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The Irony of Mineral Rich Island: the Root Cause of Poverty-Stricken Local Fisher in Bangka Island and the Proposed Empowerment Model

Muhamad Fadhil Nurdin[#1], Hadiyanto A. Rachim[*2], Budi Sutrisno[#3], Aditya Candra Lesmana[*4]

Department of Sociology, University of Padjadjaran, Jl. Raya Bandung Sumedang KM.21, Jatinangor, Jawa Barat, 45363, Indonesia
E-mail: [#1]m.fadhil.nurdin@unpad.ac.id; [#2]hadiyantoarachim@unpad.ac.id; [#3]budi.sutrisno@unpad.ac.id; [#4]adityalesmana@unpad.ac.id

***Abstract*— Coastal communities in the Isle of Bangka Island are mostly living in poverty. Their life depends on activities associated with the fisheries sector, thus vulnerable to fluctuations of catchment due to seasonal fishing nature. On the other hand, the negative impact of modernization also led to excessive exploitation of marine resources and aggressive tin mining activities in the offshore that lead to marine pollution. This study aims to investigate major factor and the root cause of poverty trap facing by fisher community in Bangka Island. In addition, it intends to formulate the strategic model to alleviate the poverty of the fisher community in Bangka Island. Primary data collection in this study was carried out by using in-depth interviews and Focus Group Discussion (FGD) with stakeholders involved in eradicating poverty in the fishing community. The result of this study shows that local fisher poverty is closely related to technology deployment. Local fishers have only possessed limited fish processing technology as well as limited fish catchment equipment. While at the same time, tin miners own advanced technology in supporting their activities. It is suggested that empowerment model for dealing with poverty in the fishing community emphasis on the urgency for cross-sector integration between the civil society organization (environment), the cooperative (business), fisher community, and local and central government in alleviating poverty.**

***Keywords*— poverty; tin mining; fisher community; empowerment model.**

I. INTRODUCTION

Indonesia is the world's second-largest tin exporter while Bangka-Belitung produces about 90% of Indonesia's tin. The majority of tin production in Indonesia is exported to Singapore (58%), Malaysia (13%), Japan (7%), and the Netherlands (6%) [23]. The consumers of this mining commodity are well-known global electronic manufacturers, cell phone manufacturers, or computers [1].

Since the 18th century, Bangka island has been mined for extraction of tin. From the early 2000s, there have been unconventional mining activities. These illegal activities not only take place onshore but also offshore, which destroy forests and the sea habitat. An investigation conducted by Friends of the Earth revealed that two of the world's smartphone manufacturers use tin materials originated from Bangka Island, Indonesia [1]. Regarding this report, tin mining has destroyed forests, agricultural land, damaging coral reefs, and harming residents. Also, it has damaged the local ecology, ecosystems, and destroyed more than half of the island of Bangka in the past few decades. A similar finding was reported that one of the state-owned enterprises (BUMN), was a supplier for smartphone manufacturers as well as suppliers for telecommunication devices [2].

As a result, this area has suffered severe environmental damage. Ironically, this mining sector turned out to pose negligible impacts on the welfare of its people. Bangka Belitung is the second poorest province in Sumatra Island after Aceh, which was also impoverished by the Tsunami disaster.

This is consistent with a study conducted by Obi [18] in the Nigerian oil boom, a major benefit of oil went to transnational companies (global) and elite national politics, with little or none to the wider society. Obi [18] continues that Corporate Social Responsibility programs undertaken by the transnational companies have not adequately addressed the demand of the people. Economic development only pays little attention to the marine sector. After a significant period, it was realized that such a development paradigm did not carry enough “trickle-down” effect as initially expected. Consequently, it affected in the numerous pockets of poverty found throughout the fishing communities.

A study in mining producing region Krobo in Ghana [19] shows that local institution may hamper the benefits from natural resource to be enjoyed by the local people. The result indicates that traditional councils and local assemblies have blocked the transparency attempt by the national government. It is done to preventing people from access to adequate compensation and other benefits from mining.

Given the traditional power of chiefs, local people have no options in obeying the corrupt system.

