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Small-Scale Fisher's Livelihood Strategies: Findings from Case Studies in Several Indonesian Coastal Areas

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ABSTRACT Globally, small-scale fisheries have a substantial impacts on food security, nutrition, and well-being as well as the main livelihood for coastal communities. Due to widespread environmental changes, some 2.67 million Indonesia fishers who depend on small-scale fishing are vulnerable to poverty and environmental deterioration. This study summarizes the results of studies related to the analysis of the livelihoods of small-scale fishers through several case studies conducted by the Fisheries Socioeconomic Laboratory at the Department of Fisheries UGM, during 2015 to 2020. Such literature review was employed as the primary methodology in this study and it is essential for developing conceptual models for synthesizing research findings and identifying the areas for further investigation. The study examines the livelihoods of small-scale fishers with a focus on livelihood resources, responses to pressure on livelihood resources, and survival strategies. The study discusses on the livelihoods of small-scale fishers who actively engage in fishing activities with boats of approximately 10 GT, with 2 to 5 fishers per boat. The study found that most small-scale fishers only have a basic education particularly elementary school, have no other employment options during bad weather, and are under pressure from a variety of environmental change factors. Small-scale fishers are particularly exposed to pressures from the weather, gear bans, rising fuel prices, and low levels of education, and overfishing. Small-scale fishing households adapt by reorganizing household tasks, utilizing various technology, and developing group organizations to avoid problems like territory disputes. The fishers also do this by requesting support and subsidies and actively partaking in religious activities. Local customs that forbid fishing on particular days are said to aid in the replenishment of fish stocks, making sea alms a safety net for fisher communities.

Keywords: Exposure; fisher; livelihood; small-scale; strategy

INTRODUCTION

Small-scale Fisheries (SSF) are defined by their production and trade social interactions. Based on the Law Number 7/2016 Regarding the Protection and Empowerment of Fishermen, Fish Farmers, and Salt Farmers, the small-scale fishers define as individuals who employ fishing vessels up to ten (10) gross tons in size and capture fish to meet their daily needs (GT). Many SSFs are structured at the family level and incorporated into more significant kinship and community relationships, but they depend on market trading (Johnson, 2006). Small-scale fisher that closely resemble the fishing population and are nomadic pursue possibilities based on the spatial and temporal migration of fish populations in addition to other socio-economic factors to maintain their livelihoods (Njock & Westlund, 2010; Stacey *et al*., 2017).

Small-scale fishing is characterized by relatively low capital intensity, dispersed settlements that aren't clustered in ports because the boats aren't very big, and all fishing units whose owners are directly involved in fishing operations, either by doing, manual work, supervising, or coordinating indirectly. In other words, the managerial role lacks complete specialization (Allison & Ellis, 2001). Small-scale fisher have fewer fishing operations, are located near the coast, and require a lot of labor (Satria, 2015).

Most research on small-scale fisheries in developing countries also points out that fisher are very dependent on resources and that fisheries are open to anyone. The dependence on natural resources usually causes resource degradation, poverty, and marginalization. Citing the assertion made by (Allison & Ellis, 2001) *"Small-scale fisheries are frequently characterized as the occupation of last resort and fisherfolk as the poorest of the poor."*

Small-scale fisheries are typically viewed as low-status vocations and fisher as the lowest of the low (Allison & Ellis, 2001). The occupation with the highest rate of poverty is that of fisher (Anna *et al*., 2019). In addition to internal variables relating to production techniques, external conditions established in their surroundings also contribute to poverty in fishing villages (Humaedi, 2017). One of which is the issue of environmental and climate change, causing the livelihoods of fisher to become vulnerable (Nissa *et al*., 2019). Small-scale fisheries are sometimes viewed as vulnerable to any destructive force because they typically rely on relatively traditional gear to survive. A small disturbance can cause long-lasting and damage company instability when there is a high level of uncertainty and vulnerability (Béné & Friend, 2011).

