

## **Fishermen-Household's Accessibilities to Solving Problems of Their Poverty :A Case Study in the East Java Coastal Villages**

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### **ABSTRACT**

The objectives of the research are (1) to identify a change for bio-physic livelihoods, to solving their poverty and to disempowering home marine social economy, (2) to analyse factors influencing the strategy of resource usage and fishermen empowerment and (3) to analyse accessibilities of poor home fishermen in solving their needs.

The research used a survey method and a poverty rapid appraisal (PRA). Primary data are collected from home fisherman respondents using Participatory Poverty Assessment (PPA) and Sustainable Livelihoods Approaches (SLA). Data was analysed using descriptive and inferential statistics with an analysis model of Ordinary Least Squares (OLS) and Two Stage Least Squares (2SLS), and Structural Equation Modeling (SEM).

The results of the first-year research are as follows: (1) exploitation pressures on coastal marine resources are very intensive and exceed maximum sustainable yield (MSY) (over exploited). (2) Fishing operations of the fishermen are far away fishing locations, quantity and fish-size are smaller. Some poor fishermen solved their problems by using size-renovation of their ships and adjusting catching fish technology, fishing ground, post-harvest activities. (3) Poor fishermen have the

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accessibilities with orderly scores as follows: social assets have a highest score (0.940), physical assets scored of 0.444, human resource assets scored of 0.353, financial assets for business developments scored of 0.309, and accessibility on availability of fish-resources at lowest score of 0.285. With the results, empowering and solving the poverties of the fishermen are comprehensively needed with local content and comprehensive approach an emphasis on policies of strengthening capital institution for the local poor fishermen.

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Keywords: Accessibilities; Fishermen; Poverty.

### 1. Introduction

#### 1.1 Background of the study

The coastal area of Indonesia is rich of natural resources. The coast line, approximately 81,000 kms (Dahuri, et al. 2000), is also advantageous for lives. One of the potential resources is fish resource. The fishermen live somewhere the area with very low income. They are poor and undertaking very hard works. Of such worse condition of their lives, it is necessary to empower and develop them, the coastal area and natural resources of ocean as their potential environment. The worse condition is also caused by the poor and worse system of exploitation of the resources and the human factors. The fishermen still keep using the traditional tools for fishing. Although the relatively modern ways are performed, the meaningful effect does not bring forth into the reality of their lives.

The coastal area of Indonesia where most fishermen live has great natural resources. One of the potential resources here is fish resource which is still not professionally developed and technologically touched. The natural resources are much available, but they are poor, and are not affordable enough to meet their daily needs. Their fishing activities are traditionally done, and of course they get few fish. At the same time illegal fishermen who are from neighborhood countries, fishing with illegal instruments get much more fish and destruct the resources and the surroundings. In this case, it is necessary to develop and empower the coastal village-fishermen besides repressing the illegal fishing.

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he development conducted so far still does not meet the real objectives. The coastal villagers are still posed as the object of development rather than a subject. They are to be invited to participate in designing and implementing the program of development (UU No.22 & 25 tahun 1999). Based on the fact above, it is necessary to conduct a comprehensive study on human development and empowerment programs supported by the government.

### **1.2 Statement of the Problems**

There are some factors causing the coastal village poverty, especially the low class fishermen. The problems of this study are stated as the following.

1. How is the the effect of the changes of fish availability on the fishermen poverty?
2. How do the households solve their unempowerment and poverty?
3. What are the factors influencing the household fishermen accessibilities in solving their unempowerment and poverty when they are facing bio-physical changes and the government policy of fish resource exploitation?

### **1.3 Objectives of the Study**

This study is aimed at:

1. Identifying a change for bio-physic livelihoods, to solving their poverty and to disempowering home marine social economy
2. Analysing factors influencing the strategy of resource usage and fishermen empowerment
3. Analysing accessibilities of poor home fishermen in solving their needs.

## **2. Theoretical Framework**

During 1990s World Bank had been conducting research on poverty and huma empowerment in more than 50 countries in the world. It was done with Participatory Poverty Assessment (PPA) and found that poor people are not lazy, not stupid, not corrupt (Narayan et al. 2000). They are poor because of poor facilities and infrastructures, corrupt and unlawful practices by the government and NGO, other unaccomodative environments. The solution offered in this case is (1) to strengthen an institution for them, (2) to change social norm, and (3) to develop their entrepreneur skills.

