered to take fish for free. Currently, it is hard to even buy fish within the desa and prices are higher.

Locals are currently polarized into the following groups, based on their attitudes towards SD operations: the Disagree Group, the Agree Group, and the Neutral Group. Their attitudes are influenced by several factors and conditions. The Agree Group consists of locals who agree with and support SD operations, while the Disagree Group consists of locals who do not approve of or support SD operations. The Neutral Group consists of people who tend not to reveal their attitudes, whether they agree or not. Most of those in the Disagree Group are community fishers, whereas the majority of the Agree Group consists of miners (see Fig. 2).

One of the major reasons for this polarization stems from the different experiences resulting from SD. A majority of villagers in the Agree Group (50%) mentioned that economic compensation and royalties became the primary reason for their acceptance of SD, but interestingly, a quarter of the villagers in the Agree Group (25%) simply followed the majority as they did not really understand what was going on and what the consequences would be. They have experienced the direct impact of exploitative large-scale mining on their fishing activities as SD mining grounds intersect fishing grounds.

The results show that 97% of the fishers have experienced difficulties in catching fish because of depleted fishing grounds that require a deeper bagan structure and longer travel distances with limited technical capacities. As a result, all of the fishers experienced a depletion of fishing yields. HD (46 years old), one of the local fishers, stated,

In this area, anchovies have historically been the main fishing commodity of local fishers. Since the last decade or so, the quantity of anchovies caught has been drastically reduced, even though there were still many squid or shrimp in the shallow sea. There was a time when sea water was clean and we could see coral reefs. However, after the operation of suction dredgers, it is not possible to find them because the condition of the sea water has become dirty and muddy.

Table 1
Historical Trajectory of SD Operations.
Source: In-depth interview, 2016.

Year	Important Event
2002	Beginning of small-scale land mining by locals. Shift in local subsistence from farming and fishing to small-scale tin mining, which changed the social and economic function of the land.
2004	Peak of small-scale land mining and the emergence of small-scale coastal mining. Local economy was boosted followed by rapid land conversion and a massive influx of seasonal migrants.
2009	Beginning of SD operations without obtaining local consent along with depletion of small-scale land mining, gradually pushing locals to find alternative livelihood sources.
2011	The first PCM
2014	SD operations stopped due to border conflicts between neighbouring villages.
2015	Victory in the first court case. Dusun X and Desa Y have the right to use and control the previously conflicted area.
2016	Loss in the second court case. SD commences, organized by a neighbouring desa.

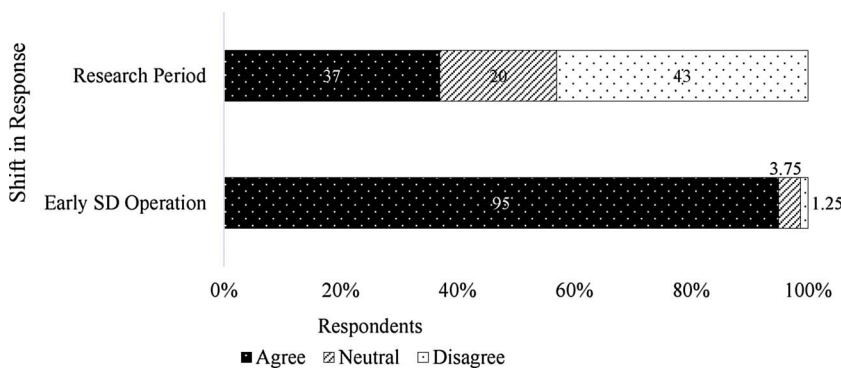


Fig. 1. Community Agreement/Disagreement on SD Operations. Source: Household Survey, 2016.

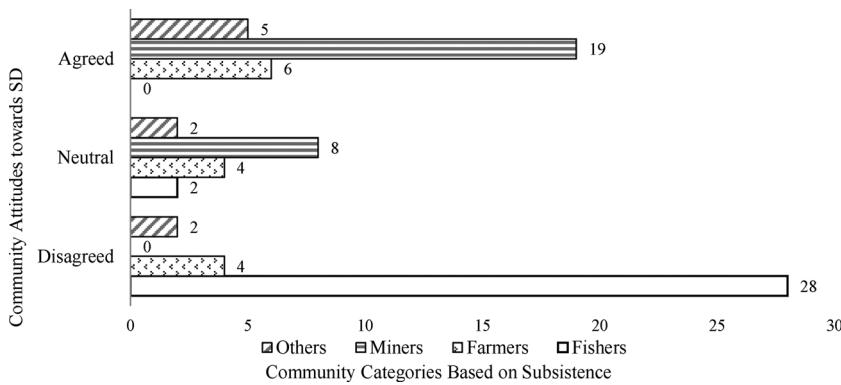


Fig. 2. Community Attitudes toward SD Based on Subsistence Activities. Source: Household Survey, 2016.

Another fisher, MH (48 years old), had a similar observation:

Before, I was able to build my *bagan* within 500 meters of the coastline. The yields were abundant with a variety of fish. Within a few hours, I could catch a minimum of one and a half sacks of fish (approximately 100–150 kg). Now, though the *bagan* is built almost two miles away, the yields are unpredictable and far from what we used to earn in the recent past. Moreover, if the suction dredgers move toward our *bagans*, we are lucky if we catch even 20–30 kg.

In addition, 23.3% of fishers’ experience scarcity of a particular fish, such as kembung, yellow tail, and other varieties, while 37% experience a depletion of fish quality. The experience of MK (42 years old), a local fisher who has continuously relied on *bagan* fisheries, confirmed these facts:

In the beginning of the east season, normally we were able to catch medium and large size shrimp and some medium size high-quality fish,⁴ but in the last few years, they are no longer found. It certainly affects the amount of fish available in the market and that correlates with fluctuations in fish prices. Besides, many people, including myself, feel like the taste of fish has gradually changed. The change in taste might be because of lead contamination in the sea water [as explained by an extension worker to this key informant].