Globally, 90 percent of fisheries jobs along the value chain are in small-scale fisheries (SSF). An estimated 113 million people work in SSF value chains or depend on SSF for survival (World Bank, 2013; Fabinyi *et al*., 2022). Due to their contribution to food and nutrition security and the opportunity they give for eradicating poverty, small-scale fisheries are being more acknowledged for their importance to human well-being and sustainable development, especially in developing nations (FAO, 2020). SSF remains one of the most important livelihood activities in Indonesia. According to data from the Central Beareau of Statistics (BPS, 2018), the poor population in Indonesia reached 26.58 million people, and 61.36% were people living in coastal and rural areas. However, in the context of food supply, 80% of domestic fisheries consumption is met by small-scale fisheries. According to Bappenas (2013) 89.45% of Indonesia's total fishing fleet in 2011 was still dominated by fisher with vessels ≤5GT. Therefore, Indonesian capture fisheries are still characterized by small-scale capture fisheries.

The key issues that small-scale fisher faced were the transitional phase, the growth in cost, the unpredictability of catch, weather, and policy, restricted capital ownership, access, and knowledge and skills outside of fishing (Nissa *et al*., 2018; Suadi *et al*., 2021). In Indonesia, different regions may have different small-scale fisher traits and difficulties. The species targeted, fishing locations, fishing gear employed, and market orientation in small-scale fisheries are all varied (Halim *et al*., 2019). Moreover, according to Adger (2006) every community in a given place has a unique set of risks and as a result, employs a unique set of livelihood management techniques. Therefore, research on the essential traits of small-scale coastal fisher in various coastal regions of Indonesia and the difficulties they encounter to preserve their livelihood is deemed essential. Suadi *et al*. (2021) said that diverse geographic environments dictate different means of subsistence. Practically all small-scale fishers rely heavily on natural resources, particularly the abundance of fisheries resources. In developing livelihood strategies and achieving welfare goals, households need livelihood capital, which includes human agency and resources (Manlosa *et al*., 2019). Additionally, it is usually noted that small-scale fisher react quickly to changes in resource availability (Allison & Ellis, 2001; Bailey & Pomeroy, 1996). This paper aims to put forward the adaptive responses of small-scale fisher to resource fluctuations and other shocks and uncertainties so that strategies for managing the livelihoods of small-scale fisher can be identified by utilizing the understanding of the livelihood strategies of the fisher themselves.

METHODS

This study presents the findings of research conducted by the Laboratory of Fisheries Socio-economics, Department of Fisheries UGM between 2015 and 2020 on the livelihood of small-scale fishers through a number of case studies. The study have been reported as the undergraduate thesis of Iskandar (2015), Iskandar (2016), Kardi (2016), Widyana (2016), Atmojo (2017), Kalaloe (2017), Putra (2018), Trihardiyani (2018), Ghina (2020), and served as the analysis's foundation. The location of study depicts in Figure 1.