The institutional strengthening of funding program for the poor men still meet great barriers because it is done for such short period, one year. Actually, such program should be designed for a reasonable period of time, for 10 till 20

years (Narayan, et al. 2000). The meaningful changes will be on satisfaction resulted from the program, if it is based on the approach of "community locomotive" for any matters, the changes of mindsets, the synergical efforts of individual strength and community strength, the community leaders' commitment of decreasing the poverty rate. In this case, the government's roles is needed in empowering and developing the poor fishermen.

A study on the government's roles in enhancing the poor men quality of life was conducted by Mubyarto, Sutrisno and Dove (1983) revealed that:

- (1) The poor fishermen was getting poor because they don't have a competitive advantages in fishing. The large vessels operated by the rich men, exploited too much more fish made them lose and they just got few fish. Of course, their income was also getting decreased.
- (2) The poor fishermen did not behave "explosive" because the rich men who live in the surroundings cared them. The rich provided a job for them, paid zakat, infaq and shadaqah. This tradition creates a patron-client relationship.
- (3) The government was necessary to regulate the resource exploitation, especially for protecting the poor men's importance.

According to the results of research conducted by World Bank based on "Sustainable Livelihoods Approach" (Mukherjee, et al. 2002) that the other factors making the fishermen poor is briefly explained that 1) their household is relatively weak for any challenge because of poor fishing tools and equipments, and poor skill of fishing, no space for preserving fish; 2) lower skills, knowledge, and educated; 3) the social and structural transformation does not touch them; 4) the strategy undertaken by the poor fishermen in facing the competition with the rivals is various: some take advantages from other commodity of coast, while their wives produce snacks made of fish, etc.; and 5) the world Bank's recommendation of empowering and developing them is that the founded institutions should be empowered and effected for them, then the participation of all is needed and focused on developing the resources comprehensively.

Based on the previous studies, there are some important issues to overview in deep as the the further observation of the problems. They are 1) the poverty problem of the poor fishermen and the its solution is specific in term of location; 2) the local institutions are needed to strengthen and effected for well-run fishing activities; and 3) empowering and strengthening the local institutions needs the long-term financial system effected continuously based on the local considerations.

This study is also finally aimed at analyzing any information based on the local poor fishermen's participation for formulating a model of strengthening accessibility of marketing institutions and fishermen-finance. It is called The Progressive Financial Intitution Development for Structural Development of Progressive Coastal Villages.

### 3. Methodology

#### 3.1 The Conceptual Framework

This study focuses on human-centered development consisting of the freedom, the welfare, the safety, and the dependence. Those include the physical life quality, jobs, freedom of choice, independence, and social and political development. The following the figure discussing human position in the frame of the rural development.

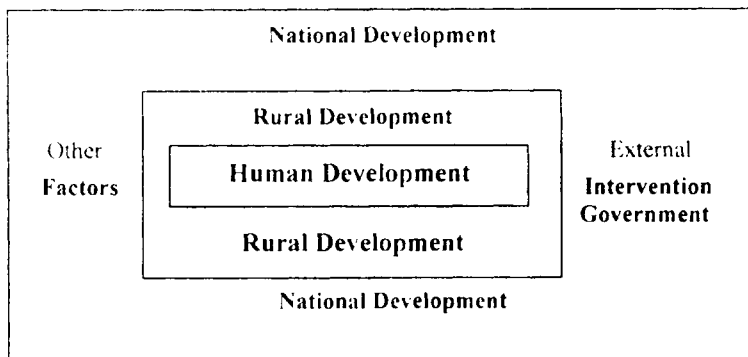


Figure 3.1: The human position in the frame of rural development (Mubyarto, Sutrisno, and Dove, 1983:9).

The institution in human development program play a very important role. It is commonly divided into two: governmental organization (GO) and non-governmental organization (NGO). The typology is presented in Table 3.1.

