



Fisherman Livelihood Effects on Marine Conservation Area towards Sustainable Development

Submitted: 26 January 2018

Accepted: 19 February 2018

Available Online: 28 February 2018

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Abstract

Excessive utilization of coastal resources is threatening the livelihood of coastal dependent people. The current challenge is how to maintain and use coastal resources sustainably without reducing their potential benefits in the future. In response to coastal sustainability issues, many countries have implemented a policy to support marine protected areas. Until 2008, approximately 3.2 million hectares of marine protected areas conserved in Indonesia. One of them located in Ujungnegoro-Roban, Batang Regency of Central Java Province, Indonesia. This study aims to analyze fisherman livelihoods in Ujungnegoro-Roban, which may affect the fishermen's conservation choices. This study employs questionnaire survey as the main data collection source, which was distributed to 60 fishermen randomly. The findings indicated some fisherman livelihood factors which have significant support for conservation activities, i.e. age, experience, income level and fisherman organization membership.

Keywords: fisherman livelihood; marine conservation area; sustainable coastal development

1. Introduction

Reliance on common pool resources, especially aquatic resources for local people's livelihood is considerably high (DFID, 2005), and in the future coastal areas will probably suffer from severe damage if people do not use these resources sustainably. Coastal ecosystem is being degraded by human activities such as unsustainable fishing practices and polluting industries and mining, and from environmental changes like climate change and natural disasters. Fishermen who rely on coastal resources have directly or indirectly been contributing to coastal degradation. To control coastal resource exploitation, developing marine conservation areas is viewed as one of the potential solutions.

The marine conservation area is an area of land and/or sea, especially dedicated to the protection of biological diversity, and of natural and associated cultural resources, and managed through legal or other effective means" (IUCN, 1994 on Kelleher, 1999). Marine conservation area brings several advantages and benefits for fishermen, local communities and biodiversity such as: [1] provide alternative incomes for local communities and alleviate poverty; [2] increase fish catches in surrounding fishing grounds; [3] protect sensitive habitats from disturbances and damage from fishing gear, such as bottom trawls; [4] foster natural age structures in fish populations, increasing fish catches; [5] provide refuge for species that cannot survive in areas that continue to be fished; [6] prevent by catch of non-target species; [7] eliminate ghost fishing by lost or discarded gear; and [8] serve as benchmarks of what is an undisturbed, natural ecosystem, that can be used to measure fishery effects in other areas and thereby help to improve fisheries management (WWF, 2008).

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This study was conducted in 2012-2013. The establishment of Ujungnegoro-Roban marine conservation area on December 15th, 2005 was proposed by the communities in three villages, especially those who work as fishermen. They have the interest to protect marine resources that serve their livelihood. The conservation area has been legalized through the Batang Regent Decree Number 523/283/2005 and Number 523/194/2012, and the Decree of the Ministry of Marine Affairs and Fisheries Number 29/MEN/2012.

The conservation area is 4,015.20 hectares and assigned as a reserved conservation area. Based on IUCN Protected Areas Categories System, it is categorized in number VI, functioning as a protected area with sustainable use of natural resources (KKP Republik Indonesia, 2012). There are many protected natural resources in Ujungnegoro-Roban Marine Conservation Areas, such as coral reefs that are called by the local community as *Karang Maeso*, *Karang Pancer Darat*, *Karang Pancer*, *Karang Angrik*, *Karang Wuluh*, *Karang Jojogan*, *Karang Guo*, *Karang Kepuh*, *Karang Kembar*, *Karang Ipik*, and *Karang Kretek*. Based on the survey results, the hard-coral cover is 6%, such as *Porites lobata* with massive and submissive growth form. Species of *Faviidae Amilia Favites sp* is found in massive growth.

The conserved mangrove species are *Rhizophora mucronata*, *Rhizophora apiculata*, *Avicennia marina*, *Bruguiera cylindrical*, *Calophyllum inophyllum*, *Terminalia catappa* and *Excoecaria agallocha*. The protected faunas are Horseshoe Crab (*Limulidae*), *Dermochelys coriacea*, Green Turtles (*Chelonia mydas*), Tiger Shark (*Galeocerdo cuvier*) and Irrawaddy Dolphin (*Orcaella brevirostris*).

Coastal communities have been utilizing coastal resources in many ways to meet their livelihood, including fishermen. A livelihood comprises the capabilities assets (stores, resources, claims, and access) and activities required for a means of living. A livelihood is regarded as sustainable when it can be used to cope with and recover from stress and shocks, it has self-capability to maintain and enhance their assets, it provides non-declining economic opportunities for the next generation, and it contributes to net benefits to other livelihoods either at the local or global levels and in the long and short-term (Chambers and Conway, 1992 in International Marine Management, 2008).