In their study observing natural resource-rich region in the Chinese Northeast Region from 1998 to 2013, they found no impact of resource curse at the national level. However, the impacts are observed in local regions such as Yellow River center, northeast and northwest regions as well as Yangtze River center and southwest regions. An important factor in alleviating is such impact on resources and environment regulation policy, economic policy and regional location [20].

Douglas [21] has also observed resource curse in the study of regional production in Appalachian counties, eastern United States during 1970-2010. The presence of coal has been correlated with a slow pace of economic development. It is partly due to human capital accumulation and retention. Given no requirements for high skill labours, abundance workers in coal mining areas have no incentives to continue their studies at a higher level. One possible explanation is that the coal industry does not need a sophisticated refining system.

Fishers, as part of the communities living in coastal areas in Indonesia, are known as areas of poor, slums, and underdeveloped communities. This condition is ironic when compared to the coastal areas that are considered rich in natural resources and could be economically exploited. The image of fishers is still synonymous with poverty. They are even called the poorest among other community groups (the poorest of the poor). Studies on groups of impoverished fishers, states that fishing community groups are considered the poorest group in Indonesia [4], [7]. In the same vein, if they compared to the agricultural sector especially laborer and traditional fishers, they could be classified as the most impoverished social layer [5], [8], [12].

Although there have been numerous social programs being rolled out for the impoverished coastal communities, in general, these programs have not made much impact in improving their lives [11]. One of the causes of the lack of success of these government programs in eradicating fisher poverty is the top-down approach in policy formulation. The policies implemented tend to be too general even though the problems faced by the fishers are very diverse and often very local specific [16].

The poverty of fisher in the presence of abundant natural resources, i.e. fish, is resembling what is known as “resource curse”. This phenomenon is mostly taking places in mining regions. It is useful to draw some examples here.

Such condition has also been happening in Bangka Island. Given the environmental issue faced by tin miners in the land area, gradually tin mining activities have been taking place in offshore. Both big Mining Corporation undertook these activities, they are the state-owned enterprise PT. Timah and the small medium sized illegal miners. In particular, these illegal tin miners dump the tailing back into the sea, depriving Coral Sea. A study conducted by the local government environmental agency showed increasing sedimentation on the offshore due to this tailing dumping activity [27]. The deprivation of Coral Sea resulting in the decaying of fish habitat has reduced the number of potential fish available in the sea for local fishers.

Moreover, sedimentation in the offshore is causing local fishers to go farther to the sea to be able to find fish. It is recorded that before the mining activities took place, local fisher was normally gone between 2-5 miles to the sea. Now, they have to go even for 15 miles [28]. Most of the boats used by local fisher do not have sufficient technology to go that far.

Based on the aspects stated above, the research questions in this study can be formulated as follows: (1) What are the major factors that aggravate the poverty of fisher community in Bangka Island? (2) Why do the fisher community in Bangka Island trap in poverty? (3) What is the ideal recommendation to alleviate the poverty of the fisher community in Bangka Island?

According to the problems above, this study aims to: (1) identify the major factors that aggravate fisher community poverty in Bangka Island; (2) investigate the root cause of poverty trap facing by fisher community in Bangka Island; (3) formulate the strategic model to alleviate the poverty of the fisher community in Bangka Island.

This paper has been divided into four parts. The first part provides the rationale of the study and a brief literature review. The second is concerned with the methods and material used for this study. The third part presents the findings of the research, focusing on the three-component, poverty, environment pollution, and hope. Lastly, the final part gives a summary and recommendation.

II. Material and Method

This study employed qualitative methods to determine the major factor of fisher community poverty. Explanatory research was performed to obtain an in-depth understanding of the nature of problems underpinning fisher community poverty. For this study, nonprobability sampling, particularly purposeful sampling technique [24], was applied to discover the condition of poor fisher community in the coastal areas of Pangkal Pinang City, Bangka Belitung Islands Province (Figure 1). The fisher community in the district of Pangkal Balam, a district of the coastal area in Pangkal Pinang City, was selected. Fifteen local fishers have been acknowledged to participate in the interview session. These participants are selected based on poor criteria. Additionally, we also conduct an interview with WALHI, a local NGO concerning about environmental issue. This research was carried out starting in March 2018 until February 2019.

