Assessment of Perceptions and Attitude Changes Of a Post-Tsunami Community on the use of Aquatic Resources

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Abstract

Fisheries have become an important issue because of severely declining stocks driven by world market demands. While worries about unlimited extraction of resources have lead to a number of measures being tested, most attempts have been unsuccessful. The 26 December 2004 Tsunami has had an impact on affected coastal people. A tragic as this event is, it may provides us a small window of opportunity to divert attention from going back to fishing if the fisheries are provided with alternative livelihood options.

This study, therefore, attempts to understand whether and how the perceptions and attitudes toward fishing in coastal areas may have changed since the tsunami. Five coastal villages in Ranong Province, Thailand were selected as the study area because most of impacted people are fishermen or coastal aquatic resources users. A combination of research tools was applied including RRA, field observation, a semi-structured questionnaire and key informant interviews; all applied to measure perceptions and attitudes of the local community. A total of 247 households were contacted, with 494 responses.

The analyses indicate that, the recently tsunami disaster did not influence changes of community's perceptions and attitudes, in particular elder fishermen, in terms of going back to fishing. It was also noted that the majority of fishermen are still highly satisfied with their occupation in the hope that fishery resources are still available for them. The satisfactions were confirmed with the indicators that fishermen would reinvest in fishing once they have opportunity if even their loved ones or they themselves were severely injured, their fishing facilities were totally destroyed, and their properties were completely damaged by the disaster. The important reasons for not adopting an alternative occupation for these fisher folks relate to fishing as their main source of income, their low level of education, the high number of years of experience they have in fishing, and their age. It is relatively difficult in attempting to convert them to have alternative occupations which are not related to fishery activities. Thus, there is a need is to provide truly alternative sources of income, to relieve dependence on coastal resources or it should have some of the same characteristics as those considered desirable in fishing.

Keywords: *Perceptions, Attitude, Post-Tsunami, Aquatic Resources*

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1 Introduction

At present, natural resources and environment quality problems continue to occur worldwide causing severely negative impacts at all level including the local, regional, national and global. It has increased since the early 1970's economic growth. The quality of natural resources has decreased due to the population growth, inadequate investment, weak inter-agencies coordinator, weak research and extension services, poverty, poor database, institutional failure, and non-participation of women in planning and decision making and rapid economic development (FAO, 2000).

At the same time, increased fisheries overexploitation and habitat degradation are also threatening the earth's coastal and marine resources. Along the seacoasts worldwide, fisheries have become an important issue due to severely declining stocks driven by huge market demands. To cope with these, urgent intervention is needed.

The world population growth has caused a rise in the demand for fish. The increased fishing pressure, particularly in coastal waters, has resulted in already overexploited inshore fish stocks in many parts of Southeast Asia. Lower catches further increase the fishing effort and lead to the use of destructive fishing techniques such as fishing with too fine mesh sizes (mosquito nets) or with dynamite, which further accelerates the overexploitation of the aquatic resources and results in the destruction of the marine environment (Seilert & Sangcham, 2001).

Conventional methods of regulating fisheries have often failed to prevent the continuous depletion of fish stocks. In an attempt to avert the downward trend of capture fisheries, many local communities of tropical countries have established marine reserves or fish sanctuaries. Many fishery scientists believe that the alarming levels of over-exploitation of marine fisheries make stopping fishing be one of the few management options available to maintain a critical spawning stock of biomass needed to sustain fisheries.

Alternative livelihood approaches have become popular policy options used to fulfill integrated coastal management environmental and social objectives along with elevation of the socioeconomic status of small-scale fishers and the reduction of fishing pressure on overexploited fisheries resources. Alternative livelihoods have been recommended for fishers engaged in destructive fishing practices, displaced by marine protected area or displaced because of a scarcity of fishery resources. Alternative income activities commonly used in coastal community included terrestrial agriculture, park ranger, dive tourism employment and mariculture (Gell & Robert, 2003).

The alternative is for fishermen to change their occupation. However, in rural areas with a low average income and often no possibility of land ownership,

opportunities for alternative income-generating activities are limited. In most cases, fisherfolk have to leave the village. This increases migration pressures on cities and leads to changes in the population structure of rural areas. The best way to ensure the livelihood of small-scale fisheries in rural areas is to establish sustainable fishery management plans that will support the rural poor fishermen. However, fishery management also has to recognize the social importance of small-scale fishery. It has to address the problem that the sustainable use of marine resources may no longer generate enough income for all fishers engaged in small-scale fishery. Only if the economics of small-scale fishery is fully understood and its social importance as source of employment and income is fully recognized can proper recommendations for socially equitable and sustainable fishery management be made. This stresses the need for a study on feasibility of alternative livelihood options for coastal community fisheries.

Fisheries along the coast are an important issue. As a reported by FAO, Thai fisheries are now facing severe decline resulting from over exploitation, improper and destructive fishing. The fishing efforts were driven by the huge world market demand. Thailand is one fishery exporter and it has had reputation for its robust fishery industry. A large number of fishing boats is in service and a decline in fisheries on the Andaman coast has been known for over a decade (FAO, 1997). Concern over the people's resource extraction has result in a number of measures but the attempts to reduce the fishery fleet have been unsuccessful.