Capabilities, assets, and activities have become main factors which influence a person to make choices. Individual choices will be influenced by hopes, aspirations, opportunities, and threats. A person's choice will cause physical actions and activities, which in turn result in livelihood outcomes. The outcomes of existing livelihood activities may change the nature of the underlying livelihood capital (e.g. increased income will result in more financial capital), thus feeding back into the chain of influencing factors and ultimately resulting in changes in future livelihood outcomes (International Marine Management, 2008). Sesabo, Lang, & Tol (2006) have stated that there are many factors which affect the attitude of rural households who live around marine conservation area (see Table 1). Our questionnaire was built from these variables. This study aims to analyze fisherman livelihoods in Ujungnegoro-Roban, which may affect the fishermen's conservation choices.

Table 1: Factors which Shape the Attitude of Households towards Marine and Coastal Conservation Initiatives

Factor	Variables
Socio-economic variables and demographic	<ul style="list-style-type: none"> • Household structure • Age • Education • Livelihood resources
Rules and resources	<ul style="list-style-type: none"> • Informal rules • Formal rules • Enforcement
Benefit from marine protected areas	<ul style="list-style-type: none"> • Increase of access resources in the future • Revenue is not used to compensate the losers • Protect the marine and coastal ecosystems
Cost from marine protected areas	<ul style="list-style-type: none"> • Denied access to the important livelihood source • Revenue is not used to compensate the losers • No participation of local communities
Other factors	<ul style="list-style-type: none"> • Location • The resources trend

Source: Sesabo et al. (2006)

2. Methods

We used close-ended and semi-open questionnaire techniques and sampled 60 fishermen in three villages (see Table 2). The questions are close-ended to determine fisherman livelihood characteristics and semi-open to find out fisherman opinions in conservation activities. The cross-tabulation method was employed to verify fisherman livelihood characteristics which can affect conservation activity choices.

Survey and questionnaire distribution were carried out at the end of 2012 through a face-to-face method which lasted 30 minutes or more per respondent depending on how much information provided by the fisherman. The respondents were selected randomly around the study sites: fisherman's house, fishermen along the beach in Ujungnegoro Village where their boats were anchored, and fisherman group organization spots near the fish auction market in Kedungsegog and Sengon Villages.

Table 2: Sample Size

Village Name	Fisherman Population	Sample
Ujungnegoro	40	7
Kedungsegog	157	26
Roban	168	28
Total	365	60

Source: Authors Analysis (2016)

3. Result and Discussion

The marine conservation area establishment was a commitment between communities and the Batang Local Government to protect their coastal resources. However, in practice, many fishermen have been inconsistent with the conservation principles, such as:

1. Some fishing instruments such as *arad* (otter trawl), *apollo*, and *cantrang* (danish seine) which can catch juvenile and harmful to coral reefs are still used;
2. Fishermen have been catching fish on the coral reefs, which are sensitive habitats and play an important role in fish protection and sustainability.

The initial effect of the conservation area on the fisherman livelihood has been recognized. Approximately 56.72% of them have experienced positive changes related to their livelihood matters, while 43.28% of the fishermen have not experienced any changes (see Figure 1). It is important to highlight that fishing season and weather are external factors which intervene fishermen's livelihood. From this result, 56.72% of the fishermen who are concerned with economic benefits of the conservation area perceived that it has immediate effects on their livelihood. Figure 2 shows their conservation activities.

Eight variables were analyzed using cross tabulation. Natural capital is considered as a part of fisherman livelihood, although the relationship between natural capital and fisherman conservation behavior was not analyzed. It is assumed that all of the fishermen in Ujungnegoro-Roban have the same access to natural capital. Based on the cross-tabulation analysis, this study shows that there was no correlation between all tested variables with fishermen conservation choices.

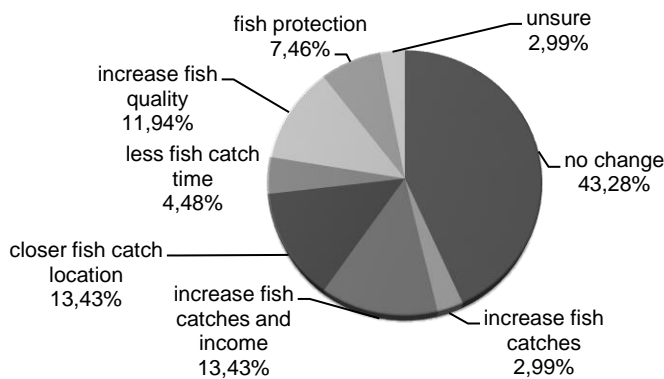


Figure 1. Conservation Area Benefits for Fishermen

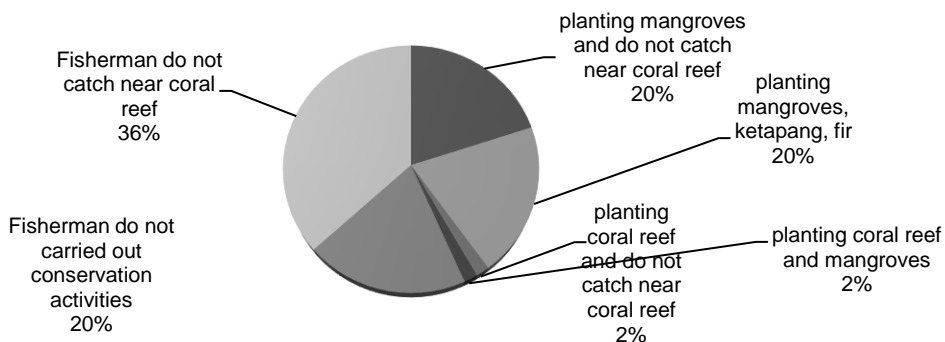


Figure 2. Fishermen Conservation Activities

3.1 Natural Capital

Natural capital is the quality and quantity of natural resources available to people, and above all, it is the access and control that people have over the natural resources. People living in coastal fishing