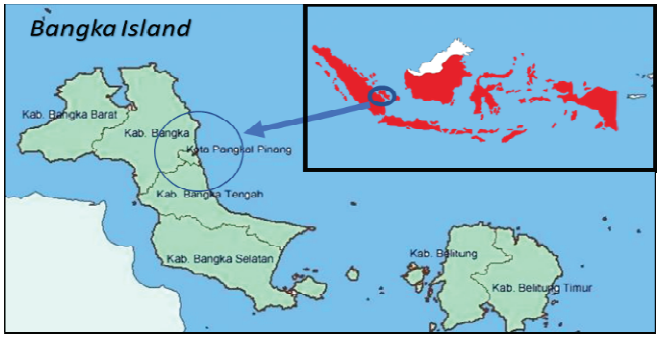

Fig. 1 Map of Pangkal Pinang City

The primary tool in this study is an interview, including semi-structured and unstructured. The reason for conducting

interviews is to understand the experiences of the selected fishers concerning poverty and discuss the meaning that they make of their experiences [13]. Semi-structured interviews were conducted to understand ways in which poor fisher community empower their members, as well as the challenges and constraints faced. Unstructured interviews are often used in preliminary research, even for more in-depth research on informants. Based on the analysis of each participant's response, the researcher may raise a variety of subsequent questions that are more directed and deemed appropriate because the informal approach is not sufficient in extracting in-depth information from informants. In conducting interviews, tools such as tape recorders, pictures, brochures and other materials were utilized to support the sessions running smoothly.

Observations were carried out to gather rich data of the social life in a natural setting, particularly the living conditions of the local fisher community. The location used as the research area is Air Itam Village, Bukit Intan Sub-District, Pangkalpinang City, and Bangka Belitung Islands Province. According to data obtained from the Department of Fisheries and Maritime Affairs of Pangkalpinang City, the number of fishers in the Air Itam Village in 2016 was 79 people and was the second largest number of villages after Ketapang Village. Air Itam Village is one of the villages in Bukit Intan Subdistrict, which is the No. 2 Subdistrict with the Poorest Population in Pangkalpinang City [10]. Observation targets include infrastructures such as social and public facilities, access to roads and transportation, fish processing equipment, cooperation (*koperasi*), and environment. Field notes have been used to support other tools, interview, and observation to record ideas, to record any issues and difficulties during data collection.

Lastly, documentation study as secondary sources of data that "covers materials sourced in a printed copy, electronic, and broadcast media formats" [22]. The data targeted in this study include government reports, non-government organization reports, civil society organization report, or documents related to the empowerment programs for the poverty-stricken communities, especially fisher living within the coastal area.

III. Result and Discussion

A. Environment Perspective: Effect of Mining Exploration

The post-industrial era could be indicated by the rising domination of machinery and electronic devices. The digital world must be accessed with relevant technological devices. This period has illustrated industrial production of raw material, particularly tin mining, for houses factories and infrastructure. Subsequently, there is a growing demand for tin as feedstock to manufacture electronic components such as laptop, tablet, and smartphones. Mining companies prefer to do extraction activities explore in developing countries, namely due to less stringent environmental regulation and cheap labor cost [18], [21].

Bangka Island suffered from severe environmental damage due to tin mining, which was not environmentally responsible [2]. Changes in the environment began to be felt by the local community due to mining. For example, temperatures continue to rise, floods, and some areas that experience drought. Bangka's Sea is one of the world's major coral reef locations. Mining causes sedimentation up to coral reef destruction (bleaching) [26].