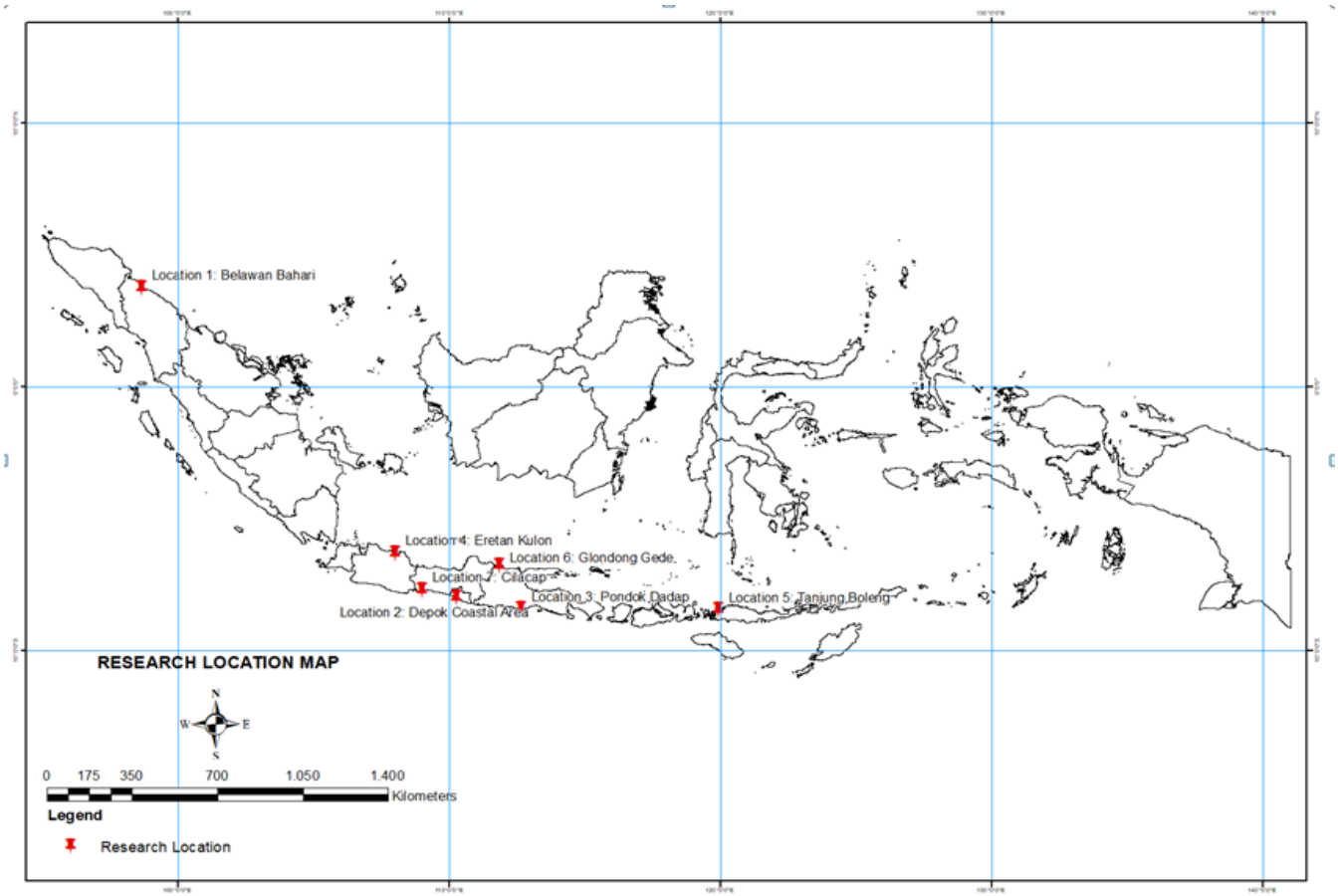

Figure 1. Fisher's livelihood research sites.

This study is essentially a literature review, especially considering the findings of case studies carried out at the Socioeconomic and Capture Fisheries Laboratory of Gadjah Mada University in a number of Indonesia's fishing villages. A literature review was used as a basic method, because this method is vital stage in creating theoretical frameworks and conceptual models to summarize research results, provide data at the meta-level, and pinpoint areas that require more study (Snyder, 2019). The analysis of case studies were included to provide a clearer picture of the types of livelihood strategies and resilience of small-scale fisher households from various ecological environments. With that as an example, the analysis describes the sources of livelihood, certain stressors, risks that fisher's households had to deal with, their reactions, and the adaptive measures taken by rural fisher's households to deal with threats to their source of livelihood. The limitation of this study is that its findings cannot be generalized to encompass all varieties of fishing communities throughout all developing regions. This article provides a prior illustration concerning livelihood management tactics used by small-scale fisher households to survive, putting aside the fisher's social stratification because they cannot be compared.

RESULTS AND DISCUSSION

Small scale fisher's characteristics

Small-scale fishers continue to play an important role in the cultural and social history of Indonesian fisheries, which are the main source of income for the majority of the country's fishermen. According to Bappenas (2013), fishermen operating vessels under 5 GT accounted for 89,5% of Indonesia's overall fishing fleet in 2011. According to the most recent Marine and Fisheries Data (2022), 96.2% of existing fisheries are classified as small-scale. Small-scale fishermen using fishing vessels under 10 GT make up the majority of the fishermen included in this study (Table 1). These fishers mostly employ handlines, gillnets, and traps, in addition to other traditional fishing gear. They frequently live where fishing has a big societal impact. In many fishing communities, complex rituals and cultural traditions are based on fishing, and fishers frequently work together to exchange information, resources, and labor. Many small-scale fishers might not have access to funding, insurance, or cutting-edge fishing gear like GPS or automated fish finders. Nonetheless, natural disasters, economic downturns, climatic changes, and fluctuations in fish demand or price can occasionally put small-scale fishermen at danger.