This suggests that fishers bear the greatest brunt from the impacts of mining activity, which include effects on the amount and variety of fish caught, difficulty in catching fish, and the price and quality of the fish. Consequently, fishers have had to increase their working hours and operational costs and improve their logistics. Another local fisher, RF (39 years old), stated,

I used to go fishing early in the morning and would come back home before noon with sacks of anchovies. Nowadays, until late

afternoon, I cannot catch an even half a sack of anchovies. Moreover, I fish five days a week. Consequently, whether I want to or not, I have to fish every day for long hours to meet my household food demands.

While only 37% of respondents agreed with SD operations, a majority (54%) considered compensation and royalties (cash and tin loading wages) as the primary motivating factors in accepting dredging. Other important reasons for their agreement include competing with neighbouring villages (13%) and following the majority within the group (20%). The prominent reasons for disagreement with SD operations include compensation and royalty amounts not balanced with the economic losses they sustained (35%) and 26% showed concern about not receiving benefits once SD operations cease. Some villagers (21%) disagreed because the compensation and royalties received were low compared to the quantity of tin extracted. Therefore, it can be concluded that the shift in local people’s attitudes has been influenced by their perceptions of the impacts of SD operations, as well as the income and other resulting benefits. The capability of locals to perceive the impacts and benefits of SD operations is influenced by personal assets and options for income generation. Desa officer representatives mentioned that Dusun X is considered less developed than the other dusuns in terms of regional development infrastructure and quality of natural resources. Results show that the Disagree Group (23 respondents), which is dominated by fishers, has the lowest literacy rate, whereas elites and small-scale mine owners (11 respondents) who support SD tend to have higher literacy levels. Furthermore, the dusun chief elaborated that the gap between those who support SD and those who do not somehow creates distrust over direct payments of profit shares. This has occurred several times in the past, creating internal conflicts within and among the groups.

Another factor that influences local perceptions is opportunities for generating income. The majority of respondents (71%) adopt a double income strategy, while 29% rely on a single income source because their assets and resources, skills, and options for alternative income sources are limited. Among those who adopt the double income

⁴ Here, high-quality fish refer to those imported by Indonesia such as kerapu, yellow tail, tenggiri, and other expensive fish.



Fig. 3. Community Income Strategies. Source: Household Survey, 2016.

strategy, 54% apply a diversification strategy wherein fishing is their main livelihood activity and agriculture is a supporting livelihood activity. Forty-six percent apply a seasonal strategy, using a combination of income sources such as fishing in the east season and small-scale mining or day labour in the wet season. Responses from the Disagree Group show that 25 out of 34 employed double income strategies, whereas 12 in the Neutral Group and 17 in the Agree Group used double income strategies, as shown in Fig. 3.

Discrepancies in the views expressed by representative developers and interviewees from within the local community highlight difficulties in managing community funds in a way that is broadly perceived as fair and effective and that presents meaningful benefits to the community.

Table 2 shows that 66.7% of the Agree Group, 35.7% of the Neutral Group, and 17.6% of the Disagree Group do not own land. The Agree Group has the lowest amount of land ownership, while the Disagree Group has the highest. Among all three groups, the majority owns less than two hectares of land. Slightly more than a quarter utilize leased land (government-owned land). Not all of the land owned by locals is cultivated productively. In addition, the results show that 40% of respondents from the Agree Group own non-productive land, whereas in the Neutral Group and the Disagree Group, most of the respondents mentioned that they cultivate their land.

3.2. Mining Permit Procedures

The community decision-making process involves several stages. The pros and cons for each relevant party are both considered, and several meetings occur between the community and representatives of the local government in an effort to reach an agreement. Even though Desa Y consists of five dusuns, local decision-making and compensation and royalty distributions occur primarily in Dusun X because SD operating points are located there. The chiefs of other dusuns join in the decision-making process as observers. The mining license procedure is divided into four stages, including the pre- and post-operation stages, as shown in Fig. 2.

The first stage begins with a mining permit proposal submitted to

the dusun chief by the SD company. In the initial response, the dusun chief explains the process and the terms and conditions regarding the requested area of operation, compensation, and royalties. Next, the dusun chief requests informal consent from the villagers and reports the results to the desa officers; if there is positive feedback, the company must hold a PCM facilitated by the local government in the second stage of the decision-making process. The PCM involves various societal groups such as community members, desa government officials, company representatives, and representatives of the desa security forces (Fig. 4).

The purpose of the PCM is to involve all relevant stakeholders and to obtain consent on the operating procedures, compensation distributions, site selection, tin loading employment, etc. It is obligatory for the company to provide a contract offer according to the terms and conditions. In the third stage, locals decide whether an SD mining permit will be granted by the dusun. If the contract offer is not approved, the company is given the chance to renegotiate the offer; and if there is still no agreement, the company must withdraw its proposal and look for another mining site. If the contract offer is approved, SD operations may commence. In the final stage, operating procedures on the distribution of compensation and royalties, as well as the management of local employment for tin loading activities, will be organized.

The first public meeting was held in March 2011. All households in Dusun X were verbally invited to the PCM, considering the small number of households and settlements located in close proximity. During the PCM, locals were expected and encouraged to express their opinions and to engage in a dialogue with the company. However, 15% of the total respondents did not participate in the PCM. Fig. 5 highlights that the Disagree Group had the highest absenteeism with two potential reasons being unwillingness to attend or because they were not informed.

We found 22 additional attendees brought by the villagers to the PCMs. We considered the importance of their knowledge and understanding on the purpose of why these PCMs were held and also their participation in such gatherings. The household survey results reveal that not all PCM attendees understood or cared about the purpose of

Table 2 Percentage of Land Ownership Assets among the Disagree Group, the Neutral Group and the Agree Group. Source: Household Survey, 2016.