TABLE I
Five Biggest Tin Producer Countries [29]

#	Country	Production (metric ton)		+/- (%)
		2011	2010	
1	China	100,000	155,000	3.2
2	Indonesia	55,400	57,100	-2.9
3	Malaysia	40,300	38,700	4.1
4	Peru	30,200	36,100	-16.2
5	Thailan	23,900	23,500	1.7

Consequently, fisher's catch has been reduced by 80% after three years of the initial tin mining activities in the offshore, according to WALHI [25]. Not to mention, tin mining is now rife in the shallow sea near the coastline. Not the only sedimentation can spread to a radius of more than 20 kilometres, but the marine ecosystem is also destroyed and polluted [2]. After decades Bangka Belitung was dredged for global tin production, mining has exceeded the capacity of the coastal environment. Moreover, there is a danger of radioactivity exposure. As indicated by WALHI, radioactive exposure in Bangka is three times higher as compared to normal exposure due to the presence of *radon*, one of the pure radioactive ingredients [2]. Matras Beach and Pasir Padi Beach are examples of declining seawater quality due to tin and sand mining off the coast. One individual from National Walhi Energy and Mining Campaign state that:

> *"Tin mining has damaged 65% of the forest area and more than 70% of the coral reefs around Bangka Island. Also, fifteen rivers are now contaminated with waste and effluent associated tin extraction, and hence, access to clean water is becoming a problem for more than half the population on Bangka Island. Also, mining is very dangerous, since the beginning of 2012 more than 60 people has lost their lives in relation to mining activities mostly due to accidents such as being buried or trapped underwater"[32].*

Fig. 2 Illegal floating mining in Bangka

Furthermore, conflicts between fishers and miners often occur. Fishing communities have been polarised into two groups, pro and against tin extraction in the coastal and offshore. For the communities that support the tin mining carried by extraction vessels, which have started since 2014, they receive financial gains from the profits made by tin extractors. Whereas the fishing community who are against mining activities, they refuse because the population of fish has drastically diminished due to damage in the coastal ecosystem. Fishers are forced to sail further to deeper water

to catch fish while they have constraints with their modest fishing boats that they have. "Problems arise recently in the coastal area since the tin extractor vessels operate at sea; they cause the seawater becoming dirty and muddy. We do not like this. Even though there are various species of fish, it is difficult to catch fish near the coast" (Fisher 03).

As society change, the criteria of poverty are adjusted. Most people regard them as a necessity, but in the context of Bangka, the necessity is a healthy environment. The relative poverty of fisher in Bangka has illustrated that there are other aspects of individual conditions generating poverty. Fisher communities have disadvantaged against the tin mining exploration in order to manufacture massively technological devices. The system that perpetuates the hegemony of exploration without considering the effect of environment, economy, and society should be blamed as the main factor of the amplified poor community. This crisis contributes to shaping the probability that people experience poverty.

B. Economic Perspective: Dependency Trap

According to the poverty data in the city of Pangkal Pinang in 2011, there were 5000 households, which categorized as low-income families. While in 2015, there was a significant increase, around 3000 households, reaching 8000 poor households/families. Therefore, the municipal government of Pangkal Pinang formed the Poverty Prevention Communication Forum. However, the efforts have had yet to touch the lives of poor fishermen families around the coastal area of the city of Pangkal Pinang. In September 2017, the population of poor citizen (residents with per capita expenditure per month below the official poverty threshold criteria) in Bangka Belitung continued to rise, up to 5.30 per cent, while in March - September 2017, only 5.20 per cent, meaning that the poor population from March 2017 to September 2017 were also increasing [30].

This poor fishing community can be categorized as absolute-relative poverty. Absolute poverty occurs because of the limited resources possessed by fishermen in the City of Pangkalpinang. Limited resources such as traditional fishing gear, the power of a ship's engine, which is only able to reach coastal areas, are increasingly diminishing in fish catches and quite old boats which can endanger fishers if used for fishing.

Fish products that are only sufficient to meet the family's daily food needs from fishers also show that poor fishers have the character of absolute poverty. Our interviews session reveal that fish catchments mostly were only sufficient to pay for the boat’s gas and leave only a modest amount of money for the fishers. Sometimes, even local fishers suffer loses. This condition shows that fishers who have limited source systems to go to sea tend to get very uncertain benefits.

Income generated from fishing activities is approximately 2 million Rupiahs per month, revealed some of our interviewees. This is a significant decrease as compared to their monthly income before tin mining activities took place in the offshore, which may reach up to 20 million Rupiahs per month. It is also supported by [30], which reveal that per trip income of local fishers has been reduced significantly from normally 300 thousand rupiahs (around 2008, when no tin mining activities) to just 70 thousand rupiahs nowadays.

