



Local wisdom of coastal communities in management of fishery resources in conflict areas of unconventional tin mining in Central Bangka Regency

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Abstract. The coast in Central Bangka Regency is one area of conflict of interest between unconventional tin miners and traditional fishermen. The impact of tin mining, which causes damage to the coastal environmental processes, such as the sedimentation, is the cause of conflict, thus threatening the sustainability of fishery resources and traditional fishing. This research aims to determine the local wisdom of coastal communities in the conflict areas of unconventional tin mining in managing fishery resources and to analyse the strategies for managing potential conflicts of interest between traditional fishermen and unconventional tin miners. The data collection technique was purposive, based on in-depth interviews with several informants who were considered competent, such as the chiefs of traditional fishing groups, village government, and community leaders. Data analysis was performed through emic and ethical approaches by cross-checking, summarizing, and synthesizing. The research results of the local wisdom of the community in managing fishery resources are the delineation of capture fisheries and tin mining areas using wooden sticks arranged in a row towards the sea for 1 km. The strategy for managing the potential conflict between traditional fishermen and unconventional tin miners is a compromise: compensation by unconventional tin miners to traditional fishermen.

Key Words: Central Bangka, local wisdom, conflict, fishermen, traditional.

Introduction. The sea is an open-access resource that has the potential to cause conflicts of interest in its utilization (Bidayani 2014). One of the conflict areas of unconventional tin mining in the Bangka Belitung Islands Province is Central Bangka Regency (Bidayani & Anggeraini 2019; Bidayani et al 2020). Coastal damage in Central Bangka Regency impacts the welfare of traditional fishing families, with income levels of USD 50.40 per month (Bidayani et al 2020). Traditional fishermen are affected by the coastal environment's damage due to their low fishing range (under three miles) and simple fishing technology. Traditional fishermen's fishing techniques are dominated by bagan tancap (which is included in the lift net category and whose operation relies on lights, in order to attract fish. The catch is composed mainly of Yellowstripe Scad (*Selaroides leptolepis*), also known as the Yellowstripe Trevally or by its local name, "Ciu", and white Sardinella (*Sardinella albella*), known by its local name "Tamban". Other techniques deployed by fishermen are shrimp and crab nets and fishing boats with outboard engines of a capacity of 3 gross tons (Bidayani et al 2020).

The impact of tin mining activities on land consists of rivers pollution and siltation (Pirwanda & Budi 2015). The remaining tin mining activities produce tailings that are discharged into the waters. Waste from mining activities generally contains heavy metals, namely Cr, Cd, Cu, Pb, Al, and Zn (Henny & Susanti 2009). Water quality recovery naturally takes 20-30 years (Kurniawan et al 2014). This impact causes a mass population decline, which can reduce aquatic biodiversity in the long run (Mentari et al 2017). According to Thushari & Senevirathna (2020), waste that enters coastal waters can cause negative effects, by concentrating and accumulating in aquatic ecosystems.

The environmental impact of unconventional tin mining causes conflict. Nurdjana (1994) defined conflict as a result of situations where desires are different or contradictory, so one or both are mutually disturbed. In conflict areas, local wisdom is a solution to solving problems. According to Zamzami (2011), local wisdom is the values of life that are passed down from generation to generation either in the form of religion, culture, or customs, generally in oral form in a social system of a community. Sulaiman (2011) defined local wisdom in more detail as “knowledge built by the community from generation to generation, related to the relationship with nature and natural resources”.

Local wisdom traditions for marine resource conservation include controlling tools, not using dangerous tools, a commitment not to catch and kill turtles, not to throw garbage into the sea and to plant mangroves (Zamzami et al 2017). As an example of environmental management, several regions in Indonesia already have a lot of local wisdom. Examples are Phanglima Laot, Awig-awig, and Mane’e. The wisdom applied by the local community greatly affects the sustainability of the local environment (Stanis 2005). Based on this background, this research aims to determine the local wisdom of coastal communities in unconventional tin mining conflict areas and its role in managing fishery resources, and to analyze strategies for managing potential conflicts of interest between traditional fishermen and unconventional tin miners.

Material and Method. This research was carried out from October to November 2022. The research location was the conflict area of unconventional tin mining in Batu Belubang Village, Pangkalan Baru Sub-district, and Baskara Bhakti Village, Namang Sub-district, Central Bangka Regency (Figure 1). The location determination was purposive, considering that the unconventional tin mining activities affected the two coastal villages.