Governmental Oraganization	Non-Governmental Organization (NGO)
Macro :	Macro :
Central Government Province/Regence Justice	LSM Perserekatan agama/ etnis Asosiasi bisnis Asosiasi kasta
Micro :	Micro :
Local Government /Village Local Police Health Center Field Consultants	Community based organization Neighbour, RT/RW Relatives Traditional leaders Local NGO Religious buildings

Table 3.1: Typology of Non-governmental Organization (Narayan, et al., IBRD, 2000)

### 3.2 The Lower-income Fishermen

In this study, the poor fishermen is defined as (a) those who do not have production tools, (b) those who have very simple production tools, and (c) those who have production tools with the reach-capacity

12 miles, and (d) those who is still jobless, unempowered, lower educated with small houses.

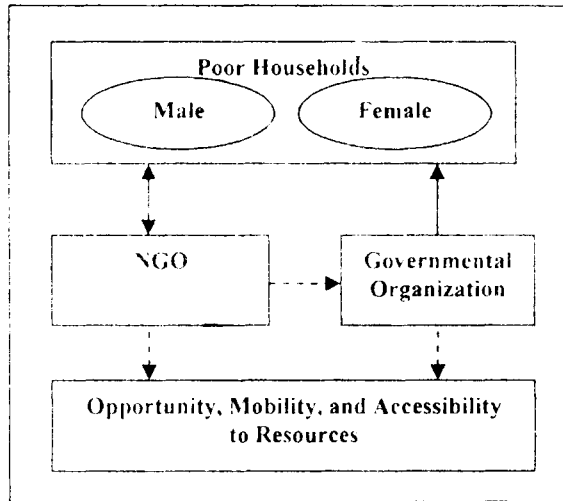


Figure 3.2. The institutional and accessibility on opportunity (Narayan, et al., 2000, p. 12)

- = One way relation
- ↔ = Two-way relation
- - - → = Low/weak interdependence

### 3.3 Location of the Research

It takes place in East Java, and divided into four zones: (a) the northern zone including Weru village, Lamongan, (b) Madura island, Lekok village, (c) Muncar village, Banyuwangi, and (d) the southern zone including Prigi village, Tulungagung.

### 3.4 Method of Analysis

#### 1) Fish Stock Estimation (MSY)

This model is from Schaefer, estimated using OLS (Ordinary Least Squares) between production (Y) and number of standard instruments (effort) year 1985-2004. This may be stated in the following equation (1)

$$Y = a.E - b.E \dots\dots (1)$$

The function of fishing sustainably has the same form with the growth of fish stock. It is a parabolic form. Equality (1) may be stated in the other equation, CPUE (Cash Per Unit Effort, Y/E), then it becomes equation (2)

$$Y/E = a - b.E \dots\dots\dots(2)$$

Using the production data and the number of transports in a particular period (1985 – 2004) the relationship between CPUE and the growth of transport can be set up. Then, OLS, the parameter value of a and b in the equation (2) can be estimated. The result of the estimation a and b is used to calculate Q maximum (MSY) and optimal E (the number of effort).

- (2) Identifying the households' asset of fishermen  
In identifying their assets and outputs, the researchers use the model from World Bank (Mukherjee, et al, 2002). It consists of (a) types of asset (input), and the result ( outputs). The first includes 1) human capital, 2) physical capital, 3) social capital, 4) financial capital, and 5) natural resource capital. The latter consists of 1) increasing income level, 2) increasing welfare, 3) eliminating their weaknesses, and 4) sustaining the right exploitation of local natural resources.
- (3) Some factors affecting their poverty and accessibility.  
Some factors estimatd to affect directly and indirectly on their poverty may be divided into two: input and output. The relationship of the three is stated in Figure 3.3.