communities depend on not only fish but on a combination of natural resources for pursuing their livelihoods (Kleih et al., 2003). Similarly, not only do fishermen in Ujungnegoro-Roban depend on coastal access, but they also need river as binding place and mangroves as an ecosystem able to protect their settlement from sea abrasion and intrusion.

Among the main forms of natural capital for those fishermen are a Ujungnegoro-Roban coastal area, Sono River (Ujungnegoro), and Kaliurang River (Kedungsegog and Sengon). The fishermen use rivers for binding places and transportation purposes. Another form is land. Some fishermen own pieces of land in various sizes for crop production. The land ownership becomes important since fishing is a seasonal activity. Land for agricultural activities acts as capital able to increase income or supply food for the households.

As for mangrove conservation, mangrove forest dominated by *Rhizophora mucronata* is located throughout Sono and Kaliurang Rivers. Meanwhile, *Casuarina equisetifolia* species dominates Ujungnegoro-Roban beach. The fishermen have stated that *Casuarina equisetifolia* trees have better endurance than *Rhizophora mucronata* in confronting wind and waves. *Casuarina equisetifolia* trees were planted by the fishermen and the Batang Marine and Fisheries Agency in Roban Barat and Roban Timur beaches.

In biodiversity aspect, Karang Maeso and Karang Kretek are biodiversity enriching coral reefs in the conservation area. The reefs function as fish protection and juvenile to help maintaining the fish stock. Ujungnegoro-Roban coastal area can be categorized as sub cell dominated by dead coral with algae. The reef types are hard coral *Porites Lobata* and minor *Faviidae* family.

Fish species in the conservation area are *Pomacentridae* (78.78%), *Labridae* (3.02%) and *Siginidae* (18.18%). The dominant coral fish species are *Neopomacentrus Cyanomos*, *Neopomacentrus Azysron*, *Labridae*, and *Siganus javus* (Baronang). Other species are *Labroides dimidiatus*, sponge, sea cucumber, prawn, cuttlefish, squid, and crab (Dinas Kelautan dan Perikanan Kabupaten Batang, 2007). Fish catch has increased since 2006.

The increasing fish catch in Batang Regency is due to the growth of people engaged in fishing activities and the increase of boat and net ownership. Fish resources in Batang Regency have been overexploited since the introduction of Apollo net by the Demak fishermen (see Figure 3). The fishermen perceive Apollo net as “effective” fishing equipment in all seasons. Apollo net gives a positive effect on fishermen’s income, but it gives a negative impact for conservation purposes. Fish stock depletion would happen soon since there is no rule about fishing equipment in the conservation area.

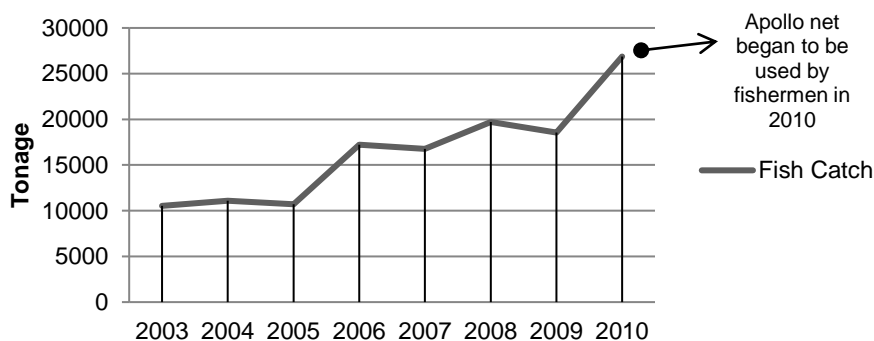


Figure 3. Conservation Area Benefits for Fishermen
(Source: Authors Analysis, 2016)

3.2 Human Capital

Human capital includes skills, knowledge, ability to work and good health (Kleih et al., 2003). Access to a combination of those elements is a pre-requirement to be able to seize the other four types of capital. For example, fishermen able to predict weather condition, operate the boat, able to maintain the fishing equipment e.g. nets, boats, and engines.