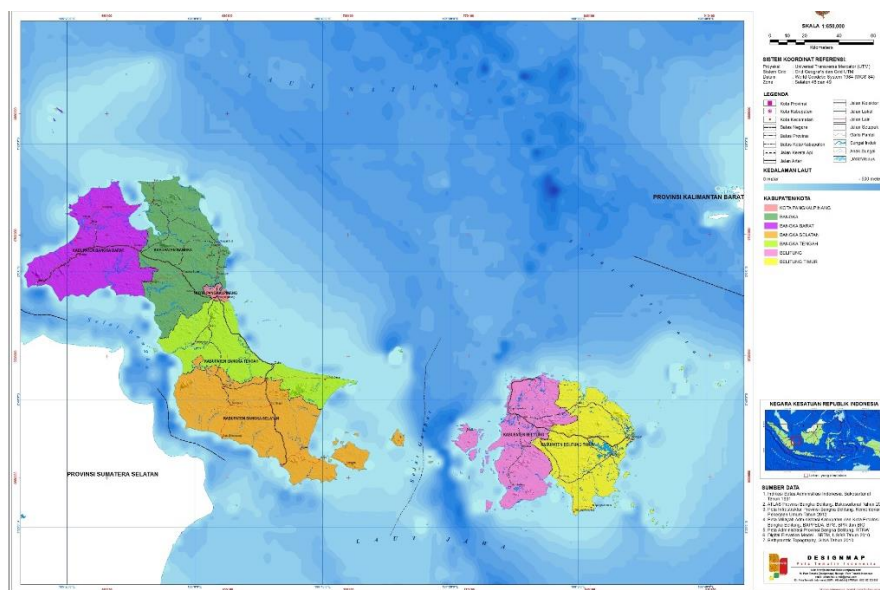


Figure 1. Location of research (Batu Belubang Village and Baskara Bhakti Village).

The method used in this study was the survey, utilizing a qualitative approach with a descriptive analysis. Qualitative research is a focused and multi methods inquiry strategy, natural and holistic, that emphasizes on the search for meaning, understanding, concepts, characteristics, symptoms, symbols and descriptions of a phenomenon, and is presented in a narrative (Yusuf 2017).

Sources of data in qualitative research are local communities and field observation. In this study, the data source was selected using a purposive sampling method, which is the collection of data from people who are considered to know the most about the issues to be studied (Bah et al 2020). The instrument in this research is the questionnaire that is administered directly to the local communities in Batu Belubang Village and Baskara Bhakti Village.

This study included primary and secondary data. The data collected was the local knowledge about traditional fisheries management. The semi-structured interview was carried out in the two villages. This interview was conducted through in-depth interviews with local experts purposively selected (Iskandar et al 2016; Iskandar 2018) who were considered competent to know traditional fisheries management. This interview used the guidelines for interviews made previously and developed during the interview (Husodo et al 2019). The informants included the chief of the traditional fishermen group, the village government, and the community leader. Secondary data collection was conducted through literature study. We also applied participants observation, in order to cross-check and validate the information obtained from the informants, by studying the daily activities of the community. According to Newing et al (2011), the analysis was conducted by cross-checking, summarizing, and synthesizing.

Results. The research results of the local wisdom of the community in managing fishery resources are the delineation of capture fisheries and tin mining areas using wooden sticks arranged in a row towards the sea, over one kilometer. The boundaries of this area must be respected by fishermen and tin miners as a mutual agreement not to interfere with one another. According to Kombiadou (2019), barriers are considered as components of the coastal resilience. Ostrom (2009) developed a theory for coupled social-ecological systems, in which socioeconomic dynamics, among other components, determine the response of a common pool of environmental resources to disturbances and shocks.

Traditional fishermen in Batu Belubang Village, Pangkalan Baru Sub-district, have different fishing gear than Baskara Bhakti Village, Namang Sub-district. Most fishermen in Batu Belubang Village use *bagan tancap*, with the catch mainly consisting of *Ciu* and *Tamban* fish. Meanwhile, fishermen in Baskara Bhakti Village use shrimp and crab nets. The average income of traditional fishermen in the two villages during the low season is around USD 20.44 USD per month, while during the fishing season, it is 50.52 USD per month even though they have a small and fluctuating income, fishermen do not want to change their professions because they have been in this business for decades. According to Bidayani et al (2020), traditional fishermen have individual characteristics for resilience, including insight, independence, relationships, initiative, creativity, humor and morality. Masselink & Lazarus (2019) defined coastal resilience as the capacity of the socioeconomic and natural systems in the coastal environment to cope with disturbances induced by factors such as extreme events and human impacts, by adapting whilst maintaining their essential functions.

The fishermen's ability to manage a business for 20-40 years is a consequence of their individual resilience. According to Latifah (2020), individual characteristics have a positive and significant effect on the work productivity. Another character is independence. Fishermen address the problem of coastal pollution in their area by not being emotional but looking for a way out together and living alongside unconventional tin miners who are also from the local village community, incidentally. According to Manizar (2016), emotional intelligence will produce qualified and successful human beings in their lives.