		Land Ownership Status of the Disagree Group (%)			Land Ownership Status of the Neutral Group (%)			Land Ownership Status of the Agree Group (%)		
		Leased	Self-Owned	Mixed	Leased	Self-Owned	Mixed	Leased	Self-Owned	Mixed
Land Size	0.1–2 Ha	20.5	32.3	8.8	25	25	0	6.7	6.7	3.3
	2.1–4 Ha	3	0	5.9	6.25	6.25	6.25	3.3	10	3.3
	> 4 Ha	3	3	5.9	0	0	0	0	0	0
	No Land	17.6			37.5			66.7		
Land Utilization Status	Productive	28.6	36	21.4	27.3	36.4	9.1	10	20	10
	Non-productive	3.5	7	3.5	18.1	9.1	0	40	10	10

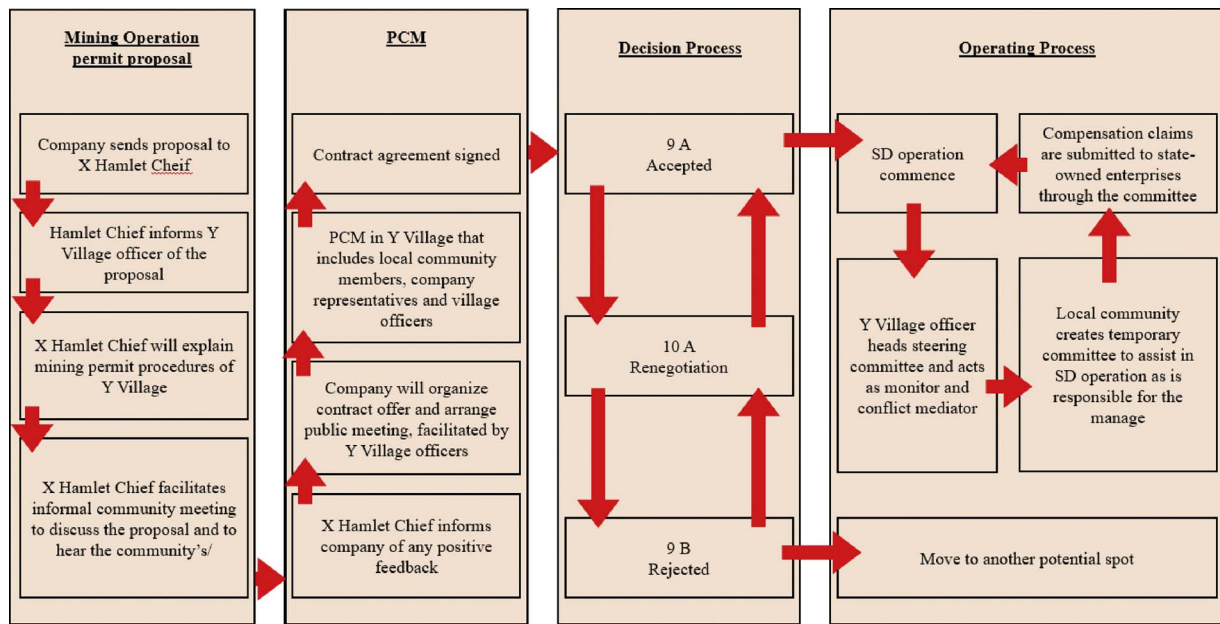


Fig. 4. Tin Mining Licensing Procedures. Source: Key Informant Interview, 2016.

this meeting (31%), while the remaining 69% knew and understood the purpose of the PCM.

Fig. 6 shows that the Agree Group has the highest number of attendees who knew and understood the purpose of the meeting, whereas the majority of attendees who knew the purpose but did not understand why the meeting was being held and attendees who did not know the purpose of the meeting were in the Disagree Group. This shows the different degrees of knowledge and understanding in each attitude group. SD companies provide an attendance sheet that is later used as evidence that the community agreed to SD operations. Contract offers are determined and renewed every season, depending on public agreement after considering the needs of local communities. The public can voice objections during the PCM. In the in-depth interviews, a few informants mentioned that the attendees who actively participated were primarily local elites and locals who strongly supported SD operations. One desa officer stated,

The PCM should be held at a place where people can interact directly with the company representatives. The company should inform the public of its operation plan while locals can discuss their concerns, expectations, and maybe the possibility of cooperation opportunities, but I observed a local trend where attendees were passive and simply observed and listened to the discussion, which in most cases, was dominated by dusun or desa elites.

Apparently, the economic benefits package became a contentious

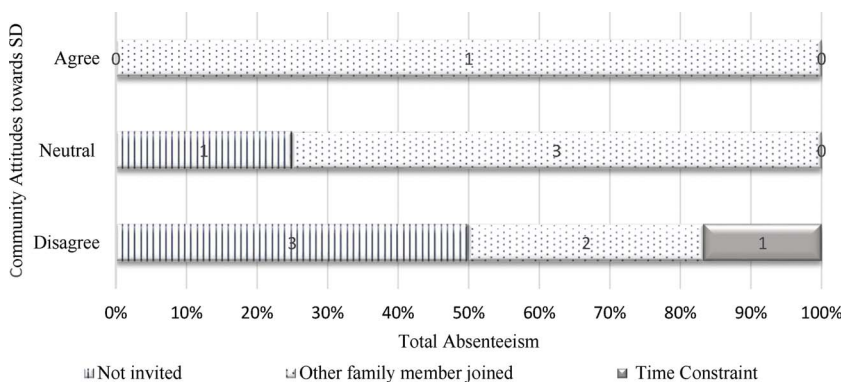


Fig. 5. Reasons for Absenteeism at the March 2011 PCM. Source: Household Survey, 2016.

topic during the PCM. A variety of questions and opinions were expressed by the desa and dusun representatives and some locals belonging to the elite group. One local elite, who was also a mine owner, stated,

I actively participated in the PCM because, as a community representative, I wanted to know how locals could benefit from the operation. Specifically, I raised questions about what kinds of opportunities we could expect from the operations, including income generation, employment opportunities, etc. Luckily, I was given the chance to speak by the moderator, and I asked important questions on behalf of the community.