The fishermen who live in the three study areas have similar characteristics as a coastal area community. Most of the fishermen did not finish their primary education, and they have a wide range of alternative jobs for their livelihood. Fishing, for fishermen in Ujungnegoro, is just a side job because prawn season occurs from January to April only. For the rest of the year, they work as peasants, traders, factory labors, home industries, or labor fishermen in big ships outside the Batang Regency. A similar situation takes place in Kedungsegog and Sengon, where the well-off fishermen do not rely on fishing only, but also work as traders, peasants, and boat mechanics.

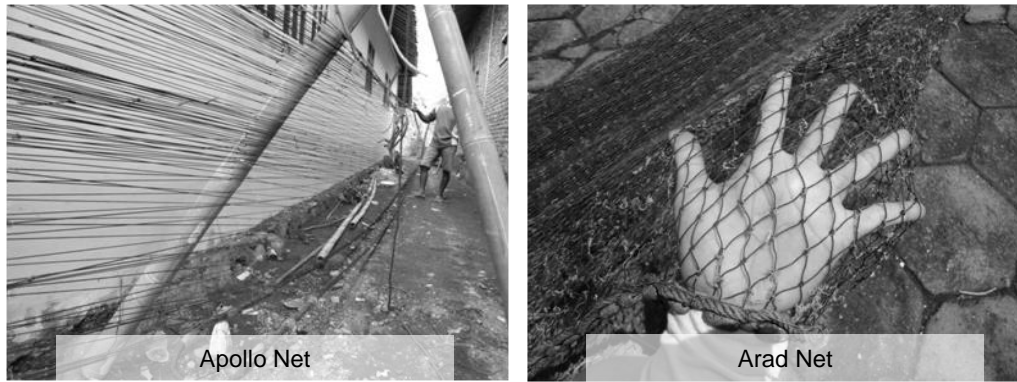


Figure 4. Fisherman Fishnet

As for the education aspect, government primary schools are there in all villages, but only one junior high school is available in Ujungnegoro Village. Most of the fishermen’s children can get primary school education since the government gives education subsidy, namely *Bantuan Operasional Sekolah*/BOS (School Operational Assistance Fund). However, most of the children in Kedungsegog and Sengon villages cannot continue to junior high school because it is quite far from their villages. They have to live in the center of Batang Regency for better education. Fishermen’s children who can have higher education usually prefer to work in city formal sector than fishing. Meanwhile, children from low-income families usually become fishermen, and they learn fishing skills since very young age or after finishing primary school.

Higher educated fishermen are believed to have a better understanding on conservation benefits (Mordi, 1987 on McClanahan, Davies, & Maina, 2005; Sesabo et al., 2006; Vodouhê, Coulibaly, Adégbidi, & Sinsin, 2010), but this theory is not applicable in the study area. Both fishermen with high and low education levels implement conservation activities due to the information disseminated from the Batang Fishery and Marine Agency or fishermen’s groups (see Table 3). The fishermen have said that whether to conserve or not is a matter of personal choice. Conservation can be considered as fishermen’s local wisdom to protect the livelihood resources. Indeed, understanding the attitudes, perceptions, and personalities of fishermen could help estimating their likely behavior towards conservation success (Gelcich, Edwards-Jones, & Kaiser, 2005; Pita, Pierce, Theodossiou, & Macpherson, 2011; Abecasis, Schmidt, Longnecker, & Clifton, 2013).

Table 3: Education and Conservation Choices

Conservation choices	Fisherman education			
	< 6 years	Primary school	Junior high school	High school
Yes	26,7 %	31,7 %	5.0%	3.3%
No	5 %	23, 3 %	5.0%	.0%

Source: Authors Analysis (2016)

Age and experience affect fishermen’s choices towards conservation area. Older fishermen tend to support conservation (Hamilton, 2012; Leleu et al., 2012). Our results are consistent with this as the middle age group of fishermen (34-48 years old) and the old group (49-63 years old) are more involved in conservation activities than young fishermen (19-33 years old). The older age groups of fishermen receive first-hand information on conservation activities, and they have an ability to locate coral reefs in the conservation areas (see Table 4).

Table 4: Age Group Education and Conservation Choices

Conservation choices	Age group		
	19-33	34-48	49-63
No	15.0%	13.3%	5.0%
Yes	16.7%	38.3%	11.7%

Source: Authors Analysis (2016)

Therefore, we checked the age groups and fishermen conservation choices. Most of the young age fishermen do not carry out conservation choices (15%), and they prefer to plant mangrove and do not catch fish near coral reefs (see Table 5). Most of them are new players in fishing activities, whether they are migrants or get the skills from their parents. Their experience and conservation information are significantly less than those of the older age groups of fishermen.