The livelihood of small-scale fisher can be seen from several approaches. One of these approach is utilizing assets and/or livelihood capital both from the perspective of ownership and access, the livelihood vulnerabilities faced and the livelihood strategies undertaken to survive or even develop their livelihoods. Fisher's livelihood resilience status might be understood through an analysis of the five sources of fisher's livelihood capital, namely natural capital, physical/infrastructure capital, financial/economic capital, human resources (HR) capital, and social or institutional capital (Allison & Ellis, 2001; Hahn *et al*., 2009). The condition of small fisher is generally known as subsistence fisher or lack of commercial orientation whose livelihoods are full of uncertainties and limitations. Since the livelihood of these small fisher depends on nature (depend on natural resources), it means that small fisher depend on uncertainty situation for their livelihood. The uncertainty may comes from nature or other factors, such as incompetence (Berkes, 2007; Suadi *et al*., 2021).

Small-scale fisher households ensure that their catch is sufficient for each trip, climate and weather uncertainties which in the last ten years have been heavily influenced by the impact of global warming, which has led to climate change and weather (Nissa *et al*., 2019). Limited capital ownership, limited access, limited knowledge and skills, and several other sources of livelihood are indeed difficult for small fisher to reach. Limitations in ownership and access to livelihood sources affect fisher's livelihood patterns. Changes in policies made by the government can also have an impact on the dynamics of the livelihood of small-scale fisher. In addition, Garcia *et al*. (2008) stated that small-scale fisheries (gear technologist tradition) or artisanal fisheries (socio-economic practice) generally emphasize smaller technologies and household-or family-based social units, respectively, compared with larger-scale and industrial or company-based fisheries. The characteristics and the dominant sources of livelihood of Indonesia's small-scale fisher can be seen in Table 1.

Table 1. Characteristic and the dominant sources of livelihood of small-scale fisher at the study sites.

Case studies of small-scale fisher	Fisher characteristic	Domination of livelihood capital
Pondok Dadap, Sendang Biru, Malang, East Java (Gina, 2020)	• Fishing activities using lifeboats. It size is about 10-15 GT. The lifeboat consists of 3-4 hatches with a capacity of ± 6 tons. • Fishing trips is about 7-14 days. In one lifeboat, there are 4-5 fisher. • Lifeboat fisher use fishing aids in fishing operations. The fishing aids used include GPS, FADs, kites (for catching tuna), artificial baits, rocks, jerry cans, and lights (for catching squids)	• Natural capital: fishery resources. • Physical capital: fishing gear and boat engines, and some fishing aids.
Belawan Bahari, Medan, North Sumatra (Putra, 2018)	• The main commodity is anchovy • Fishing gear using trawls • The vessels or fishing boats size < 10 GT and engine power is 30 PK	• Natural capital: depends on fish catching • Human capital: fisher's wives majority work as anchovy processors, open a

Table 1. Characteristic and the dominant sources of livelihood of small-scale fisher at the study sites.

