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Conflict Resolution in Coastal Resources Utilization among Fishermen and Unconventional Tin Miners

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ABSTRACT

Coastal as an open-access resource has the potential to cause conflict with spatial use. This research aims to analyze the conflict in the utilization of coastal resources among fishermen and unconventional tin miners. This research used a survey research method with qualitative descriptive research, including income analysis, employment opportunities, education, and health. Respondents in this research were fishermen and unconventional tin miners in Bangka Tengah district, including Batu Belubang village - Pangkalan Baru sub-district, Kurau village - Koba sub-district, and Baskara Bhakti village - Namang sub-district. Data collection using methods through observation, interviews, and documentation. Conflicts are analyzed through a stakeholder analysis approach with an onion analysis approach. The results showed that there were four main issues triggering conflict: 1) environmental issues; 2) social issues; 3) law violation issues; 4) economic issues. Conflict resolution that is collaborative with a negotiation approach that combines elements of the user community (fishing groups and unconventional miners) and the government known as Co-Management which avoids the excessive dominant role of one party in the management of coastal and marine resources, including equitable division of territory between fishing and mining areas, with reference to coastal and marine spatial regulations in the Bangka Belitung Islands Province, Indonesia.

Keywords: *Bangka Belitung; Coastal; Conflict Resolution; Fishermen; Miner; Resource; Tin*

1. Introduction

The economy in the Bangka Belitung Islands Province, in general, still depends on the mining sector. Most of the province's income is still dominated by tin production revenue. It can be said, infrastructure development in Bangka Belitung is contributed by the mining sector. Tin is the largest export, accounting for 83.37 percent of the total exports of the Bangka Belitung Islands Province. The main destination for tin exports, May 2015, was Singapore which reached US$ 32.82 million or 49.04 percent of the total tin exports (Badan Pusat Statistik Provinsi Kepulauan Bangka Belitung, 2015).

Coastal as an open-access resource, has the potential for spatial use conflicts. According to Fisher et al. (2001), conflicts caused by human needs (physical, mental, and social) are not met. As happened on the coast of Central Bangka district, for example, the case of unconventional mining pontoon burning by fishermen was the peak of the conflict. Triggers of conflict between tin miners and fishermen generally occur because fishermen are economically disadvantaged due to pollution of the sea and coast due to mining activities. This coastal management problem is expected to be resolved through research so that coastal management strategies are appropriate.

There are several types of tin mining activities, including inland mining and sea mining carried out by companies, as well as mining activities carried out by the community or known as community mining or unconventional mining. Tin mining activities at sea, have caused negative impacts on the environment, including reducing water quality, damaging coral reef ecosystems, and causing physical degradation of coastal habitats. As a result, tourism and fishing activities were disrupted (Bidayani, 2014). Sedimentation due to tin mining production in the sea can spread to the surrounding area due to waves, and cause the death of coral reefs (Manik, 2014).

Differences in interests among fishermen and unconventional tin miners in the use of resources in coastal areas cause conflicts. Unconventional mining activities are believed to cause a decrease in fishermen's income. This research is important to be conducted so that the interests of fishermen and tin miners in utilizing resources can be accommodated properly, without causing other new problems. This research is interesting because unconventional mining has become one of the people's livelihoods. The research objective is conflict resolution of coastal resource utilization among unconventional tin miners and fishermen.

2. Literature Review

A. Coastal Resources Management

Coast is a transitional area and interaction between terrestrial and marine ecosystems. Coastal is very rich in natural resources and environmental services. Coastal resources consist of biological and non-biological resources. The biological elements consist of fish, mangroves, coral reefs, seagrass beds and other marine biota and their ecosystems, while the non-biological elements consist of mineral and other abiotic resources on coastal land, surface water, in the water column, and on the seabed (Kementerian Kelautan dan Perikanan Republik Indonesia, 2002).

Community-based resource management is a strategy to achieve community-centered development (Sen & Nielsen, 1996). Community-based management is an approach to natural resource management based on the knowledge and environmental awareness of local communities that accommodate various interests (including government) in natural resource management called Co-Management (Ferrer & Nozawa, 1997).

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B. Impact of Tin Mining at Coastal Area

Prianto & Husnah (2009) explained that high sedimentation in coastal areas has caused changes in the coastal landscape. This is due to tin mining activities along the coast of Bangka Island. High mining activities along the coast have caused deepening due to the dredging of the seabed in certain areas and landfill to other areas.

Landfill activity on the seabed can damage the benthic organism community and other aquatic biota spawning sites. Suspended soil particles will cover the habitat, both aquatic plants, and soil surfaces and eggs of aquatic biota so that eggs cannot develop properly. This impact will cause a mass population decline which eventually in the long run can reduce the biodiversity of the waters (Prianto & Husnah, 2009).