Table 5: Age Group and Conservation Choices

Age	Planting mangrove, do not catch fish near a coral reef	Planting mangroves, ketapang, fir	Planting coral reef and do not catch near a coral reef	Planting coral reef and mangroves	Do not carry out conservation activities	Do not catch near a coral reef
19-33	3.3%	6.7%	.0%	.0%	15.0%	6.7%
34-48	13.3%	10.0%	.0%	1.7%	10.0%	16.7%
49-63	3.3%	3.3%	1.7%	.0%	5.0%	3.3%

Source: Authors Analysis (2016)

3.3 Physical Capital

Physical capital includes basic infrastructure such as roads and transport facilities, shelter, sanitation, water, energy and communication facilities, the production equipment and the means which enable people to pursue their livelihoods (Kleih et al., 2003). It includes infrastructures as public goods, e.g. roads, public sanitation, etc. Private owned physical capitals such as fishing gear, boats, engines, fishing nets, fish processing equipment (ice boxes, smoking ovens, and drying racks/slabs) and modes of transport are crucial to support livelihood strategies.

Road access is an important capital in all villages (see Table 6). Kedungsegog and Sengon Villages are separated by Kaliurang River. Sengon can be accessed by farm road, and it takes 45 minutes from Pantura Road with a motorcycle. On the other hand, Kedungsegog has easy access as the roads are made from asphalt, and it only takes 20 minutes with motorcycle from the Pantura. Because of this, most of the government infrastructure aid/fund like public mosques, public sanitation, and communal wells have been built in this village. Also, the outside traders prefer Roban Barat fish auction place since it is easier to come to it. The condition leads even Sengon fishermen to do the auction in Roban Barat rather than Roban Timur.

Table 6: Physical Capital

Items	Ujungnegoro	Kedungsegog	Sengon
Road access	Easy access from Regency main road, road made from asphalt	Easy access from Regency main road, road made from asphalt	Difficult access from Regency main road, road made from soil, it is much easier to access this village by boat from Kedungsegog Village
Boat	Small motorized boat < 5 gross tonnage	Small motorized boat with 20-23 HP engine	Small motorized boat with 20-23 HP engine
Net	Small prawn net	arad, prawn net, pukat harimau (trawl), lowang, tigawaja, jebak/wadong (fish pot act as guiding barrier), apollo	arad, prawn net, pukat harimau, lowang, tigawaja, jebak/wadong, apollo
Fish auction	Not available, fishermen sell fish to fishermen cooperation or home industry	Roban Barat fish auction	Roban Timur fish auction
Public facilities	Public sanitation, school, mosque	Public sanitation, school, mosque, communal water well	Public sanitation, school, mosque, communal water well

Source: Analysis (2016)

Fishermen use damaging nets such as arad, pukat harimau, apollo, cantrang (danish seine) in the conservation area (see Table 7). Fishermen have acknowledged that damaging nets could catch non-targeted fish species and destruct the coral reefs. 38.3% of fishermen who own damaging nets have been carrying out conservation activities such as mangrove planting, coral reef planting and do not catch fish near sensitive areas around the coral reefs. The coral reefs can damage the fishing nets, and it needs extra cost and time for the fishermen to repair the fishing nets.

Table 7: Damaging Net and Conservation Choices

Conservation choices	Damaging net ownership	
	no	yes
Yes	28.3%	38.3%

Source: Authors Analysis (2016)

The second variable is physical capital ownership, which is classified into three levels: primary, secondary and tertiary (see Table 8). Fishermen who have alternative jobs like farmer, trader, boat mechanic, and fishpond owner can have tertiary physical capital. They make additional income, and then use the money to pursue other forms of capital.

Table 8: Fisherman Physical Capitals Classification

Physical capital	Primary	Secondary	Tertiary
House	They have a house/rent house or living together with their parents	They have a house or living together with their parents	They have a house
Boat	1 boat or boat join	1 boat	1-2 boats
Fishnet	1 fishnet	1-2 fishnets	2-5 fishnets
Apollo net	They do not have Apollo net	They have an Apollo net	They do not have Apollo net
Motorcycle	They do not have motorcycle	They have 1-2 motorcycle for daily transportation	They have 1-2 motorcycle for daily transportation
Land/fishpond/rice field	They have none of these physical capitals	They have none of these physical capitals	They own one of these physical capitals
Livestock	They do not have livestock	Livestock in small number for daily consumption	Livestock as saving or breed and get income from selling it

Source: Authors Analysis (2016)

Table 9 shows that in any physical capital ownership, fishermen have indicated their support toward conservation area and participated actively. The finding is not in agreement with Hackel (1999) in Sesabo et al. (2006), which states that wealthy households are more supportive towards conservation activities. They have many means at their disposal (land, fish pond, rice field or livestock) and can generate income from those capitals.

Table 9: Physical Capitals Ownership and Conservation Choices

Conservation choices	Physical capitals ownership		
	Primary	Secondary	Tertiary
Yes	28.3%	28.3%	10.0%
No	16.7%	13.3%	3.3%

Source: Authors Analysis (2016)

In contrast with fishermen in the secondary or tertiary type of physical capital ownership, the fishermen with primary ownership have limited choices to generate income. Their life depends on natural resource-based activities for survival, which is fishing (Ruttan and Borgerhoff Mulder, 1999 in Sesabo et al. 2006). Furthermore, the fishermen with primary ownership who are committed to doing conservation activities have other motives. They believe conservation activities can increase their fish catches and reduce sea abrasion effects on the settlement while they get paid from the government for doing conservation activities. By all means, economic incentives or motives can be particularly important for gaining the support from fishermen (Angulo-Valdés & Hatcher, 2010; Mccay & Jones, 2011).