Interpersonal relationships between fishermen and unconventional tin miners in coastal communities are well established, thus minimizing conflicts of interest. The community's initiative in dealing with the problem is demonstrated by the division of the coastal area using wood planted one kilometer out to sea for fishing and tin mining activities, such as in Baskara Bhakti Village. Meanwhile, in the Kebintik village, there was no division between unconventional fishing and tin mining areas. Côté & Darling (2010) stated that facilitating coastal resilience is increasingly seen as a desirable outcome for coastal management, since a resilient coast is more able to accommodate disturbances driven by natural and anthropogenic processes than one that has limited capacity for internal change (Nicholls 1998).

The creativity of fishermen is useful while seeking side income from activities other than fishing, such as farming, odd jobs, and boat rental. Humor help fishermen facing problems without altering their happiness. The traditional fishermen's resilience

strategy against coastal pollution due to tin mining is innovative and creative. People are looking for side businesses such as renting boats, odd jobs, and farming. Other family members also help with the work, such as the women working as fish weighers at the fish landing site or teenagers selling young coconuts. According to Asmara & Rahayu (2013), to increase the competitiveness of small and medium industries, two significant strategies have to be developed: innovation and utilization of the social network, based on: 1) individual technical skills, 2) business models and strategies, 3) technology and innovation capability and 4) marketing skills.

Conflict management strategy. The strategy for managing potential conflicts between traditional fishermen and unconventional tin miners is a compromise: compensations are attributed by unconventional tin miners to traditional fishermen. According to Putra (2015), conflict management is a process-oriented approach that directs the forms of communication (including behavior) between actors and outsiders, by modulating interests and interpretations, as an algorithm for problem solving. The amount of the compensation is agreed upon between fishermen and tin miners, taking into account the daily acquisition price of tin sand mining and the reduction of the fishermen's income, reaching about 2.5% of the tin mining income. Factors that support the resilience of traditional fishermen are:

1) Individuals, namely, the ability to overcome problems. Traditional fishermen can find solutions to the problems they face. Even though they have a small income, they remain in their jobs and do not desire to find another job. According to them, working as a fisherman is inherited from parents who also work as fishermen. Decades of experience as a fisherman enables them to overcome problems, especially those caused by work. According to Patnani (2013), a form of behavior that indicates intellectual qualities is the ability to solve problems.

2) Family, namely family support. The strongest support comes from the wife. These fishermen admit that they worked as fishermen before they got married. Spouses support their husbands to survive from the practice of their profession, at their residence place. Moreover, according to Listyawati & Suryani (2017), spouses often increase the family income. Climatic conditions and uncertain catches have prompted fishermen families to adjust their lifestyle to their income.

3) Community, namely environmental support, to deal with pressure. Traditional fishermen are generally joined in fishing groups. This group makes it easier for them to access assistance from the government and support social support; for instance, if a member is sick, other members help by raising aid funds. According to Rahmawati (2023), fishing groups play an important role in improving people's living standards.

Discussion. Local wisdom of coastal communities in managing fish resources in tin mining conflict areas in Central Bangka Regency manifested by demarcating sea areas. This is in line with Rumampuk (2013), who stated that a community-based coastal area management system has been implemented in North Sulawesi Province. Dewi (2018) also explained that community-based coastal management is carried out with the right synergy and interaction between the government, the community, and local wisdom values. According to Kasworo (2017), zoning is necessary to create harmony and synergy in the utilization of coastal areas. According to Moita (2017), a pattern of coastal resource management based on the local wisdom values of the Tolaki ethnicity, such as the *mondonduri*, *mepuka*, *meboso*, *mearano*, and *melupai* traditions, is a necessity for safeguarding aquatic ecosystem entities from over-exploitation. Human understanding of nature and human ecological behavior towards its proximity natural elements form the local wisdom of the people. Traditional values, attitudes and behavior, with an ecological outlook on the local community's way of life, shape the ecological intelligence of a community, supporting an effective management of natural resources and of the ecosystem's conservation (Utina 2015).

The fishing community of Aceh Nangroe Darussalam has been aware of managing the potential of their resources, the coast, and the sea for centuries, which are complemented by the values of local wisdom and tradition. *Panglima Laot* (customary

structures of fishing communities in Aceh Province) cooperate with the local government to determine the timing of fishing and marine management systems. Sanctions are also applied as a consequence of violations. They respect nature and believe that if they "treat" nature wisely and gently, it will give them something in return. Efforts to empower traditional fishermen to improve welfare include training methods and developing micro-entrepreneurship management, fishery products diversification, and the ability to develop business capital (Nugroho 2015). Effective development communication strategies and programs will help communities become more aware of coastal resource management (Amanah 2010).

Conclusions. The methods developed by community groups stemming from their deep understanding of the environment are able to prevent conflicts of interest. This research concludes that the local wisdom of coastal communities can preserve fish resources in unconventional tin mining conflict areas in Central Bangka Regency. The strategy for managing potential conflicts between traditional fishermen and unconventional tin miners is a compromise.

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Conflict of interest. The authors declare no conflict of interest.

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