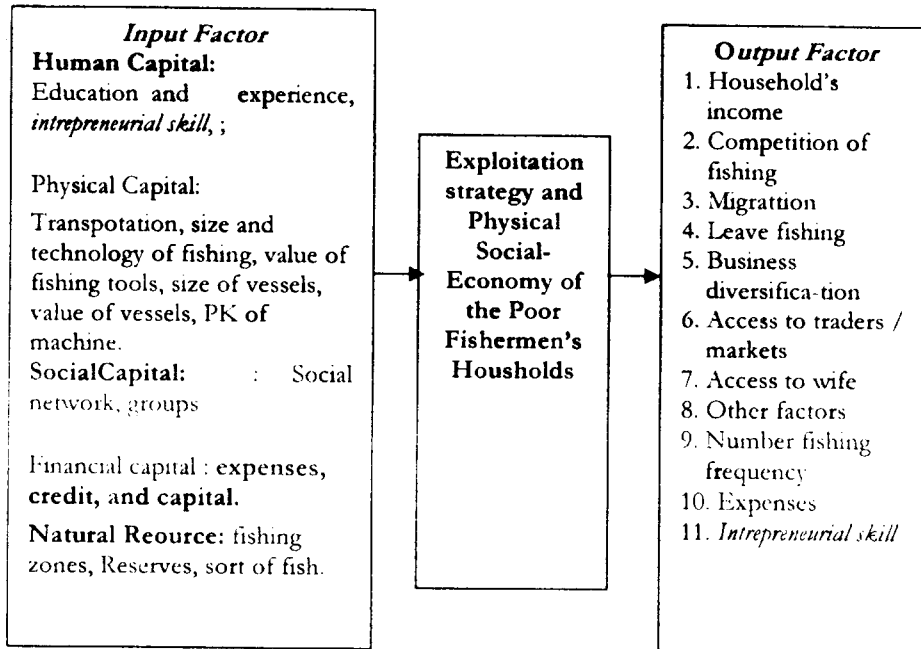


Figure 3.3: Input-Output Factors affecting physical household economy of the poor fishermen

The input-output factors above may be divided into three groups: a) internal factors, b) external factors, and c) intrepreneurial skill factors, as called social-economic factors. The latter is measured based on their household covering: 1) the independence, 2) the innovation, 3) the risk-taking, 4) the initiative action, and actively compete in having market/trade potential.

The research variables are measured using quantitative and qualitative approach. The qualitative variables are measured using Likert Scale with five points. The type of relationship is tested and presented in Figure 3.4. The scores are based on the following standards:

- Score 1 means quite unagreeable
- Score 2 means not agreeable
- Score 3 means neutral
- Score 4 means agreeable
- Score 5 means quite agreeable

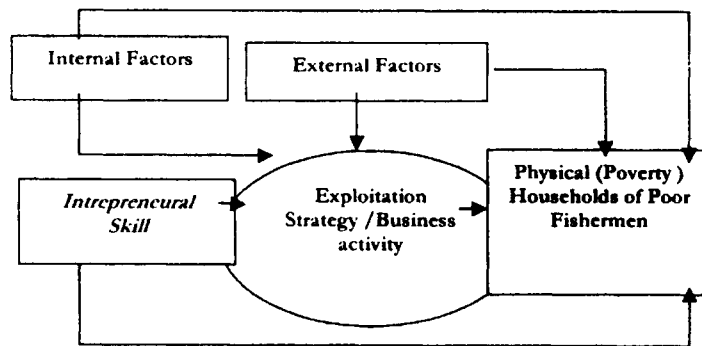


Figure 3.4: The cause-effect of the environmental changes on household poverty of the poor fishermen.

The primary data and secondary data are analyzed descriptively. To get the description on any factors affecting the social (human) empowerment effectivity, the researchers employed the inferential statistical analysis and econometric model in the form of simultaneous equation.

In analyzing data on cause-effect relationship, the researchers employ Structural Equation Modeling (SEM) with the following procedures: 1) technical model development, 2) path diagram development, 3) path diagram conversion into structural equation and model, 4) input matrix and model estimation selection, 5) observing the possibility of model identification problems, 6) evaluation of criteria of goodness of fit, and 7) model interpretation and modification.

### 3.5 Types of Data and Gathering of Data

The types of data in their research are divided into two: primary data and secondary data. The first is collected with in-depth interview based on poverty participation assessment (PPA). The secondary data is needed as the complement for the primary data collected from the related institutions.

4. Results and Discussions

4.1 The Reserve of Fish Resources

The reserve level of fish resource in East Java is getting decreased. Exploitation level of fish in Bali Ocean (Hariyanto, 2005) was found over exploited. The same thing also happened in Madura ocean. Table 4.1, Table 4.2, Table 4.3 explain the reserve level of fish.