3.4 Financial Capital

Financial capital includes resources which are available to people (e.g. cash, savings, loan, remittances) and provide them with different livelihood options (Kleih et al., 2003). Another kind of financial capital is illiquid resources that can be quickly converted into cash and more liquid means. In some societies, there is a preference for saving in kind as that is perceived as having a higher value or being less risky than cash (Kleih et al., 2003). Examples are jewelers (gold) and cattle. Financial capital is a versatile type of capital which can be used to obtain other livelihood capitals (Kleih et al., 2003). Financial capital can also improve one's social capital as a high socioeconomic status often correlates with having power and being respected or feared by others.

In Ujungnegoro-Roban, income levels affect conservation behavior. The analysis results show that 40% of low-income fishermen and 25% of middle-income fishermen are willing to do conservation activities. This finding confirms Sesabo et al. (2006) that poor fishermen are more likely to have positive behavior towards marine conservation area purposes and participate more actively than wealth fishermen.

A possible explanation for this finding can be taken from Gelcich et al. (2005) and MacNeil & Cinner (2013), who state that the fishermen who perceive fishing resources primarily as a source of income hold positive behavior towards marine conservation area. They have limited options for physical capital (fishnet and other forms of physical capital) to generate income. Lower and middle-income fishermen pursue their livelihood based mostly on fishing. They comprehend the consequence of fishing near coral reefs that will negatively affect the physical capital and time (see physical capital section). Furthermore, the fishermen in the study area are aware of fish resource degradation, so they believe protecting coral reefs can increase the fish stock (see Table 10).

Table 10: Income Level and Conservation Choices

Conservation choices	Income Level		
	Low 4.620.000- 36.680.000 IDR	Middle 36.680.001-68.740.001 IDR	High 68.740.002- 100.800.002 IDR
No	15.0%	13.3%	5.0%

Table 10 Continued

Conservation choices	Income Level		
	Low 4.620.000- 36.680.000 IDR	Middle 36.680.001-68.740.001 IDR	High 68.740.002- 100.800.002 IDR
Yes	40.0%	25.0%	1.7%

Source: Authors Analysis (2016)

While the Bangladesh fishermen have access to informal loan and half formal loan in the financial capital which helps them to earn other capitals (Kleih et al., 2003), the case is also there in a Ujungnegoro-Roban marine conservation area. The fishermen use the loan for initial capital every year in early fishing season, usually in January to February. They use it to repair boats, machines, buy fishing nets, and other fishing is supporting equipment such as diesel fuel, fish baits, and ice.

There are three schemes in the formal fisherman loan. The first scheme is the fisherman organization loan, exists in Kedungsegog and Sengon Village. This loan is payable through Raman or income deduction after the fishermen sell their fish in the fish auction. The second scheme is a formal loan provided by the cooperative in Kedungsegog Village, at a maximum of IDR 10.000.000 per fisherman. A fisherman should pay the installment every month, and the maximum loan term is one year. The third is provided by the *Bank Rakyat Indonesia* by *Kredit Ketahanan Pangan dan Energi/KKPE* (food and energy security credit) scheme. A fisherman can apply for a personal loan with land ownership certificate or ship/boat license as the collateral. The personal loan amount ranges from IDR 2,000,000 to 10,000,000. Group loan is also available through KKPE scheme, which should be applied by 10-15 fishermen with a maximum amount up to IDR 50,000,000. The group should pay the monthly installment based on *arisan* (regular social gathering) shift. (see Table 11 and Figure 5).

Table 11: Loan Access, Saving Ownership and Conservation Choices

Conservation choices	Loan Access		Savings Ownership	
	No	Yes	No	yes
Yes	16.7%	50.0%	35.0%	31.7%
No	6.7%	26.7%	16.7%	16.7%

Source: Authors Analysis (2016)

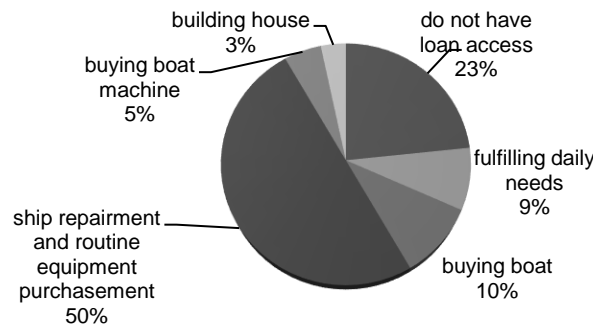


Figure 5. Fisherman Credit Purposes

The fishermen can also get informal loans from neighbors or money lenders. The informal loan from usurer usually ranges from IDR 100,000 to 200,000, which the fishermen should pay after selling fish in the fish auction. The loan interest rates depend on the agreement between the fishermen and the usurer. From the cross-tabulation analysis, there is no correlation between loan access and conservation behavior.