Case studies of small-scale fisher	Fisher characteristic	Domination of livelihood capital
	• The revenue are Rp.50,000-Rp. 75,000/ day for crew members, and Rp. 100,000 up to Rp. 150,000/day for *tekong* or captain. • The educational background majority is an elementary school	food stalls, traders, and open laundry businesses. Fisher's children also work as fisher, factory workers, shop workers, gas station employees • Social capital: power relations between skippers and crew members, fisher groups, and cooperation
Cilacap, Central Java (Trihardiyani, 2018)	• Fishing gear: majorly gillnets • Fiberglas fishing boats sizes ≤ 3 GT, 9-11 m in length with engine 15-18 PK (horse power), operated by two fishers • Main target species: hairtails and white pomfret • Fishing trips is 7-9 hours and maximum of 14 hours per trip. • The total revenue range from Rp. 200,000 to Rp. 300,000 per trip, but lower during famine season. • Sharing system applied for revenue	• Natural capital: fishery resources • Social capital: local tradition of *kliwonan*, which means the prohibition for catching fish every Selasa (Tuesday) Jumat (Friday) *Kliwon* (Javanese Calender), fisher, groups and *Mino Saroyo* Village Unit Cooperatives (KUD). • Financial capital: saving and jewelry
Glondonggede, Tambakboyo, Tuban (Kalaloe, 2017)	• Types of fishing gear used by fisher are *payang* and *cantrang* (trawl-likes), dan gillnets. The majority of fisher use *payang* fishing gear in fishing activities. • The catch: majorly pelagic species and some demersal species. • *Cantrang* boat crews: 4-6 people • The educational background majority is an elementary school • Fishers use sharing system, depends on the fishing gear used.	• Natural capital: fishery resources • Financial capital: saving and jewelry • Social capital: neighborhood relationship
Eretan Kulon, Kandanghaur, Indramayu, West Java (Kardi, 2016)	• The majority of fisher spend more than seven days at sea and one-day fishing • The fishing boat is about 5 GT & 20 GT in size • The fishing gear used is cantrang and dogol • The fish caught include various species of pelagic and demersal species. • Fisher's education: majority is elementary school	• Natural capital: fishery resources • Human capital: the majority of fisher's wives work as factory workers, shop workers, and traders. • Physical capital: fishing gear
Depok Coastal, Parangtritis, Bantul Regency, Yogyakarta Special Territory (Iskandar, 2016)	• The main fishing target: white pomfret, black pomfret, lobster, hairtails, mackerel and snapper. • Fishing activities using outboard motor boats • Fishing gears include gillnets, hooks, and *pintur* (traps) • The fishers consist of local and migrant fisher • Fishing trips is about 7 to 8 hours • The educational background majority is an elementary school	• Natural capital: fishery resources and agricultural land • Human capital: fisher's wives work as fish processor, traders and shop workers.
Tanjung Boleng, Manggarai, East Nusa Tenggara (Iskandar, 2015)	• The types of fishing gear used by fisher are nets and traps "*bubu*" (fishing gear for crab commodities) • The fishing trip is about 8 to 12 hours or one day fishing	• Natural capital: fishery resources • Human capital: beside skill in fishing, there are other skills like the ability to make brown sugar and woven hats from *gebang* leaves and farming skills

Table 1. Characteristic and the dominant sources of livelihood of small-scale fisher at the study sites.

Case studies of small-scale fisher	Fisher characteristic	Domination of livelihood capital
	• The catch: grouper, snapper, barracuda, mackerel, sardines, stingrays and crabs • The educational background majority is an elementary school	

Sources: Gina, 2020; Iskandar, 2015, 2016; Kalaloe, 2017; Putra, 2018; Trihardiyani, 2018.

Based on Table 1, in general, it can be said that the livelihood of small-scale fisher is very dependent on natural capital, namely the abundance of fish resources. The majority of small-scale fisher in Indonesia are subsistence fisher (Satria, 2015). The subsistence of Indonesian small-scale fisher is shown in terms of the income earned to meet their daily needs, most of which come from the sale of fish caught and or from profit sharing, which is the wages of their work as crew members. The boundary of waters or ocean which is openly accessible and is commonly owned by many fisher has made a problem of competition, contravention and resource conflict among them. All fisher can access the ocean equally in which no one is able to exclude the other from the sea. Fishers are highly dependent on natural resources. Any stressor arising from land or ocean can be a disastrous to their livelihood system.

Social capital owned by small-scale fisher, namely in the form of neighborly relations, power relations between skippers and crew members, cooperation activities, the functioning of KUD and fisher groups, and still obeying local wisdom believed by their ancestors, such as the prohibition to catch fish every *Kliwon* Tuesday and *Kliwon* Friday and *Sedekah Laut* is a social safety net for small-scale fisher when they experience Exposure or pressure and shock to their source of livelihood.

The human capital or human resources of small-scale fisher can still be said to be of low quality due to their low level of education (dominated by elementary school graduates) and their lack of skills outside the fishery sector. Small-scale fisher usually only have side jobs as laborers, porters, and small businesses. Several other family members, such as their wives and children, do not work or, at certain times, help meet their daily needs by working as fish processing workers, laundry workers, and household helpers. Fishing is integrated into social relationships, just like all other forms of livelihood (e.g., with fish processors, traders, and other fishers) (Johnson, 2006; McWilliam *et al*., 2021; Suadi *et al*., 2021). Different social and ethnic groups have different ways of making a living from fishing, and they are all affected by gender norms that affect how men and women share work along the fisheries value chain, who has access to and control over fisheries resources, and who makes decisions within the household (Lawless *et al*., 2019). Fishing can be a primary, secondary, or tertiary source of income, hence the ways in which people make a living fishing are varied and adaptable. Fishing may serve as a "fall-back" strategy for individuals who depend on it for their living or as part of a larger household unit, or it may be a part of varied livelihood strategies for individuals who depend on it for their living. One such strategy may include farming (Béné & Friend, 2011; Harkness, 2020).