No	Item	Pelagis Fish		Demersal Fish		Total (Ton)
		MSY (ton)	Effort (unit)	MSY (ton)	Effort Opt	
1	Prod.	101.120		28.236		129.356
2	Trans		1.653-		406- DS	
3	CPUE	61,18	PS	69,51		
4	Prod. 2004	128.403		6.190*)		
5	Trans 2004		1.713- PS		1.012 DS	
	Expl		Over exploitd		Over exploitd	

Table 4.1: The estimated results of maximum fish production (MSY) of Madura Ocean (Schaefer Model) and Fish production in 2004.

No	Details	Total	%
1	The changes of fishing zones		
	a. No change	4	16,00
	b. Get farther	21	84,00
2	Size of Vessels		
	a. No change	19	76,00
	b. Get larger	6	24,00
3	Business Activities		
	a. No change	13	52,00
	b. Get worse	12	48,00
4	Size of Fish		
	a. No change	4	16,00
	b. Get smaller	21	84,00
5	Number of caught-fish		
	a. No change	5	20,00
	b. Get less	20	80,00
6	Operational cost of fishing		

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	a. No change	2	8,00
	b. Get higher	23	92,00

Table 4.2: The Fish Reserve according to the respondents of Prigi Village

No	Details	Total	%
1	Change of fishing zones		
	a. No change	8	32,0
	b. Get farther	17	68,0
	Change of Size of Vessels		
2	a. No change	18	72,0
	b. Get larger	7	28,0
3	Change of Business activities	8	32,0
	a. No change	11	44,0
	b. Get decreased (worse)	6	24,0
	c. Get developed		
4	Change of size of fish		
	a. No change	11	44,0
	b. Get smaller	14	56,0
	Change of number of caught-fish		
5	a. No change	2	8,0
	b. Get decreased	23	92,0
6	Change of operational cost of fishing	1	4,0
	a. No change	24	96,0
	b. Get higher		

Figure 4.3: The Fish Reserve According to the respondents of Weru Village

4.2 **Social and Economic Condition of Fishermen**

The social and economic condition of fishermen in east java related to the local condition with household consumption level in 2005 is less than Rp. 20,000.- per day as stated by the respondents of Prigi Village and Weru Village. It is presented in Table 4.4 and Table 4.5.

No	Regarding	Total	%
1	Household asset ownership	3	12,00
	a. < Rp. 10,00 millions	3	12,00
	b. Rp. 10,00 – Rp. 20,00 million	19	76,00
	c. > Rp. 20,00 millions		

2	Busines asset ownership		
	a. < Rp. 10,00 millions	17	68,00
	b. Rp. 10,00 – Rp. 20,00 million	7	28,00
	c. > Rp. 20,00 millions	1	4,00
3	Income per month		
	1. Fish, Kgs		
	a. < 200 Kg	3	12,00
	b. 200 – 400 Kg	3	12,00
	c. > 400 Kg	19	76,00
	2. Income rate		
	a. < Rp. 0,50 millions	1	4,00
	b. Rp. 0,50 - Rp. 1,00 milians	2	8,00
	c. > Rp. 1,00	22	88,00
4	Household consumption		
	1. Per day		
	a.< Rp. 10,- thousands	7	28,00
	b. Rp. 10,00 – Rp. 20,00 thousand	12	48,00
	c. > Rp. 20,00 thousands	6	24,00
	2. Per month		
	a. < Rp. 0.50 millions	20	80,00
	b. Rp. 0,50 – Rp. 1,00 millions	5	20,00
	c. > Rp 1,00 millions	0	0,00

Tabel 4.4. The Economic Welfare Rate of Fishermen Household of Respondent in Prigi Village

No	Regarding	Total	%
1	Household asset ownership	2	8,00
	a. < Rp. 10,00 million	14	52,00
	b. Rp. 10,00 – Rp. 20,00 million	9	36,00
	c. > Rp. 20,00 millions		
2	Business asset ownership	4	16,00
	a. < Rp. 10,00 millions	11	44,00
	b. Rp. 10,00 – Rp. 20,00 million	10	40,00
	c. > Rp. 20,00 millions		