The second form of financial capital is saving. A fisherman who has surplus income can have savings. Fishermen in three villages tend to have consumptive behavior. Kusnadi (2009) has stated that if fishermen have a better fish catch, they tend to spree and be wasteful. Fishermen usually make savings in their houses instead of formal institutions such as bank or cooperation. Some fishermen put their money in school savings. The school saving can reduce the fishermen's burden on the children's education cost. The cross-tabulation analysis shows there are no correlations between savings ownerships and conservation behavior (see Figure 6 and Table 11).

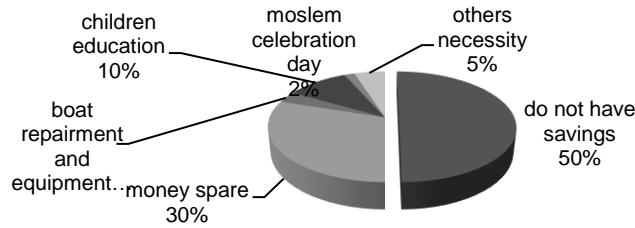


Figure 6. Fisherman Savings Purposes

3.5 Social Capital

People are dependent on social capital in pursuing their livelihood strategies (Kleih et al., 2003). Social relations affect the way in which people can access and make use of their capitals. Social capitals are developed through networks and connectedness, either vertical (patron/client) or horizontal (between individuals with shared interests) that increase people’s trust and ability to work together and expand their access to wider institutions (DFID, 1999). Other ways are from trust, reciprocity, and exchanges that facilitate co-operation to reduce transaction costs and may provide the basis for informal safety nets amongst the poor.

Patron-client relationships are found in Kedungsegog and Sengon, where fishermen who own boats employ labor fishermen. They divide the fishing earnings after deducted with boat fuel cost. Another form of social capital supporting the fisherman livelihood is fisherman organization. From the questionnaire, 78% fishermen are members of fishermen’s groups (see Table 12). The Ujungnegoro fishermen are the members of Maeso Rukun Makmur group. While the Kedungsegog and Sengon fishermen are members of many fishermen’s groups, such as Roban Karomah, Mina Karya, Mina Jaya, Sido Maju, Bakti Ikhtiar, Amanah Mandiri, Putra Bahari, etc. They have said they get many benefits from the memberships.

Table 12: Fisherman Organization Membership

Conservation choices	Fisherman Organization Membership		
	Active	Less Active	Not Active
Yes	55.0%	1.7%	10.0%
No	23.3%	3.3%	6.7%

Source: Authors Analysis (2016)

There are 78.3% of the fishermen who are members of the organizations, 55% of which implement conservation activities (see Figure 7). Meanwhile, 51% of the respondents claim to have heard the conservation program from the Batang Marine and Fisheries Agency. Since many conservation activities and assistance are provided through the fisherman groups, the groups become an important means to disseminate information and facilitate coordination of the conservation activities, and this is in accordance with Sesabo et al. (2006), Rodríguez-Martínez (2008), and Heuër, Navarette, van Bochove, Harding, & Raines (2008). Fishermen who are not members of the fisherman groups can also be involved in the conservation activities through an invitation from their families or neighbors who are members of the fisherman groups.

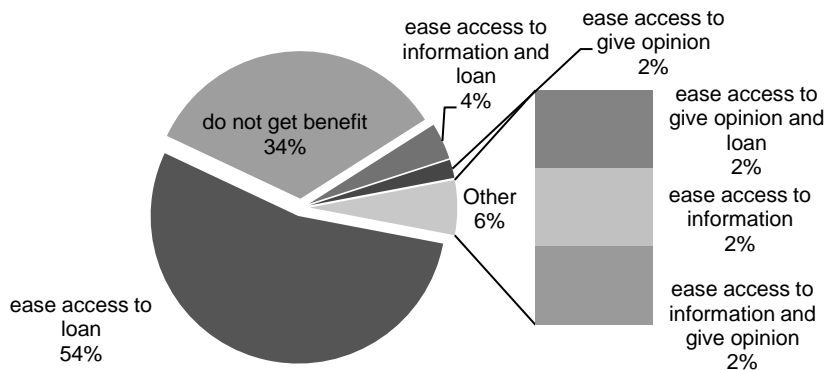


Figure 7. Fishermen Group Benefits

This finding confirms Sesabo et al. (2006) and Heuër et al. (2008) who state that fishermen who are aware of the existence of rules and regulations are more willing to do conservation than those without such information (in this context, information on rules and regulations disseminated through the fisherman organizations). In this case, a fisherman organization acts as social sanction bestowal. The member fishermen warn their fellow nonmember fishermen not to catch near coral reefs or ask them to participate in the conservation activities. Informal social norms within fisherman organizations specify the rights (i.e., privileges) of individuals to access the marine resources appropriately (Fox et al. 2012).