Fishers have no choice but to continue their fishing operations, which may include moving to new fishing grounds, due to the limited opportunities for employment outside of fisheries caused by low human resource availability (migration strategy). Furthermore, small-scale fishermen typically reside in coastal villages where access to the city core, which serves as the primary economic hub, is difficult and at a distance. Migration carried out by small-scale fisher is only migration/movement of fishing locations. Migration and movement are often ways fishers make a living (Pauwelussen, 2015). Suadi *et al*. (2021) also found that small scale fisher in north coast of Java choose to prolonging fishing time and expanding others fishing grounds when they face the nature exposure. Recently, many fisher in several locations have admitted to fishing in areas farther away than before. This indicates that the availability of fish stocks at fishing ground near the coast is decreasing. The decrease in the availability of fish stocks was influenced by the increasing number of fisher, the number of fishing gear, and the use of some fishing gear that was not environmentally friendly. However, this does not make fisher stop going to sea; they will still carry out several strategies to keep getting catches.

The exposure and livelihood strategy implemented by Indonesian small-scale fisher

An alternate livelihood strategy implemented is strengthening part of the livelihood capital owned by the fisher. Fishers' livelihood solutions can help improve fisher's quality of life and reduce their livelihood vulnerabilities (Dharmawan, 2007; Saragih *et al*., 2007). Vulnerability is the condition of being susceptible to injury from exposure to stresses brought on by environmental and societal change and a lack of ability to adapt (Adger, 2006). Vulnerability varies depending on the situation and the time of day (situational). Weather conditions, the availability of fishing grounds and fish stocks, as well as significant changes like fluctuating fish prices, global climate, institutional and social, market shifts, and policy regimes, can all impact how vulnerable fisher's livelihoods are (Chen & Lopez-Carr, 2015).

Small scale fisher in living their livelihood also have different levels of livelihood vulnerability. Livelihood vulnerability is composite, meaning that it is determined from a combination of internal and external pressures or exposures, each fisher's sensitivity, and its adaptive capacity. Thus, small scale fisher who can activate and optimize the use of livelihood capital that they own or have access can form their resilience capabilities to deal with the livelihood vulnerabilities they experience. Vatria *et al*. (2019) mentioned several factors that determine the level of resilience of fisher, including 1) natural disasters; 2) fish pier/landing; 4) geographical conditions; 5) the role of the wife and family members; 6) diversification capabilities; 7) transfer payments; 8) social security; 9) norms. The exposure and

livelihood strategy implemented by Indonesian small-scale fisher is shown in Table 2.

Table 2. The exposure and livelihood strategy implemented by Indonesian small-scale fisher.