Fig. 7 highlights that the majority of the Disagree Group and the Neutral Group stated that their passiveness was a result of feeling anxious, insecure, or not confident. One of the respondents in the Disagree Group discussed his experience as follows:

I was present at the PCM, even though I initially did not know what the purpose was. My neighbours told me that there was a discussion in the desa hall about coastal mining. During the event, I just listened to the company, desa officers, and some active participants because I am not an educated person so I think my opinion may be worth less than that of other participants, though to be honest, I did not really know how these suction dredgers would work and how they would affect my daily activities.

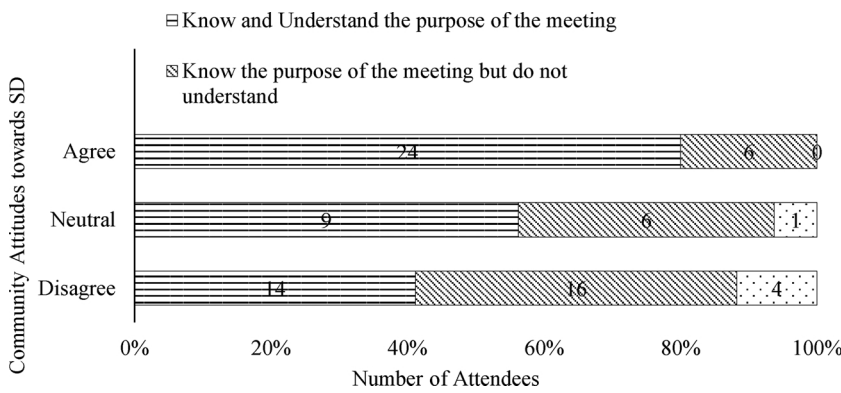


Fig. 6. Attendees' Knowledge and Understanding of the purpose of the PCM (March 2011). Source: Household Survey, 2016.

The feeling of insecurity also affected villagers' attitudes:

I'm just an ordinary person like many other villagers with no position in the desa government and I never had any experience concerning desa governance. I believe elders and experienced villagers should speak for the benefit of the whole community such as Mr. XYZ, the owner of the land where I work for day wages. Additionally, because I am only a day wage labourer, to avoid conflicts, I have to agree with whatever my boss says. Otherwise, it might affect my relationship with the land owner as well as my income source.

TN (38 years old), one of the respondents in the Disagree Group, expressed his disappointment because he did not have the opportunity to submit questions related to how the process would damage his fishing gear because there was insufficient time. Thus, the lack of opportunity and lack of time also influenced the low participation of attendees.

3.3. Actors involved in mining permit decisions

In this section, we present the results from our key informant interviews and the FGD to address the actors involved in mining permit procedures (Fig. 8). Power relations within the decision-making process form one of the factors that affect the local political situation in Dusun X and in Desa Y as well. This section also includes both positive and negative considerations of the relevant stakeholders.

The primary decision-making actors are committee members, the dusun chief, and the SD company. Additionally, desa officers, state-owned enterprises, and Desa Y community members are also important stakeholders in the decision-making process for large-scale tin mining. Key informant interviews revealed that the dusun chief and the committee hold strategic positions that bridge the company and the rest of

the stakeholders. The dusun chief and the committee deliver information to the company and vice versa. The dusun chief also plays the role of mediator among all stakeholders, ensuring that the entire process from proposal submission to acceptance or rejection runs smoothly. The role of the dusun chief is also important because he is very influential and is typically knowledgeable about the area and the community. The committee, with members elected during a public meeting every season, represents locals and acts as a liaison between the company and the community. The attendees are welcome to nominate themselves or other attendees as committee candidates. One member is appointed as the chief of the committee and is responsible for distributing and controlling the division of labour among members.

The results show that not all community members want to be involved in the committee. Eight percent of the total respondents were not willing to be involved because of a lack of time, personal abilities, health conditions, and personal preferences, while the majority of respondents (30%) are involved in the committee every season. Participating as a committee member comes with cash benefits; but practically speaking, some respondents felt that the time and energy was not worth the extra cash they received.

In addition, Fig. 9 emphasizes that there is a decreasing trend in the number of people who participate in the committee. The Disagree Group has decreased participation in all seasons while the Agree Group participation tends to increase each season.

3.4. Mechanism for compensation and royalty distribution

The PCM provides a platform for the company and community to discuss the compensation and royalty mechanisms. In this meeting, the local community is assured that the project will bring prosperity to the desa by improving infrastructure; providing communal facilities; increasing access to the market; and financing the construction of roads,

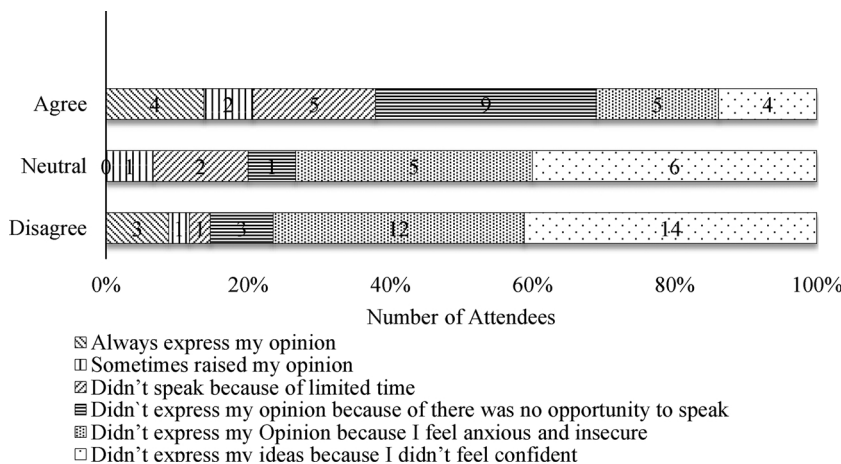


Fig. 7. Attendee Participation at the First PCM. Source: Household Survey, 2016.