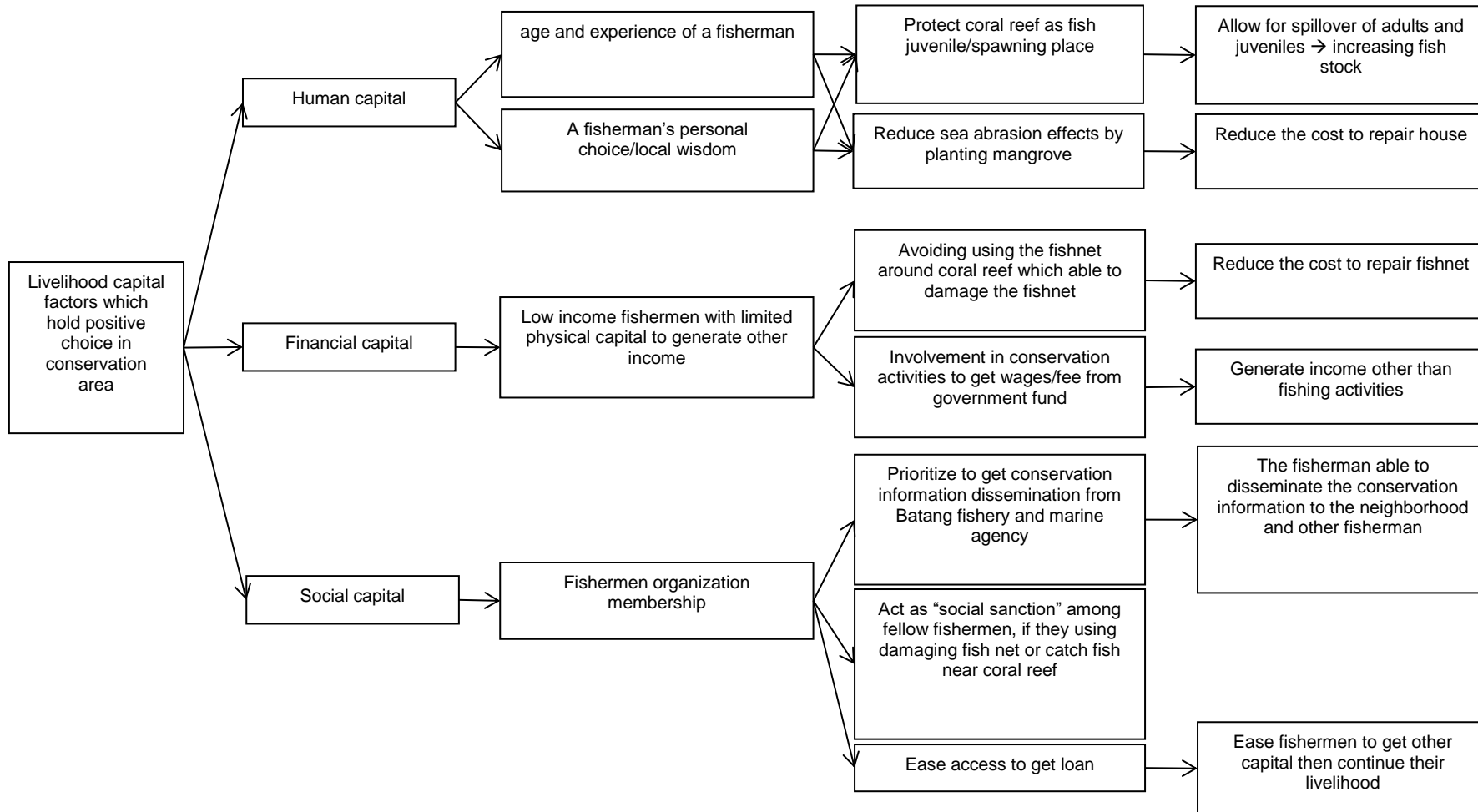


Figure 8. Relationships between Fishermen's Livelihood and Conservation Choices in Ujungnegoro-Roban Marine Conservation Area

4. Conclusion

It should be noted that this study is based on experience and facts in the Regional Marine Conservation Area of Ujungnegoro-Roban in its early conservation phase. The Ujungnegoro-Roban marine conservation area as an “arranged” coastal space has resulted in fishermen’s behavior change on coastal resource utilization. It can be concluded that fishermen’s livelihood capitals affect positively the conservation choices which support marine conservation sustainability (see Figure 8). The future challenge is increasing fishermen’s involvement and participation to ensure better achievement of the conservation purposes. The “reserved” status and permission to utilize the coastal resources still become a complication. The fishermen can still carry out fishing activities that are not in line with conservation goals. Indeed, economic motives evidently act as the main driving force in the conservation activities.

This study can be considered a preliminary to identify factors affecting the fishermen’s choices in conservation activities and add new discourse of fishermen’s attitude heterogeneity on the marine conservation area. Nevertheless, this study is expected to help the related policy makers and stakeholders understand the relationships between the fishermen’s livelihood and conservation choices in the Marine Conservation Area of Ujungnegoro-Roban.

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