According to Anggoro (2011), waste that enters coastal waters will experience concentration and accumulate in the aquatic ecosystem and can cause negative impacts. This process occurs if heavy metals are not spread by turbulence and ocean currents. Parts of pollutants that are not diluted and scattered or carried to the high seas will be absorbed or concentrated through a biophysical-chemical process. Furthermore, the heavy metal will be suspended in seawater and accumulate into bottom sediments (dispersed).

Tin mining activities produce waste (tailings) that are directly discharged into the sea. Waste from mining activities in coastal areas is generally waste containing heavy metals. It is known that the properties of these heavy metals easily settle to the bottom of the water and bind with other chemical components so that the possibility of accumulation of heavy metals in the bottom of the water also becomes greater (Riani & Surjono, 2004). According to Anggoro (2011), heavy metal is one of the parameters of waste as a source of impact in coastal waters.

Waste discharged from tin mining activities, both industrial-scale such as suction vessels and dredges or small-scale mining such as unconventional mining, contains heavy metals including Cr, Cd, Cu, Pb, Al and Zn (Henny, 2011). In addition to the quality of heavy metals in water is still above the threshold, the results of previous studies indicate that in the area of the former mining tin has poor water quality, with a pH ranging from 2.9 to 4.5 and the content of heavy metals Fe, Al, Pb, Cd, As and Mn are very high. The content of heavy metals can reach 5-8 mg/L (Brahmana & Firdaus, 1997). To improve water quality naturally takes 20-30 years (Kurniawan et al., 2014).

C. Conflicts in Resource Utilization

Utilization of coastal and marine resources are grouped into two: 1) Community groups with an interest in the production of goods (such as capture fisheries and aquaculture) and services (such as ports and marine tourism); and 2) Community groups who use the sea for waste disposal. The activities of these two groups have the potential to pollute the coastal and marine environment. Besides that, the interests of the two groups clearly conflict with each other. For that, regulations/policies are needed that govern the management of coastal and marine resources as a wise shared resource (Ostrom et al., 1994). A conflict occurs if the objectives of the stakeholders are not in line (Fisher et al., 2001).

Conflict in natural resource management can be caused by the limitations of natural resources and the ever-increasing need for the existence, function and benefits of natural resources. Changes in social, cultural, environmental, economic, legal and political conditions can create new interests in fisheries resources. Changes in these factors if there is a discrepancy, then it causes a potential conflict (Mitchell et al, 2003).

According to Prianto & Husnah (2009), efforts in managing tin mines on Bangka Island need to apply approaches that contain accommodative, supportive, protective and anticipatory

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elements. Accommodative approach, that is the management of an area that is able to accommodate the interests of the wider community without harming other parties. Supportive approach, that is efforts that can encourage development and preserve natural resources, especially aquatic ecosystems. Protective approach, that is able to protect resources ecologically and other aspects of the physical environment. Anticipatory approach, that is which is able to overcome conflicts in the use of space. Yunianto (2009) expressed another opinion, in order to solve the problem of tin mining in the Bangka Belitung Islands Province, it needed harmonization and synchronization of policies across sectors and at various levels of government. Some theories of resolution are dialogue, negotiation, mediation, and communication.

3. Research Methodology

This research uses survey research methods with qualitative descriptive research. The survey method was chosen to find out about the problem through a questionnaire. Data collection using methods through observation, interviews, and documentation. The sampling/respondent method used was the purposive sampling technique. Respondents in this research are the community (owner fishermen who represent the characteristics of the whole fisherman), and unconventional tin miners. The total numbers of respondents in this research were 70 people, consisting of fishermen and tin miners. The research sites included Batu Belubang village - Pangkalan Baru sub-district, Kurau village - Koba sub-district, and Baskara Bhakti village - Namang sub-district.

The socioeconomic impact of tin mining activities on capture fisheries business was analyzed descriptively quantitatively, including analysis of income, employment opportunities, education, and health. Qualitative descriptive analysis is used to explain conflict analysis. The conflict analysis approach uses stakeholder analysis (Ficher et al., 2001), the first to do is to describe and group the real issues that arise. The issue was obtained from the results of interviews with a number of stakeholders in the coastal area of Central Bangka district. The issue then analyzed using the onion analysis instrument as Figure 1. The goal is to determine the claims (position), interests, and needs of stakeholders. After the results of the analysis are obtained, a governance formula is sought in the management of the area, which can accommodate the various interests of the stakeholders.