Case Studies of Small-scale fisher	Exposure	Livelihood strategies
Pondok Dadap, Sendang Biru, Malang, East Java (Gina, 2020)	1. Natural exposure: high waves, strong winds, off season 2. Physical exposure: fishing gear damage 3. Economic exposure: increase fuel prices	Intensification and extensification of fishing: increase fishing time, increase the number of fishing gear, bring a spare machines, move to other fishing ground and change the fishing target.
Glondonggede, Tambakboyo, Tuban, East Java (Kalaloe, 2018)	1. Natural exposure: high waves and strong winds, off season 2. Human resource exposure: low quality of human resources 3. Socio-economic exposure: rising fuel prices and fishing gear conflicts between fisher	1. Livelihood sources modification: a. Exploitation: increase fishing time and the number of fishing gear, b. Migration: move to other areas to find a new fishing ground 2. Use savings
Belawan Bahari, Medan, North Sumatera (Putra, 2018)	1. Natural exposure: high waves, strong winds, and off seasons 2. Economic exposure: fuel price and cantrang ban policy 3. Social exposure: conflicts among fisher because of overfishing and different in fishing gear	Modification of sources of livelihood by utilizing social capital: a. The power relationship between employers and crew members in terms of ease of obtaining debt and labor. b. Fisher community groups and local law enforcement officers in handling conflicts 2. Multi-income sources: laborer, repair fishing net and boat mechanic. 3. Do nothing
Cilacap, Central Java (Trihardiyani, 2018)	1. Natural exposure: off season, bad weather, decline catches and fishing grounds further away, and fishing net are damaged due to coral reefs	1. Livelihood sources modification: Exploitation: increase fishing time, fishing in other fishing grounds, adding supplies logistics and fuel, and increase the number of fishing gear. 2. Multi livelihood sources: side jobs, construction workers, carriage drivers, sea transportation service providers
Eretan Kulon, Kandanghaur, Indramayu, West Java (Kardi, 2016)	1. Natural exposure: off season, high wave, strong winds, drop availability of fish stocks in the sea. 2. Physical exposure: unable to use cantrang fishing gear due to cantrang ban policy by Minister of Marine and Fisheries. 3. Social exposure: the social gap between 5 GT and 20 GT fishers in terms of access to fish resources and loan	1. Livelihood sources modification: a) Exploitation: increase fishing time, increase supplies, diversify fishing gear b) Utilization of social capital: depending on the boss, fishers demonstrating against the Minister of Marine & Fisheries policy which ban the use of cantrang. 2. Re-organization the roles of household members: optimizing the roles of family members (their wives or daughters) as household servant.
Depok coastal, Parangtritis, Bantul Regency, Yogyakarta Special Territory (Iskandar, 2016)	1. Natural exposure: off seasons, high waves and strong winds	1. Do nothing 2. Multi income sources: farming, trading, SAR teams, civil servants and laborers 3. Extensification of fishing: migration to the outside fishing ground, such as to the Pacitan coastal area (East Java).
Tanjung Boleng, Manggarai, East Nusa Tenggara (Iskandar, 2015)	1. Natural exposure: isolated geographical conditions, natural conditions (the soil is infertile, calcareous and contains salt) 2. Physical exposure: lack of basic public service such as schools, public health	1. Livelihood sources modification: optimizing financial capital owned (livestock), and social capital (mutual cooperation). 2. Double income sources: a craftsman of

Table 2. The exposure and livelihood strategy implemented by Indonesian small-scale fisher.

Case Studies of Small-scale fisher	Exposure	Livelihood strategies
	centers/hospitals and infrastructures (communication networks, boat docks and electricity)	hat and palm brown sugar

Sources: Atmojo, 2017; Widyana, 2016; Putra, 2018; Iskandar, 2016; Gina, 2020; Kardi, 2016; Iskandar, 2015; Kalaoe, 2018; Trihardiyani, 2018.

In accordance with the theoretical framework regarding the sociology of livelihood presented by Dharmawan (2007), namely: 1) in any condition and situation, each individual or household always tries to maintain their livelihood status wherever possible continuing its existence across generations through various survival strategies by manipulating sources of livelihood that can be owned and accessed; 2) Each individual or household builds a survival mechanism through a group or community according to its socio-cultural and eco-geographical context; 3) There are infrastructure strengths (institutional/social institutions) and superstructural strengths (value systems) as well as social structures (patterns of social relations) that shape the livelihood strategies of each individual/household are different; 4) To a certain extent, the livelihood strategy developed by the household/individual will affect the dynamics of the social life of the community or vice versa, the dynamics of the social life of the community will determine the livelihood strategies that are built.

The problems of small-scale fishing businesses (traditional fisher and fisher) include low economic performance; the inability of fishing communities (Small Scale Fisheries/ SSF) to retain most of the benefits from the fishery; high poverty rates and pressures from globalization, including global challenges such as climate change (Chuenpagdee *et al*., 2006). In addition, the fisheries sector is vulnerable to uncertainty due to environmental, institutional, and socio-economic changes and government policies that cannot be easily predicted or determined (Fulton *et al*., 2011; Teh & Sumaila, 2013). Small-scale fisher are usually poor and lack alternative employment opportunities; so they are forced to continue fishing/fishing, even when fish resources decrease drastically. The decline in fish resources, according to fisher, is caused by the increasing number of fisher and the more often fishing is carried out.