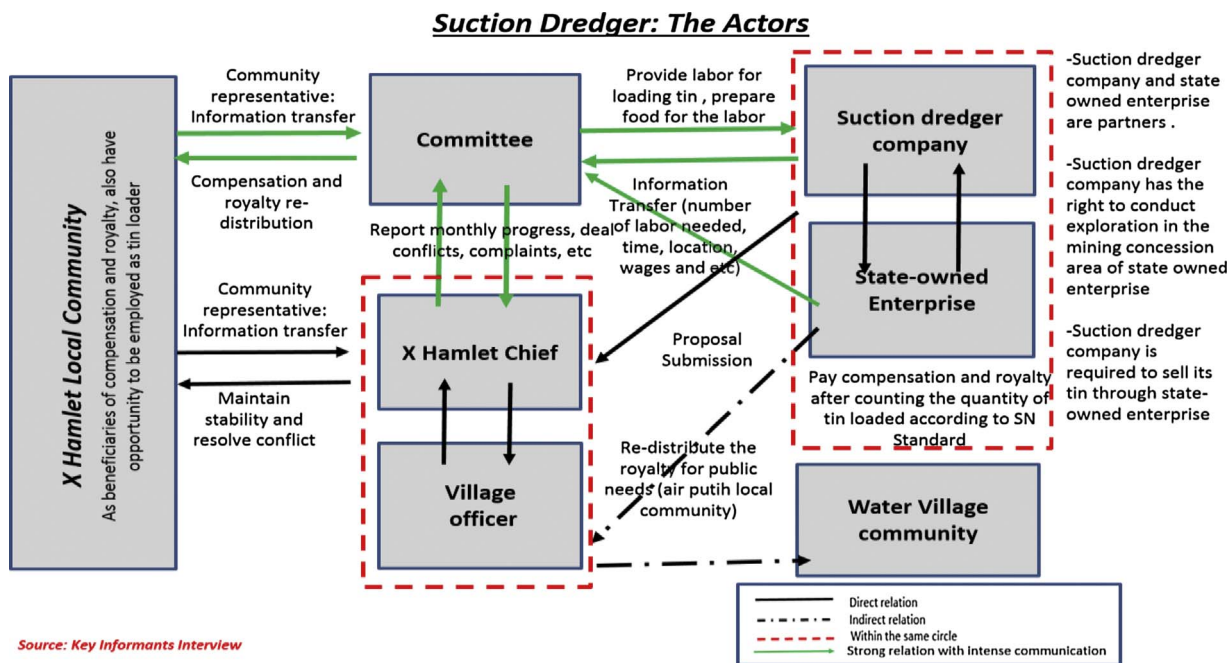


Fig. 8. Actors involved in the Decision-Making Process. Source: Key Informant Interviews, 2016.

bridges, and networking facilities. As shown in Table 2, the company is required to pay a basic entrance fee before commencing mining activities at the beginning of the mining season every year. The company pays Committee Operational Costs (750 USD), Local Community Shares (750 USD), and a fee for the construction and maintenance of a mosque (375 USD). Additionally, the company also pays royalties and compensation to the local community, the SD committee, desa officers, and a fund for desa development. Fishers are considered to be the most vulnerable to the negative impacts of dredging activity. Thus, they are given additional cash benefits as compensation.

The SD company does not hire locals because operations require specific skills and expertise. Nevertheless, the company provides opportunities for locals to earn additional cash by working as tin loading labourers. Tin loading activity normally occurs once in two weeks for each operating SD. The number of labourers needed depends on the amount of tin to be extracted. More than half of the respondents (53.66%) regularly participate in tin loading activities, while the rest participate only occasionally because they consider that earned wages from tin loading are not in line with the energy and time spent. People are also not keen to participate because the calculation of wages is considered unjust. Some labourers work less and others work more, but they receive the same amount because the total amount earned by all labourers is divided equally among them. It is important to mention

that the extracted tin is wet and heavy, but many of the wages are calculated after it is processed into dry tin. Key informants showed concern about weighing techniques and the associated wage allocations.

All community members have the right to receive cash based on their age (productive or non-productive), their household status (widowed or married), special considerations (having permanent work, health conditions, etc.). The amount of cash received and who receives it are determined by the committee, and amounts are calculated based on the amount of tin extracted by the company. Then, tin loading wages are added as well as reimbursement for loss and damage (if any) to fishing instruments caused by SD activity. Committee representatives receive compensation and royalties that are later disbursed to the community. The date and time for compensation and royalty distribution are decided by committee members according to the payment schedule provided by the company.

However, the impacts of SD activities in Dusun X were not equally shared among all villagers. Fishers were affected the most because of the overlap of mining and fishing grounds. This situation brought about the shift in the community’s perceptions, resulting in local polarization because some people started realizing that the adverse impacts of SD threatened their livelihoods. The community members who support the dredging are primarily those who did not experience direct impacts of

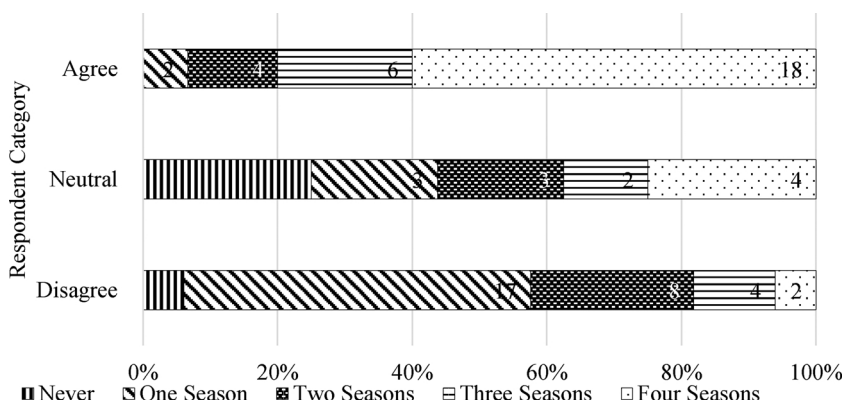


Fig. 9. Community Involvement as Committee Members. Source: Household Survey, 2016.

