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Traditional Fisherman Resilience Strategy to Coastal Pollution Pressure Impact of Tin Mining in Central Bangka District

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Abstract. This study aimed to analyze the income of traditional fishermen, the characteristics of individual traditional fishermen who have the ability to resilience, the factors that support the resilience of traditional fishermen, and the resilience strategies of traditional fishermen against the coastal pollution pressure from the impact of tin mining. This research used a survey method with a purposive sampling technique. The research was conducted in Bangka Tengah Regency, covering Sampur village, Pangkalan Baru sub-district and Baskara Bhakti village, Namang sub-district. The respondents in this study were traditional fishermen with more than 20 years of experience. Data collection methods in this study included primary data and secondary data. Primary data was collected using questionnaires, observation and documentation tools. Secondary data was collected through a literature study. The data was analyzed using a descriptive quantitative method. The result of the research showed that the average income of traditional fishermen is IDR 300,000 - IDR 800,000 per month. Fishermen have individual characteristics including: Insight, Independence, Relationships, Initiative, Creativity, Humor, and Morality. The factors that support the resilience of traditional fishermen are: individuals (the ability to overcome problems; family (family support); and Community (environmental support to deal with pressure). The strategy of traditional fishermen's resilience to coastal pollution pressures due to tin mining is innovative and creative. So it is suggested that as an effort to empower traditional fishermen, the government can develop a capture fishery business into a larger business scale increase the income of traditional fishermen.

Keywords: Bangka, fishermen, mining, pollution, resilience, tin mining, traditional

1. Introduction

In general, the economy in the Bangka Belitung Islands Province still depends on the mining sector (BPS report 2019)[1], the dominance of tin commodity exports is 80.60% with the destination countries Singapore, India, Japan, South Korea and the Netherlands. Tin ore production from marine mines reaches 40% (industri.kontan.co.id 2019)[2].

The rest of the tin mining activities produce waste (tailings) which is disposed of into the water. Waste from mining activities is generally in the form of waste containing heavy metals (Riani & Surjono 2004)[3]. Wastewater from tin mining activities, whether on an industrial scale, such as suction boats and dredgers or small scale, such as unconventional mining (TI) contains heavy metals, namely Cr, Cd, Cu, Pb, Al and Zn (Henny 2011)[4]. To improve water quality naturally takes 20-30 years (Kurniawan *et al* 2013)[5].

The deposition of the bottom waters by tailings can damage the benthic organism communities and other aquatic biota spawning sites. Suspended soil particles will cover the habitat, both aquatic plants and soil surface and the eggs of aquatic biota, so that the eggs cannot develop properly. This impact will cause a mass population decline which in the long run can reduce marine biodiversity (Prianto & Husnah 2009)[6]. According to (Anggoro 2011)[7], waste that enters coastal waters can cause negative effects, including concentration and accumulation in aquatic ecosystems.



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Traditional fishermen are fishermen who utilize fishery resources with traditional fishing gear, small business capital and relatively simple fishing organizations. Traditional fishermen have a limited operating area around coastal waters, because they use boats without motorbikes (Mulyadi 2005)[8].

Mining activities in coastal areas, especially in Central Bangka Regency, are generally dominated by Unconventional Mining located under three miles. Traditional capture fishermen is a profession that is directly affected by the damage to the coast from the tin mining. This is because traditional fishermen have low fishing coverage (under three miles) and simple fishing technology. Therefore, this research will focus on resilience strategies, especially traditional fishermen against coastal pollution pressures due to tin mining.

The objectives of this study are: To analyze the income of traditional fishermen, to analyze the characteristics of individual traditional fishermen who have the ability of resilience, to analyze the factors that support the resilience of traditional fishermen, and to analyze the resilience strategies of traditional fishermen to the coastal pollution pressure due to tin mining.

2. Materials and Methods

The research was conducted in Bangka Tengah Regency, covering Sampur village, Pangkalan Baru sub-district and Tanah Merah Baskara Bhakti village, Namang district. The technique of selecting the location was carried out deliberately (purposive sampling), with the consideration that unconventional mining activities were found in both of these locations (illustration of the TI pontoon on the coast of Batu Belubang Village as shown in Figure 1.



Figure 1. TI Pontoon on the Coast of Batu Belubang Village (Source: Personal documentation, 2019)

The method used in this research is a survey method, namely research in which the main source of data and information is obtained from respondents as the research sample using a questionnaire as a data collection instrument.

Data collection methods in this study include primary data and secondary data. Primary data collection using questionnaires, observation and documentation tools. Secondary data collection through literature study. The informants in this study were two traditional fishermen with more than 20 years of experience.

This study generally aims to analyze the resilience strategy of traditional fishermen to coastal pollution pressures due to tin mining. The data analysis method used is the descriptive method, which describes the situation that occurs systematically and factually to describe and solve research problems.

The descriptive method aims to measure the attitudes, opinions, and perceptions of traditional fishermen towards social phenomena including: fishermen's income, characteristics of individuals who have resilience abilities, factors that support resilience, and resilience strategies.