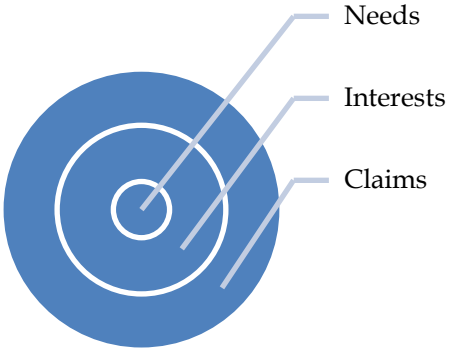

Figure 1. Onion Analysis
Source: Fisher et al., (2001)

4. Results and Discussion

A. Triggers of Conflict

Triggers of conflict in the utilization of coastal resources in Central Bangka district are classified into four, including 1) environmental issues, 2) social issues, 3) law violation issues, and 4) economic issues.

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1) Environmental Issues

Based on the results of the analysis, the main problem is the impact of unconventional tin mining on the aquatic environment is the brightness of water and mud. As happened in Batu Belubang village - Pangkalan Baru sub district, Kurau village - Koba sub district, and Baskara Bhakti village - Namang sub district. Based on the Environmental Status Report of Bangka Belitung Island Province (2016), Bangka district has a percentage of coral reef damage of 50% due to tin mining activities at sea, because the pores of coral reefs are covered by mining waste which is mud, thus making coral reefs damaged (Environmental Agency of Bangka Belitung Islands Province, 2016)

Based on the results of the research, the thickness of the mud in Batu Belubang village from the coast towards the sea ranges from 30-60 cm. This condition makes it difficult for fishermen to go fishing. Fishermen have to pay more to rent a barge; the fee is 6% of the total catch. The task of the barge is to bring the fish caught from the boat to the dock, and deliver the provisions of the fishermen when going to sea. There are around 25 barges operating in Batu Belubang village. The fishing gear used by the majority of fishermen in Batu Belubang village is *bagan tancap* (a fixed-structure lift net), *bagan apung* (from a floating platform (raft or catamaran)), *bagan perahu* (blanks net that operated from beneath or from the side of a single boat (the far side of the net being operated by poles)), and fishing line.

Based on the results of the research, Baskari Bhakti village also has a problem with low water brightness, and the thickness of the mud reaches 30 cm. The coastal area in this village has been divided, for fishing activities located in the Tanah Merah hamlet and tin mining activities located in the Bedeng hamlet. The boundary of the area is marked by wooden pillars towards the sea along one kilometer. The fishing gear used by the majority of fishermen in the village of Baskari Bhakti includes crab trawls, nets, and fishing lines.

The results of observations and interviews in the field, the problems in the village of Kurau are the same as the two previous villages including the brightness of the water and mud that causes silting of the estuary so that fishing boats cannot go out and enter the pier at any time because they have to wait for the water in high tide. Likewise, marine mining activities can cause sedimentation so that fish habitat is getting further into the open sea, and causing fishermen even further away to catch fish.

The result of the research, the direct impact changes in the brightness of the waters, which ultimately affect the fertility of the waters. In addition, the indirect impact is the farther fishing ground, the reduction in fish catches of fishermen, from the type and size of fish, and the change of work from fishermen to mine workers. A pontoon illustration for unconventional tin mining activities along the Batu Belubang beach is presented in Figure 2.

Figure 2. Unconventional Mining Pontoon on the coast of Batu Belubang village, Pangkalan Baru sub-district, Central Bangka district
Source: Research Documentation, 2019

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2) Social Issues

Analysis of social problems that arise as a result of unconventional tin mining activities for fishermen in the Central Bangka district includes children's education, fisherman health, and employment opportunities. The social issues that occurred in the conflict over the utilization of coastal resources in this study were obtained from two main sources that played a role, including tin miners and fishermen.

The results of primary data processing, related to education problems, as many as 73% of children in coastal areas in Central Bangka district did not continue their school activities due to economic problems. The children of fishermen do not continue to a higher level of school (high school) or college, because of uncertain income, which is very dependent on the season, and the high cost of catching fish. Fishermen have to catch fish as far as 30 miles because the waters around the coast are many tin mining activities (less than 2 miles).

The results of primary data processing, related to health problems, as many as 59% of fishermen already have health insurance (National Health Insurance (JKN/BPJS)). The rest, fishermen use their own expense to check their health or seek treatment. Fishermen are still reluctant to join health insurance because not all medical costs are covered by health insurance. But health insurance contributions must be paid regularly every month and that economically increases fishermen's expenses.

The results of the study related to employment opportunities, as many as 54% of fishermen stated that the quality of the coast in their area had an impact on fishing activities. Fishermen make an effort to catch fish by selecting a location where there is no mining activity, and the area is outside the coast of their village, so the distance is further. In addition, some fishermen in the Batu Belubang village also switched jobs to become barge boosters, due to the large fishing costs. Revenue as a barge booster is 6% of the total catch of fishermen who use his services, so it is felt more promising. Barge transportation as presented in Figure 3.

Figure 3. Barge Transportation
Source: Research Documentation, 2019

3) Law Violation Issues (Control of Unconventional Mining)

Controlling unconventional mining by law enforcement officials is an effort made by the local government, to reduce social and environmental impacts, and actually, unconventional mining activities violate the rules. For miners who are caught, they will be punished according to legal regulations, including seizure of the miner's pontoon.