SD operations, and they consider SD a potential source of income. Coastal resources contribute greatly to local livelihoods, not only in terms of economic resources but also in emotional and historical attachments to the community and their identity as fishers. HT said that ‘fishing is not only our profession but it is embedded in our souls and spirits, giving us life, and giving me and my family a future. We do not want our sea to be destroyed’.

Similarly, TJ (34 years old) said,

Fishing is our identity. My whole family does it for a living. It is more than just a source of income for us. The occupation of fishing is transferred to us by our ancestors. My grandfather and father were both fishers, and I do the same.

Although those who came as migrants did not have a strong locality and sense of belonging to this dusun as compare to locals and were likely neutral, they preferred not to show their concern by supporting or rejecting SD operations, but rather through expecting economic benefits.

A total of 74% of the respondents who disagreed with SD operations considered cash compensation as less important, while conversely, neutral community members and those in agreement considered cash important, along with tin loading employment. Electricity received special consideration because all of the groups expected the instalment of electricity; however, because of high costs and the community’s failure to seek government support, the SD company offered to install electricity as a form of compensation instead. However, SD technology was adopted from abroad; hence, its operations require specific skills and expertise. Therefore, the majority of workers on SD boats are foreign workers, and some are Indonesian skilled labourers, whereas locals can work only as tin loaders with limited opportunities and income (Table 3).

Nevertheless, it is interesting to note that several interviewees from the local community asserted that the amount of compensation provided by the SD company was managed by a committee dominated by members of the Agree Group, the locals who supported SD. Local participation affects different trends in each category. Participation in the Agree Group increased from season to season. Additionally, committee members determined the calculation methods, while locals received compensation in aggregate without knowing the details. Even among community members, the committee was dominated by certain elites, resulting in an unfair distribution of benefits. Owing to the illiteracy factor, locals were not able to act critically upon becoming aware of this situation. They are orientated simply to expect economic benefits without a social or political sense of the consequences. Generally, SD operations affected community members who were both directly and indirectly connected to it. Both experienced different levels of impact (positive or negative). Regarding the effects, locals began to experience them directly; then they realized that the benefits were less than expected.

Yields of important fish species and related incomes declined over

Table 3
Community Perceptions on the Economic Benefits of SD.
Source: Household Survey, 2016.

	Disagree (%)				Neutral (%)				Agree (%)			
	NI	LI	I	VI	NI	LI	I	VI	NI	LI	I	VI
Electricity				100				100				100
Mosque			17	83				100			7	93
Dusun road		50	25	25			12.5	87.5	17		17	76
Car for common use	83	9	8			25	50	25			50	50
Cash compensation	9	74	17				12.5	87.5				100
Tin loading	16	53	31				75	25				100
Compensation for damage		6	85	9			37.5	62.5			73	27

NI: Not important; LI: Less important; I: Important; VI: Very important.

Table 4
Community Perceptions of the Impacts of SD.
Source: Household Survey, 2016.

	Disagreed (%)				Neutral (%)				Agreed (%)			
	NI	LI	I	VI	NI	LI	I	VI	NI	LI	I	VI
Destroyed the coral reef			17	83	37.5	62.5			50			50
Polluted sea water			26	74	50	50			27	46		27
Difficulty buying fish		15	85				75	25		73		27
Rising fish prices		17	83				75	25		93		7
Potential conflicts among villages		25	75				50	50		50		50

NI: Not important; LI: Less important; I: important; VI: very important.

this period. Therefore, as shown in Table 4, the Disagree Group considers coastal reef destruction (83%) and polluted sea water (74%) as very concerning effects.

The destruction of the coastal ecosystem was serious enough to make fishing livelihoods no longer viable, as the fishers of Dusun X work primarily around the SD mining grounds. The Agree Group generally considers the environmental impacts as less important because they do not directly affect the sources of daily income. In addition to the discussion in the previous section, difficulty buying fish and rising fish prices have become two important concerns for the majority of respondents, because fish is considered an essential local food source.

4. Discussion

Political control of tin resources reflects complex governance because it involves multilevel actors with diverse power, knowledge and interests. The tin mining industry is characterized by its destructive force, which can create conflict over the distribution of impacts and benefits in both political and economic terms. However, according to Hall et al. (2015), it is widely recognized that extractive industries need to gain and then maintain a social license to operate from local communities in the geographic proximity of operations, particularly, from those who are most directly affected by mining operations.

Decentralization brought about a natural resource paradigm shift from state-centred control towards regional control, which enabled the local community to play a more active role in the decision-making process of how their local resources are used (Agrawal and Gibson, 1999). Further, the shift in governance increasingly transferred authority over the mining industry to non-state actors (e.g. civil society and the market), corresponding to a focus on the ‘social’ dimensions of development and the need for greater public participation in decision-making (Prno and Slocombe, 2012).

First, SD was the driving force that pushed the affected local community into marginal spaces. In fact, the destruction of the coastal ecosystem was serious enough to make fishing no longer a viable livelihood. It is evident from our results that among each of the categories, the Disagree Group consisted mostly of fishers. This situation leaves them at a significant disadvantage because they lack assets, have limited options for alternative income sources and lack knowledge on how to mitigate or adapt to the severe negative impacts of SD operations. Almost two-thirds are day-wage fishers with unstable income, and slightly less than one-fifth of those day-wage fishers do not own land. In addition, this condition has forced them to find alternative income sources that are more sustainable, but the illiteracy factor, limited skills, and limited capital have become huge barriers for this marginalized group. While operations continue in neighbouring villages, they have become marginalized.