3	Income per month		
	1. Fish, Kg		
	a. < 200 Kg	3	12,00
	b. 200 – 400 Kg	3	12,00
	c. > 400 Kg	19	76,00
	2. Income rate		
	a. < Rp. 0,50 millions		
	b. Rp. 0,50 - Rp. 1,00 millions	0	0,00
	c. > Rp. 1,00 million	1	4,00
4	Household consumption		
	1. Per day		
	a.< Rp. 10,-thousands	5	20,00
	b. Rp. 10,00 - Rp. 20,00 thousand	18	72,00
	c. > Rp. 20,00 thousands	2	8,00
	2. Per month		
	a. < Rp. 0,50 millions	13	52,00
	b. Rp. 0,50 - Rp. 1,00 millions	8	32,00
	c. > Rp 1,00 millions	4	16,00

Tabel 4.5. The Economic Welfare Rate of Fishermen Household of Responden in Weru Village

The social and economic condition and the ways the fishermen solve their problems (poverty) are stated as follows:

1. The physical condition of their houses is mostly made of bamboo wall/wood. The “good” houses found in the field are owned by and occupied by fish traders, boss, and/or vessel-owners. The most houses where the fishermen live are gift from their parents.
2. The fishermen’s habit of relieving themselves at the beach is difficult to maintain although washing rooms are available in their houses.
3. The fishermen’s wives spend more their time for writing their husbands from fishing rather than helping them make money. They also tend to avoid any activities held by the head of villages because they feel underestimated and lower social status and lower educated.
4. Religious and social activities are intensively performed.

5. The government's subsidies are not well delivered. For example, some of them got only 5 kg of rice per household rather than 20 kg of rice which should be actually received.
6. The fishermen are quite dependent on the fish traders because of debts. The price is set up unreasonable by the wholesalers for the fishermen. This condition makes them get sorrow and affects their daily lives. The infrastructure for transportation, education, and health services are available.
7. In the context of economic relation of the fishermen, "fish-traders" plays a very important roles between the traders and the fishermen. The fish traders do not only buy fish but also provide any loans which seems to be useful and helpful for the fishermen, but in fact, the loans are just "trap" for them.
8. Ocean as a common property tend to be over exploited. It affects the number of caught-fish. The number of vessels, the use of catching tools which destroy the ocean resource, eco-systems, the irregular climate may cause the number of caught-fish decreased and create poverty. The technology used in fishing like "purse seine" and "danish seine" is not useful because the number of caught-fish is getting decreased while the operational cost is getting increased.

#### **4.3 The Fishermen's Accessibility**

The fishermen have accessibilities from the lowest until the highest. Social capital is the highest (0.940), physical capital (the harbour) is 0.444, human capital (the fishermen's skill and knowledge of fishing) is 0.353, financial capital (their ability to get capital to develop their business is 0.309 and the lowest one is natural resource capital (fish reserve) --- 0.285. This result is presented in Index 2 and Index 3.

The form of pentagon asset of households of Prigi Village is more symmetrical compared to those of Weru Village. It shows that social and economic relation between the actors in Prigi Village is more balanced, but those of Weru Village are not. It means that it is possibly found that there was "an actor" who dominated the economic activity in Were Village.

Thus, some efforts of maintaining their lives meet be based on local considerations and should be comprehensively performed with the structural and cultural approach to all aspects of the household pentagon asset. The level of accessibilities showed by the fishermen of Prigi Village and Weru Village is presented in Table 4.6 and Table 4.7.

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No	Details*)	Total	%
1	Technology		
	a. Low	18	72,00
	b. Middle	4	16,00
	c. High	3	12,00
2	Market		
	a. Low	20	80,00
	b. Middle	5	20,00
	c. High	0	0,00
3	Capital		
	a. Low	13	52,00
	b. Middle	10	40,00
	c. High	2	8,00
4	Vacancy		
	a. Low	21	84,00
	b. Middle	4	16,00
	c. High	0	0
5	Social		
	a. Low	23	92,00
	b. Middle	2	8,00
	c. High	0	0,00

\*) Notes : The lowest score : 0 -3, The middle : 4 – 6 and the highest: > 6  
 Table 4.6: The Economical Accessibility of Fishermen's Household of Prigi Village