3. Results and Discussion

Mining activities in coastal areas, especially in Central Bangka Regency, are generally dominated by Unconventional Mining (TI) located under three miles. Traditional capture fisheries fishermen are a profession that is directly affected by the damage to the coast from the tin mining. This is because traditional fishermen have low fishing coverage (under three miles) and simple fishing technology. Therefore, this research will focus on the strategy of resilience, especially traditional fishermen to the pressure of coastal pollution due to tin mining.

The income of traditional fishermen in these two villages is around IDR 300,000 per month during a famine, while in the fishing season it is IDR 800,000 per month. During the Covid pandemic, which began in March 2020 until now, it also suppressed the fishermen's economy. This is due to a decrease in people's purchasing power to consume fish.

Shrimp and crab catch for export have also decreased, because exporters as buyers of catches are constrained by exports. To meet the needs of their families, fishermen have side jobs, including working in unconventional mines or so-called 'ngreman', pepper farming, renting boats, or fishing for curves and clams.

Resilience is the ability that exists in individuals to recover from stressful conditions, be able to adapt and survive in these conditions (Furqon 2013)[9]. According to (Nurinayanti and Atiudina 2011)[10] Resilience is the ability to adapt positively when conditions are unpleasant and full of risks.

Traditional fishermen have individual characteristics for resilience, including: Insight, independence, relationships, initiative, creativity, humor and morality. Insight, this attitude is shown from their ability to manage a business ranging from 20 - 40 years. Independently, fishermen address coastal pollution problems in their area, by not being emotional. But looking for a solution together, and be able to live side by side with unconventional tin miners who are also local villagers. According to (Wolin 2009)[11], there are seven characteristics of individuals who have the ability of resilience, namely: 1) insight, namely the ability to ask oneself and answer honestly; 2) independence, namely the ability to take distance both physically and emotionally from the source of the problem; 3) Relationships, namely developing mutually supportive and quality relationships; 4) Initiative, namely a strong desire to be responsible for the problems at hand; 5) Creativity, namely the ability to find alternative solutions to problems; 6) Humor, namely the ability to find happiness in any situation; and 7) Morality, namely the ability to live well and productively.

The factors that support the resilience of traditional fishermen are: 1) individuals, namely the ability to overcome problems; 2) Family, namely family support; and 3) Community, namely environmental support to deal with pressure. The strategy of traditional fishermen's resilience to coastal pollution pressures due to tin mining is innovative and creative. The factors that support resilience are divided into three, namely: 1) individuals, such as intelligence, ability to overcome problems, regulation of emotions and optimism; 2) Family, such as family support; and 3) Community, such as environmental support to deal with pressure (Cubbin 2001)[12].

Fishermen are grouped into four groups, namely: 1) subsistence fishermen, are fishermen who catch fish to fulfill their own needs; 2) Original fishermen, are fishermen who catch fish for commercial purposes on a very small scale; 3) Recreational fishermen are fishermen who catch fish for pleasure purposes; and 4) Commercial fishermen, are fishermen who catch fish for commercial purposes, both large and small scale (Charles 2001)[13].

Traditional fishermen in Sampur village, Pangkalan Baru sub-district have different fishing gear than fishermen in Sampur, Baskara Bhakti village, Namang district. The majority of fishermen in the village of Keb spot use chart tangcap fishing gear, with catches of ciu and tamban fish. Meanwhile, the fishermen in Baskara Bhakti village use shrimp and crab nets. Fishing boats use 3 GT outboard engines.

The interpersonal relationship between fishermen and unconventional tin miners in coastal communities is quite good. To minimize conflicts of interest. Community initiatives to deal with problems are shown through attitudes, among others, to divide the coastal area using wood planted one kilometer to the sea, for fishing and tin mining activities such as in Baskara Bhakti Village. Meanwhile, in Keb spot village, unconventional fishing and tin mining areas were not divided.

The creativity of fishermen is shown, among others, by looking for side income from activities outside fishing, such as gardening, odd jobs and renting boats. Humor, a problem fishermen face, does not make them lose their happiness. Some examples of activities to entertain yourself include listening to music with a fairly large sound system at the fishermen's residence that can be heard up to a radius of several meters, and tours to the island.

Morality, this attitude is shown through their ability to manage the household well. They respond to economic problems because of their minimal income by trying to find additional income. In addition, government assistance programs such as fishing gear and boat engines can help reduce production costs.

The strategy of traditional fishermen's resilience to coastal pollution pressures due to tin mining is innovative and creative. Namely, people looking for side businesses such as renting boats, working odd jobs, and gardening. Other family members also help work, such as fishermen's wives working as fish weighers at the fish landing sites, fishermen's children who are teenagers who trade young coconuts and others. Suhartono (2007)[14] states that strategies for survival against economic shocks can be carried out in various ways which are grouped into three: 1) active strategies, namely optimizing family potential, such as extending working hours; 2) Passive strategy, namely reducing family expenses, such as clothing and food; and 3) Network strategy, namely establishing relationships with the social environment, such as borrowing money from neighbors, banks, shops or money lenders).

4. Conclusions

The conclusions of this study are:

1. Factors that support the resilience of traditional fishermen are: Individual, namely the ability to overcome problems; Family, namely family support; and Community, namely environmental support to deal with pressure.
2. The strategy of traditional fishermen's resilience to coastal pollution pressures due to tin mining is innovative and creative.

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