The results of this study are in line with Robbins' (2011) definition of the concept of marginalization, which offers a powerful lens to understand how the least powerful groups in society are vulnerable to socio-environmental changes. Robbins (2011) defined marginalized people as politically and socially marginal (disempowered) and as pushed into ecologically marginal (vulnerable and unstable) spaces and economically marginal (dependent and narrowly adaptable) social positions, resulting in their increasing demands on the marginal (increasingly limited) productivity of ecosystems. Further, social inequalities limit their livelihood options, leading them to degrade landscapes and occupy hazardous environments, which constrain their abilities to cope with environmental changes.

The affected locals are marginalized by two potential factors. The first is grey participation within the local decision-making framework regarding the issuance of social permits for mining operations. This second is an imbalance in the distribution of benefits and impacts generated from SD operations.

Public meetings should be a forum to accommodate all those involved in freely expressing ideas, aspirations, refutations, and opinions without force or external influence (Prno and Slocombe, 2012). Limited opportunities, feelings of anxiety, and a lack of confidence became reasons for the low participation of attendees during public meetings. Thus, they preferred to act as passive participants. Several interviewees did, however, point to ways in which the active participation of local elites during PCMs reflected the pattern of elite domination in the local power structure by using their power and influence to combat private gain. This leads to the centralization of the interests of local ruling elites and potentially marginalizes the interests of lower-level social groups, particularly the most affected groups. The absence of active and equal participation of all affected groups thwarted the social learning opportunity for the community, an underlying principle of the practice of democracy.

On the other hand, with increases in societal concerns relating to environmental issues, companies should ethically disclose both positive and negative impacts of their operations. Not surprisingly, however, companies focus on how to attract community support by providing the services they need, without emphasizing the negative side effects of their operations. Thus, the community, as a silent attendee, unaware of the real short- and long-term impacts, accepted the SD proposal. Ironically, there was also a growing belief among dusun fishers that they would generate instant income immediately simply by accepting the SD proposal. Further, they envied neighbouring villages who were reaping the economic benefits of SD operations.

Therefore, we see public participation in the decision-making process as *grey participation*. This is evidenced by the following situations. First, not all community members attended the PCM, and most of those who attended did so without actively participating because of the local political setting that gave priority to local elites. The second is the negligence of the company and the local government, both of which focused on convincing people of the benefits without fairly disclosing the potential negative impacts on the environment and how those

impacts would affect local livelihoods. Therefore, the community gave their consent without knowing and understanding the short- and long-term benefits and impacts.

Understanding the potential negative short- and long-term effects is important because the local community could have proposed mitigation and adaptation strategies for possible negative impacts. In addition, as regulated by environmental assessment legislation written in Environmental Protection and Management Law 2009 and Environmental Permit Regulations of 2012, transparency and disclosure of environmental impact assessment and licenses should be provided fairly through public announcement, participation, and consultation. However, the company showed negligence by not fairly disclosing proper information regarding the impact of suction dredging or describing how these sets of regulations would translate into action.

In the responses to the surveys and interviews, a question arose about how local people drew on their perceptions and gradually shifted their attitudes to support SD operations. This situation can be explained by the fact, as Prno (2013) suggested, that local acceptance is dynamic, inevitable, and time and context-specific—which means, thus, that it reflects local social, economic, and environmental conditions—and that community priorities, capacities, and expectations will vary depending on the setting. Therefore, local approval for SD operations also changes dynamically, depending on the desa/dusun condition—such as whether or not it meets peoples' expectations—and its contribution towards the region's wellbeing.

As shown in Fig. 10, high illiteracy, an economic gap, limited infrastructure, and the domination of the local elites became factors that triggered the marginalization process. SD companies, together with locals who had the same interests, took advantage of the lack of involvement and understanding of the locals who were at risk of serious potential impacts and threats to their livelihood. Additionally, the company emphasized only the benefits of SD instead of fairly disclosing the potential threats. These issues were exacerbated owing to the lack of availability of public infrastructure and expectations of incremental gains in economic status.

People who actively participate and have influence in the decision-making process are generally politically strong and usually experience minimal negative effects from the SD operations; they also have more opportunities to generate cash through participating in the committee. The committee holds a strategic position in the desa by bridging the locals and the company, particularly relating to the distribution of compensation and royalties. Those who are actively involved and dominate the committee are generally also the ones who do not have an interest in the sustainable management of coastal resources and who strongly support SD operations. Others, like the fishers, weakly participate in the PCM, even though their livelihoods' economic base, identity attachment, and socio-cultural practise are highly threatened by tin extraction (as fishing and mining extraction share the same ground).

In addition, fishers who do not own land and whose income is therefore highly dependent on the bagan owner are the most potentially marginalized. The livelihood insecurity drives some of them into unsustainable mining activity as an adaptation strategy, leading them into an even more vulnerable state. They respond to the ongoing changes and livelihood threat by either shifting their livelihood from fisheries based on mining activity, engaging in coastal mining through a profit-sharing mechanism with the seasonal migrant miners, or potentially converting the available land into mining ground. In summary, the marginality of these vulnerable landless dependent fishers who are facing difficulties has trapped them into maladaptation.