Because of low income that is only sufficient for family food needs, the fishing community that experiences absolute poverty does not bring sick family members for treatment. The efforts, which were then carried out by this vulnerable community, were treating family members with traditional medicines found in the neighbourhood around the residence. In the other cases, if there is no cure for the illness, the sick family member will be brought for treatment when the money has been collected for the cost of treatment or sometimes choose debt to neighbors and families who have money.

For fishers who have the category of relative poverty, the primary source of poverty is the absence of supporting resources that are able to create opportunities for economic improvement to the fisher community. For the fishers who belong to the category of relative poverty, generally, they have more income than the capital spent in one-time fishing. Despite having more income, fishers in the category of relative have limitations to improve their welfare.

Limitations experienced are related to business development efforts from marine products obtained. Based on the data in the field, it indicates that the fishermen directly sell the fish they get to the collectors they call bosses. The price of fish offered by bosses to fishers is quite varied based on the quality and size of the fish obtained. The bosses then sell to third parties at higher prices and even most bosses. They also export fish caught by fishermen to Singapore and Malaysia.

Both fishers who belong to the absolute and relative categories of poverty have relatively similarities, namely powerlessness, which creates vulnerability in their social lives. The helplessness of the fishermen manifests itself in buying and selling activities and the absence of fish processing efforts that should have provided more excellent benefits to the lives of the fisher community. In the activity of buying and selling fish, the limited information and network caused them not to get the right price for the fish they sold. They tend to depend on the price of fish to the bosses who have been holding the fish they get. This finding supports previous research that market failures become challenges related to negative external effects of fair market [33].

This dependence has an undesirable impact because the bosses can then play the price of fish while on the other hand, the fishermen who do not know about the price of fish can only accept because of demands to fulfil their family's life. In other aspects, the lack of support from various sectors to develop a fish management business has caused fishers to become very dependent on the bosses who hold their catch fish.

C. Weather Perspective: Untoward Incident

The majority of poor fishing community, approximately 75%, found in the Air Itam Village, Bukit Intan Sub-District, Pangkalpinang City, are still coastal fishers. The mention of coastal fishers is given because the fishing area of the fishermen is located around the coastal area. The coastal area is a meeting area between land and sea, towards land covering both dry and submerged land which is still

influenced by the characteristics of the sea such as tides, sea breeze and seepage of saltwater. Sea-level includes parts of the sea that are still influenced by natural processes that occur on land such as sedimentation and freshwater flow, as well as those caused by human activities such as agriculture and pollution [3], [8].

Coastal fishers in the study area have fishing grounds in a radius of 5-10 miles away from the shoreline. The choice of location for fishing from fishers relates to resources owned such as fishing gear in the form of fishing nets, to which boats are used. The majority of fishers, approximately about 55% of them, use boats with an engine power of 5-8 HP, which have an impact on reaching further fishing locations. Fishing carried out by fishermen in quantity depends on the boat, fishing equipment used as well as other factors such as season and high tide. With boats and fishing equipment that are suitable and feasible to operate, the catch becomes better and can provide a guarantee of life for the household [5], [6]. However, current boat technology used by the local fisher is not sufficient to adapt to this change. While it is true that the government have been starting to assist for the provision of this boat, obstacles remain due to the high operational and service cost of the boat that is dealt with the local fisher, revealed our interviewees.

Fig. 3 Local fisher boats

The weather (west winds) is considered one of the significant factors in the lives of fisher in the coastal area of the city of Pangkal Pinang. The main issue for fishers is that during the monsoon season, there are big and dangerous waves. Also, it has a gust of winds accompanied by heavy rain and thunderstorms, which make it challenging to catch fish. Moreover, most of the coastal their boats are not equipped with compass or navigation systems. During this season, they tend to do preparation jobs such as mending their nets, fixing or oiling their boats.

In the life span of being a fisher, it is vital to maintain physical strength in carrying out work, including dealing with sea breezes, as well as learning and the importance of knowledge and skills in managing and riding boats as a means of fishing.