According to Koentjoroningrat (1990) in (Satria, 2015) when a crisis occurs in the community, it is awaken several community actors to fight the crisis situation/condition. Then they will innovate/create to get out of the crisis situation/condition. Therefore, many small-scale fisher on the coast of Indonesia continue to go to sea by looking for other fishing ground locations. The fishers go fishing for further away than usual, changing fishing gear and increasing fishing number of gears when catches decrease or when there is a famine season, by maximizing accessible natural capital and available physical capital owned. Meanwhile, there are also some who choose not to do fishing and make ends meet by utilizing social capital, namely neighborly relations, and patron-client relations to get into debt. The fisher's system of subsistence depends heavily on social capital. For the most part, they only know how to sail. Small-scale fishers have a tendency to overfish in times of economic crisis, shock, emergency, or catastrophe. Most fisher are limited to sailing during the terrible fishing season. What they possess is a social group founded on the idea of kinship that ensures their survival. As a result, they will cooperate to assist one another in live. Small-scale fisher need the ocean, fish resources, ships, and tools for catching fish to stay alive or get stronger. Small-scale farmer households need land and other economic resources to help them become more stable (see Table 2). In addition, fisher households that have other skills outside the fishery sector will adopt a double income pattern. Suadi *et al*. (2021) also show that most of small scale fisher in southern coast of Java will have multiple income pattern differ to small scale fisher in northern coast of Java who will do more expand the fishing ground. Furthermore, it was claimed by Nissa *et al*. (2019) and Dharmawan & Nissa (2020) that the technique used is to combine the capital currently owned for a variety of livelihood activities. One may put into practice a livelihood strategy by activating one of the capitals for their livelihood that they already hold in order to maintain their resilience. When a crisis arises, households that engage in small-scale fishing have a method at their disposal to protect themselves from the strains that are associated with their precarious position, which is the utilization of assets or capitals related to their means of subsistence. It is through actions like these that resiliency can be developed.

CONCLUSIONS AND RECOMMENDATION

Conclusions

Based on review of fisher livelilihood case studies, we concluded that on average small-scale fisher in coastal areas of Indonesia are subsistence and small-scale fisher. They are very dependent on fisheries resources. The boat used is majorly ≤10GT in size with 2-5 fisher in 1 boat. The majority of small-scale fisher's education graduates from elementary school, therefore many do not do anything when the weather is bad (unemployed). The livelihood resources consist of five categories, namely nature (fishery resources), finance (livestoks), and social (mutual cooperation), (physical, and human capital). The pressures that are a source of vulnerability for small fisher also come from these five sources of livelihood including 1). bad weather and famine; 2). prohibition on the use of certain fishing gear; 3). high fuel prices; 4). low education affects the low quality and ability of fisher's human resources; 5). conflicts that arise due to the increasing number of fisher, overfishing and differences in fishing gear.

The livelihood strategy of small-scale fishing households is an adaptation to survival by re-organizing their household/ family, becoming more exploitative by adapting technology and adapting collective institutions to minimize conflicts

between the two such as fighting over fishing grounds, distributing aid/subsidies and through local wisdom in the form of religious activities. The ritual of sharing marine alms between fisher becomes a social safety net for fisher, through local beliefs in the form of a ban on going to sea on certain days helping to provide time to restore fish populations in the sea.

Recommendation

Considering several sources of vulnerability to the livelihoods of small-scale fisher which are described from several case studies of small-scale fisher that have been described previously, it is necessary to instill an understanding of sustainable livelihoods which can be carried out through a sustainable fisheries paradigm approach. First, empowering local institutions to manage fisheries resources in their respective areas. Second, the fishery eco-management model may be more effectively implemented in addition to upholding values based on customary law and local wisdom. Third, strengthening local social institutions such as TPI (fish auction) and KUD (cooperatives) can become price controls in the trading system for marketing small-scale fisher's catches. Thus, the dynamics of the livelihood of small fisher can at least remain in a safe position. Livelihood vulnerability can be minimized, therefore it is necessary to carry out further research, one of which can be started from research to analyze the role of local institutions/institutions in several coastal areas of Indonesia and the implementation.

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