Resource governance matters for the environment and for the people who live close to extraction sites. Hence, we believe that people-oriented, practical approaches are necessary to understand the multi-faceted problems within a resource governance framework. Strong resource governance may result, on the one hand, in relatively less local environmental impact; on the other hand, under poor resource

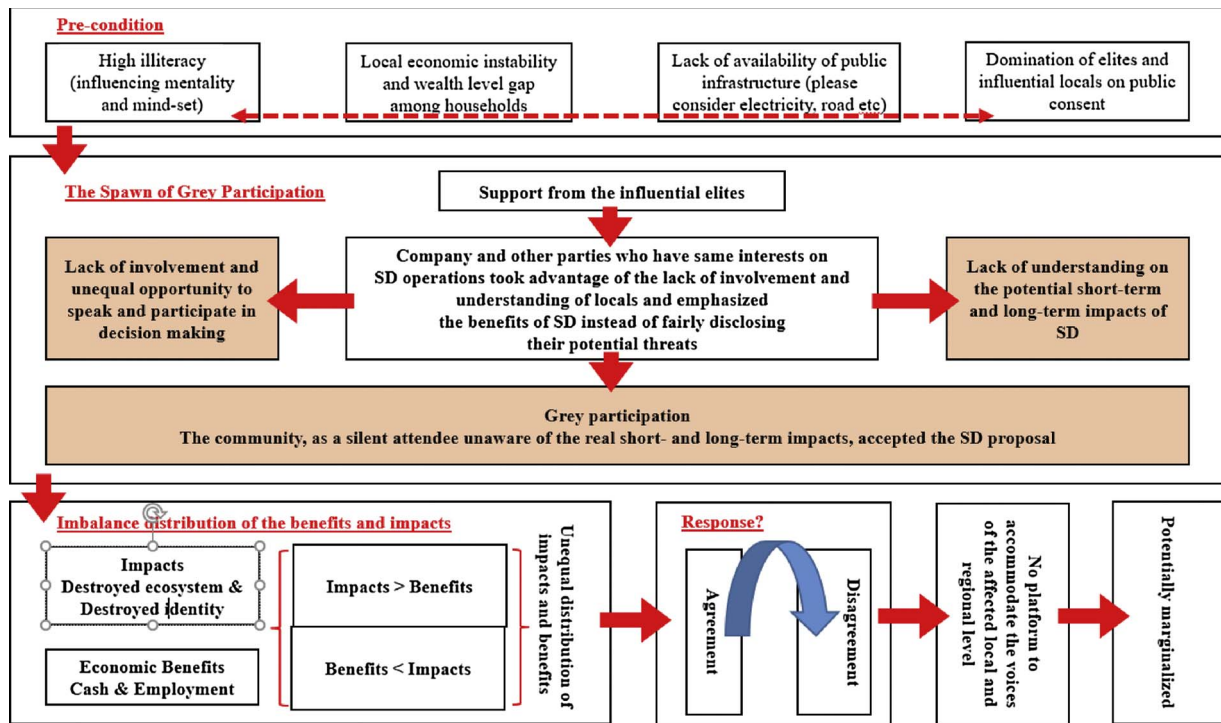


Fig. 10. Local Marginalization.

governance, companies are often lax in their efforts to protect local environments and local communities, leading to ‘resource curse’, whereby the poor stay poor and elites accumulate further wealth. We believe that well-governed resource extraction offers a path from poverty can be carried out justly. In addition, one of the key points for good governance is to have stronger institutions and policies: good governance means having good rules, strong oversight to enforce the rules, and the competence and willingness to follow them. Hence, we suggest the following points for potential improvement:

- Decision-making processes for issuing mining permits should seriously consider both justice and equity from the perspective of all related stakeholders to avoid conflicts of interest.
- The basis for assessing a mining permit should be according to a community’s perspective instead of primarily from a company’s perspective.
- Because the community does not share SD impacts equally, the company should allocate more benefits and royalties to those who are the most affected. In order to provide a reasonable compensation, a pre-assessment on household wealth conditions should be conducted to identify their economic condition, along with the impacts they experience because of SD activity.
- An agreement on revenue and compensation distribution and the allocation of social and environmental responsibilities should involve all parties and should ensure fair distribution.
- Before holding a PCM, small group discussions should be held to disseminate specific information to each community group, such as fishers or miners, so that all ideas and issues can be accommodated.
- Committee formation should occur in a separate forum after the PCM so that candidates can be mobilized from each group and not be dominated by local elites.
- We stress the importance of a proper communication platform, that is a top-down approach, as way to accommodate local voices. Such should stimulate transparency of information and dialogue on improved best practices in public consultation, community development, partnership, and collaboration agreements for local and compensation schemes. In addition, such an approach would

accommodate the least heard voices of those who are marginalized at the local and regional level.

5. Conclusion and recommendations

This study investigated how large-scale coastal tin mining marginalizes local communities who depend greatly on coastal resources in Bangka Island in Indonesia. The study showed that SD operations in Dusun X are an important part of coastal communities who have historically been highly dependent on coastal and marine resources. Initially, in 2009, most of the locals supported large-scale SD tin mining because they saw it as an instant source of income, but the unequal distribution of benefits and impacts to dusun inhabitants in later years became the primary reason for rejection. PCMs within the dusun were arranged by desa elites to discuss such issues as SD operation licenses, distribution of benefits, and royalties. The negligence of the mining company and the villages elites in not fairly disclosing both positive and negative impacts and the domination of local elites in meetings and committee membership reflect grey participation in the local decision-making framework on issuing social permits. Grey participation, which has emerged as the product of social political contestation within coastal resource governance in this tin-producing region, potentially marginalizes the most affected communities.

Access to benefits and impacts are not equally shared among all local groups. Community members who disagreed with SD operations and who are highly dependent on coastal and marine resources were adversely affected by SD operations, while those who agreed were less affected because they did not depend on coastal and marine resources. Consequently, people in the Disagree Group were forced to find alternative sources of income. Those who do not have access to land are considered dependent fishers, and if they have no alternative livelihood, they are vulnerable and potentially marginalized. Therefore, people-oriented and practical approaches are necessary to understand the multifaceted problems in complex coastal social-ecological systems. We strongly suggest that good mining governance be formulated to avoid larger negative impacts for both the community and the environment. Enhancing public consultancies and transparency will boost

the interaction and engagement between companies, the potentially affected community, and government representatives. The extensive field data from this study takes this work beyond the usual academic boundaries and makes the outcomes policy relevant. Efforts to catalyse policy change were made even before the study ended, not only for the marginalized community but also for coastal areas as a whole. The study encourages further investigation of how marginalized people might combat the changes caused by suction dredger operation, which was not a part of this research.

Conflicts of interest

The authors have no conflicts of interest to declare.

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