No	Detail *)	Total	%
1	Technology		
	a. Low	16	64,00
	b. Middle	5	30,00
	c. High	4	16,00
2	Market		
	a. Low	1	4,00
	b. Middle	2	8,00
	c. High	22	88,00
3	Capital		
	a. Low	8	32,00
	b. Middle	2	8,00
	c. High	15	60,00
4	Vacancy		
	a. Low	11	44,00
	b. Middle	4	16,00
	c. High	10	40,00
5	Social		



	a. Low	0	00,00
	b. Middle	3	12,00
	c. High	22	88,00

\*) Notes : The lowest score : 0 -3, The middle : 4 – 6 and the highest: > 6

Table 4.7: The Economical Accessibility of Fishermen's Household of Weru Village

#### **4.4 Empowering the Poor Fishermen**

The factors which affect the increase of their income, those of empowerment program participant and non-participants are fishing production, productive time spent and the cost of production or operation. The factors which affect the increase of fishing production are the asset of vessels, type of catching tools, quality human resource, fish price, the fishing area, and business development after harvest time. While the factors which affect the decrease of production of results of fishing is fuel. Some factors affecting the fishing costs are vessels used, type of catching tools, result quality and human resource quality.

Thus, the development of the ocean area for increasing the fishermen's welfare and eliminating poverty is directed to the efforts of: 1) increasing human resource quality, conservation of resources and the result quality of fishing supported by training and consultancy with which the illegal exploitation of fish resource could be avoided. 2) Empowering local institutions, funding access and marketing access. It must be realized in the form of providing loans spent for increasing production rate. If it is provided with cash, the loans must be directed to spend it for productive purposes.

### **5. Conclusions**

- 5.1 In general, the reserve of fish resource in East Java is getting decreased. It influences directly the fishermen's income. The level of exploitation reaches over available fish resource (over exploited). Thus, the maintenance and the increase of the fishermen's income should be focused on the use of technology which does not destruct environment, quality approach, and the target of commercial fish. The increase of their income from other activities (non-fishing) could be an after-harvest time (agroindustry) and other alternatives of activities.
- 5.2 The decrease of reserve of fish resources is followed by the decrease of fishing area, fish number, and fish size the fishermen got from fishing. This condition makes them sorrow. The women in the villages spent more their time just for waiting for their husbands from fishing rather than doing things for money and they avoid attending any meeting

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- because their social and economic status and level of educational background.
- 5.3 Religious and social activities are intensively performed. The fish auction facilitated by the government do not function well. Most of the government program does not run as being expected. However, the fish-traders play a dominant role for their lives. They provide any loans for them, then set up the fish price unfairly. This, of course, influences their income. The people perceive ocean as the public property to be over exploited. The increase of vessels quantity, the operating of catching tools which destructs fish resources, eco-system, unpredicted climate also affect the number of caught-fish, and cause poverty.
- 5.4 Because the economic condition is easily affected by the climate and environmental changes, the fishermen have various accessibilities from the highest till the lowest. Social capital (asset) is the highest (0.90), physical asset (the harbour) is 0.444, human capital (the fishermen's skill and knowledge of fishing) is 0.353, financial capital (their ability to get capital and develop business) is 0.309 and the lowest is natural resources (fish reserve), 0.285. Thus, all efforts of maintaining their lives should be performed comprehensively based on the structural and natural approaches.
- 5.5 Some factors affecting the increase of their income of those of participants joining the empowerment program or non-participants are fishing production or operational cost. Factors affecting the increase of fishing production the asset of vessels, type of catching tools, human resource quality, fish price, fishing area, and business development after harvest time. Factors affecting the decrease of production of fishing is fuel. Factors affecting the fishing cost is the operating of vessels, type of catching tools, fish quality and human resource quality.

### 6. Suggestions

The development of coastal area of Indonesia aimed at increasing the fishermen's welfare and decreasing the poverty rate is suggested as the following.

1. to focus on developing human resources, the quality of technological environment, the fish resource and the quality of caught-fish. Those are to be supported by intensive training and intensive guides for effective fishing and other activities, then they are expected to have alternative jobs other than fishing.
2. to drum in on the access empowerment and strengthening their accessibility to local financial institutions by maintaining the pentagon

assets especially those leading to the funding services which are mainly realized in providing equipments for fishing which make them work more efficient make the environment more sustainable.

3. Also, it is suggested that further studies focuses on the policy analysis and strengthening institutions, local leadership, and marketing/funding for the poor fishermen.

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