According to Murty & Yuningsih (2017), unconventional tin mining became more widespread since tin was categorized as free goods (not monitored) and revocation of tin status as a strategic commodity. Tin is no longer monopolized by a State-Owned Enterprise and can be exported freely by anyone.

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The Provincial Government of the Bangka Belitung Islands issued Regional Regulation No. 7 of 2014 concerning Mineral Mining Management as an effort to tackle illegal tin management. The Central Government also issued Law Number 4 of 2009 concerning Mineral and Coal Mining.

The police conduct raids and control in their respective jurisdictions in the context of law enforcement to tackle the criminal acts of unconventional tin mining. Raids and enforcement were carried out together with the Regional Government and the Public Order Enforcers by confiscating the mining operations of the equipment to be used as evidence.

4) Economic Issues

The disparity in income between fishermen and tour operators and tin miners is undeniable, the main reason for the people of the Bangka Belitung Islands Province to rely on tin mining activities as economic support. The results showed that the monthly income of miners amounted to Rp 80,432,927, and capture fisheries amounted to Rp 5,439,444. This large income difference between fishermen and miners can trigger social inequality. Tin mining activities are difficult for the community to leave behind and have the potential to make other communities switch jobs to become miners.

B. Conflict Resolution Analysis

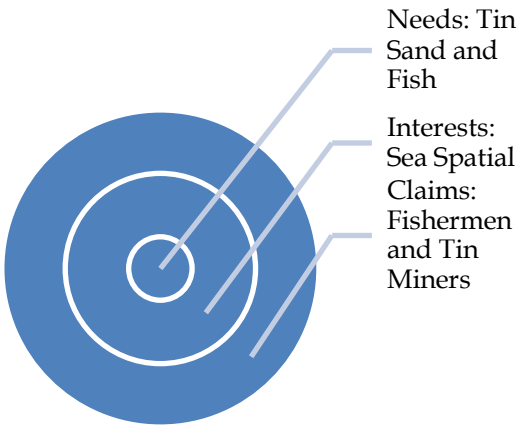

Figure 4. Onion Analysis
Source: Fisher et al., (2001)

Based on Figure 4 above, the main conflicts on the coast of Central Bangka district consist of: a) Claims: fishermen and tin miners; b) Interests: sea spatial; and c) Needs: tin sand and fish.

The solution to the conflict, as happened in Batu Belubang village, was carried out by negotiation. The coastal community in Batu Belubang village has the slogan "*Nelayan ya Penambang*" (fishermen are also miners). Because at difficult times, fishermen switch to tin miners and when there is no tin mining activity, they switch to working as fishermen. In Batu Belubang village, fishermen and tin miners can live harmoniously, because both are local villagers, although there are also miners who come from outside the village and even regions, such as Palembang - South Sumatra Province, Java Island, and other areas.

The results of the research showed that tin miners also help fishermen by paying a fee of 2 kilograms per day. These fees are coordinated by tin collectors, to then be deposited to the village government to help build infrastructure in the village such as houses of worship (mosques). The mosque that was built using part of the funds derived from fees from tin miners

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in Batu Belubang Village is presented in Figure 5. However, there are also fees that are directly given to fishermen individually.

Figure 5. Mosque from unconventional tin miner funds
Source: Research Documentation, 2019

Problems and issues that arise in the management of coastal resources require a collaborative management model that combines elements of the user community (fishing groups and miners unconventional) and the government known as Co-management through a negotiation approach that avoids the excessive dominant role of one party in the management of coastal and marine resources so that habituation of aspirations on one party can be eliminated.

This model, management of coastal and marine resources, is carried out together with related institutions, especially the community, government and other stakeholders in each process of resource management, starting from: a) Planning, which involves the community and other stakeholders in determining zoning in utilization of coastal space; b) Implementation, which involves the community in implementing coastal management policies; c) Utilization, which involves the community in the utilization of coastal resources; and d) Supervision, which involves the community in formulating resource management oversight policies. This opinion is reinforced by Setyowati (2012) who stated that the potential for conflict if not managed properly can cause losses, and if managed properly it can be an opportunity to make changes that are beneficial.

5. Conclusions

The main issues that trigger conflicts in the utilization of coastal resources are environmental issues, social issues, law violation issues, and economic issues. Conflict resolution is collaborative that combines elements of the user community (fishing groups and unconventional miners) and the government is known as Co-management through a negotiation approach. The coastal and marine resource management model is implemented by uniting relevant institutions, especially the community, government and other stakeholders in each process of resource management, starting from planning, implementation, utilization, and supervision, with reference to the marine spatial regulations in the Bangka Belitung Islands Province.

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