> *"To improve family welfare, over time, we borrow money. With this money, we can buy a small boat, but after a while, the money runs out to pay off the debt. When the money ran out, and the wooden boat was damaged in that season, I was forced to buy a used boat and could no longer afford it. Finally, until now, I worked with other people as helpers on a large fishing boat" (Fisher 02).*

This situation is undoubtedly a problem, especially for those who have dependents to support. With low education qualification, it is a daunting task to manage their finances. The further impact of extreme weather on family life is on their future generation.

> *"With this income, our children are barely enough for primary school. Finally, they will sail out and become fishers too. It is how we live from generation to generation" (Fisher 01).*

D. Between the Hope and Reality

Environmental pollution and poverty are the negative images associated with the fishing community on the island of Bangka.

> *"In essence, tin mining activities in Bangka are not only damage the forests, mangroves, and also the sea habitat. The central government must act on this issue. If left ignored, Bangka Island will experience a significant disaster and threatened to sink. In 2016, the deterioration impacts had already felt by the Bangka residents; various areas were flooded to as high as two meters. That is the impact caused by the environmental deterioration "(Walhi Bangka-Belitung Director).*

From the results elaborated above, in this context, respondents are hopeful for government to perform its role significantly. One individual stated that:

> *"The role of the government that we hoped is providing generous support to fisher. However, there are many highly bureaucratic requirements for receiving donations, especially about the allocations for poor fisher and education for children of fishers. If I suffer an illness for two weeks, I would not have any income for that period. At the same time, I have no savings; eventually, my children would drop out of school and forced to do the same job as another fisher as well as to earn a living." (Fisher 02).*

Moreover, another commented:

> *"We hope that the government sustain assistance and pay more attention to the fate of poor fisher community because by improving our lives, the impacts can be fruitful to our descendants. However, the government has not done much." (Fisher 03).*

In 2018, the regional government provided five units of 4 HP outboard engines for use by fishers during sailing. One year later, the Ministry of Maritime Affairs also provided two large vessels to support the transformation of coastal fishers to deep-sea fishers. The assumption was, the large vessels capability makes fishers be able to sail further to deeper water in enhance ease of fish catchment, in terms of quantity and variety of fish. Nevertheless, local coastal fishers in Bangka argue that the efforts of the central government were not by the conditions of those who are used to working for one day — sailing on large vessel forces coastal fishers to work for 2 to 3 days offshore.

According to the majority of local fishers, the ideal solution to their problem based on their opinion was namely the 15PK outboard engine technology that was able to bring fishers to pass through the polluted marine areas, which would allow them to catch a lot more fish, and return ashore in the same day. In addition, there is an urgent necessity for the technology, which is simple but effective for the process of fishing and catching shrimp.

This community needs more friendly-environment of technology due to their capability as a user from the lower education group. Furthermore, it also should not give pressure to the fisher to change their current routine. The high urgency of the simplicity of technology that potentially increases their production due to doubled sided of technology in Bangka's crisis. The necessity of technology for the fisher community is due to the effect of cutting-edge technology pressure in the current digital world. Technology is also needed for the assistance of fishery equipment, or to provide financial assistance to poor fishermen groups by granting long-term instalment for re-payment. Finally, the technology could assist fishers with less bureaucracy and troublesome requirements, especially for poor fisher families.

E. The urgency of Cross-Sectional Integration

The outcome of this study concerning the poverty level of fisher community indicates that the nexus socio-economic inequality and environment crisis is a crucial issue. Thus, a joint effort is needed to change the mindset of the community and the government so that they do not rely too much on tin as the economic sector. If tin deposit depleted, it will probably make local citizen suffer since the environment would have been severely damaged. Besides, environmental restoration must be done by banning mining activities in fisheries and marine areas, and ensuring that global tin producers do not cause casualties as the restoration of marine ecosystems requires significant time and costs.

The development of fishing, in essence, tins to the utilization of fish resources optimally and rationally for the welfare of the fisher community without causing damage to fish resources themselves or the environment [12]. In fact, due to limited resources possessed by fishers and the lack of support for fisheries processing sectors, it has made it difficult for them to escape the poor conditions. Interventions from various parties are needed to overcome the problem of poverty that occurs towards them.

Handling poverty is not only deal with multidimensional but also interrelated with dynamics, complexities, conditions with institutional systems (social consensus), gender and typical events of location [7]. The intervention of various parties will strengthen the social structure of the fisher community so that they fisher become more independent and empowered. The involvement of various parties to reinforce on social equality, provide a fair opportunity, generate support, raise awareness of environmental crisis is a fundamental necessity for fisher community.

Therefore, the empowerment of poor fisher community needs to be carried out continuously and sustainably. Some studies [9], [15], [17] suggest, empowerment is intended to facilitate target community to identify basic needs and enhance "power of decision and action over their lives by reducing the effect of social or personal blocks to exercise existing power". Empowerment is related to a person's ability to make decisions and actions according to his own will, without any control from the other party.

The model of empowerment of low-income families in coastal communities adheres to the principle of "help them to help themselves". The aim is to improve the welfare of low-income families in coastal areas through strengthening socio-economic institutions by utilizing human resources and the surrounding natural environment in coastal areas in a sustainable manner. The following is an empowerment model created from the results of studies conducted:

Fig. 4 The cross-sectional integration model

Cross-Sectional Integration Strategy is empowerment forum of key actors from multisectoral agencies by investigating the relationship between different perspectives. In this context, it includes Department of Regional Environmental, Department of Marine and Fisheries, Department of Energy and Mineral Resources, Department of Micro, Small and Medium Enterprises Cooperative, Department of Social, NGO and CSO.

This platform is for open-minded dialogue to compare the various point of views, making consensus, strategize the actions, and evaluate the implementation. It begins with observing and ends with resolving the complex problem. During the consensus process, it involves a decision-making procedure to preserve the interest and integrity of all participants. It is a form of a cooperative discussion of ideas and opinions to find the best solution for everyone. In addition, it ensures the equal opportunity to participate in order to promote the growth of the community.

The main objective is to collaborate all stakeholders and create meaningful impact at the societal level. This strategy is more suitable for a single point in time, a low budget project, but an acute problem. The benefit of implementing this strategy is generating an assumption and providing an estimation of the prevalence of all relevant actors. Nevertheless, it has drawbacks that need to be anticipated, such as due to the short period it may reduce the quality of output and unestablished the causal relationship.

By implementing of cross-section integration of stakeholders (CSIS), it potentially could alleviate poverty by collaborating all stakeholders. The CSIS strategies would be concentrated on providing "umbrella" for the poor fishing community by protecting, supporting, and strengthening the resources they have. Strengthening the resources of poor communities can increase opportunities to escape the problems of poverty they experience. Besides, these synergy strategies also have a significant impact on expanding

networks and transforming fisher's businesses, which currently only focus on selling and processing fish in the basic process. It shall transform from the desperate struggle to be innovative actions in order to nurture sustainable development.

IV. Conclusions

This study identifies at least two factors that aggravate fisher community poverty in Bangka Island. First, the environmental haphazard caused by offshore tin mining activities has significantly reduced their catchments, thus resulting in their low income. Second, the limited boat technology possessed by local fishers hampered their fish catching activities, which is highly dependent upon season and weather.

Nevertheless, looking at the root cause of poverty in local fishers, this study also found that local production and trade system has also been trapping local fishers in structural poverty. Asymmetric information related to commodity price and trade network possessed by the fish collector, or the bosses, and local fishers put the poor local fishers in a vulnerable position. Solely the bosses determine Price, and local fisher's role in determining price is negligible. Therefore, have we overcome the aforementioned two major factors that aggravate local fisher poverty, this community may be still in a vulnerable position.

Besides endorsing government to solve the conflict between tin miners and local fisher, this study offers a cross-sectorial integration model to alleviate poverty of local fisher community in Bangka Island. Emphasis is put on the role of cooperative to facilitate trade and communication among local fishers. The cooperative may also assist the provision of boats with appropriate technology for the fishers. Additionally, the involvement of sectoral government institutions may also overcome the environmental degradation issue as well as shorten production chain for the local fisher, resulting in the appropriate price for both buyers and producers.

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