The 26 December 2004, Tsunami affected hundreds of thousands of people. It distressed nearly 500 fishing villages along the Andaman cost and destroyed the livelihood of an estimated 30,000 households who primarily depended on fishery activities and it also severely damaged over 4,500 fishing boats (FAO, 2005).

The tsunami had an impact on people's psychology regarding use of aquatic resources. Many become afraid to go to the sea because they believed in rumors that there are ghosts at sea and that fish were feeding on human flesh. Moreover, another tsunami might happen anytime without warning. As tragic as the event is, it provides us with a small window of opportunity to divert attention from going back to fishing by providing people with an alternative livelihood option. However, it is not clear whether the change in their perceptions and attitudes toward fishing in the effected coastal are have occurred since the tsunami. Fundamentally, the aim is to determine to what extent the fisherfolk who survived the tsunami are willing to accept a new occupation or livelihood.

The aim of this study is to assess community's perceptions and attitude changes toward setting out to fish in coastal areas post-tsunami disaster; and to examine factors influencing these changes, which could contribute to improvement of future planning on reestablishing coastal fishing community livelihoods.

2 Research Methodologies

This research study employed both exploratory and explanatory techniques. The exploratory research was used to explore the changing perceptions and attitudes of the local people on the use of aquatic resources as income for their livelihood. Whereas, the explanatory one has been used to explain the situations and factors that effluences the perception and attitude changes of the community.

2.1 Sampling Design

The research was focused on the five villages. The five villages are village 1, 2, 3, 4, and 7. There were a total of 247 sample households with 494 responses randomly samples from 840 households (3,226 people) living in the study villages.

The numbers of selected households based on proportion random sampling without replacement (Maih, 1993). Therefore, 247 household were selected based on a total population of the 5 target village of 840 households at 95% confidence level, 5% precision and 0.35 proportion.

2.2 Data Collection and Analysis

The empirical parts of this research are drawn mainly from both quantitative and qualitative methods. Two qualitative methods were used for achieving above objectives, which are Rapid Rural Appraisal (RRA) and Participatory Rural Appraisal (PRA) approach. Field observation technique was applied during data collection time at the field. Researcher lived in the village to observe their casual life in the community. The qualitative data focusing on fishing techniques, household/life style conditions, farm location, village location, geographical, culture, traditional and etc of the community were gathered.

From the semi-structured questionnaires designed, perceptions and attitudes of the local people on their use of aquatic resources were gathered, including their perception of fishing, aquaculture activities and the condition of resources within their community, both males and females (spouses) in every single household were interviewed. A pre-test were carried out in village 1 with number of people to find gap or mistake in order to rephrase sentence according to local sound.

For gathering information regarding to perceptions and attitudes, questionnaires have been designed to elicit numerical values for indicators level of agreement, priority and condition of natural resources before and after tsunami. Value of each indicator was based on the perceptions of interviewee showed on visual ladder scale. This standard tool provides ordinal data, which allow statistic analysis. Resources users were asked to answer questions using a picture of a ladder as visual aid. The lowest rung represent to worst possible condition while the highest worth the best. These data were very important for changing

perceptions and attitudes analysis. The questionnaires were translated into Thai language to be easily followed by field research assistants.

3 Results and Discussions

3.1 Profile of the study areas

Ranong Province is one among the fourteen coastal provinces in Thailand. The majority of its population that live along the coast is engaged in some sort of fisheries related activity. The study area is consistent with the rest of the province. Post tsunami nearly 20% of the people are living in a tsunami house, while approximately three fourths (75.7%) still living in their original house. Regarding to basic need of sampled households show that almost all had electricity use (99.6%), 80% had pipe water and enclosed toilets.

The age distributing structure of respondents, both male and female, divided into five categories, less than 18 years, from 19-35, 36-50, 51-65 and more than 65. The purpose is to show the different percentages of people at labor age and dependent age. Respondents' age ranged from 14 to 79 years old with an average of 40.48 and standard deviation 13.51. 92.9% of responses were in working age (18-65). The average size of family was 4.17 per household with minimum of one person and maximum of 16 persons. The overall illiteracy rate of respondent families was only 8%, and nearly two thirds (64.2%) finished primary school level. In terms of religion, the majority (more than 95% in village no.1, 3 and 4; and 71.3% in village no.2) of respondents in the study area were Muslim except village no.7 which was about 75% Buddhist.

There is not a lot of immigration into the study area. The average time in the area for immigrants was a very high twenty years. Only 11.7% of respondents have lived in the community less than 4 years. Only 16.8% migrated from upland area[2], while the rest come from coastal provinces where their original way of life or families also involved fishing activities. With regard to accessibility to mass media, more than half (51.8% of 452) never listen to the radio, while nearly three fourth never even read news papers. However, the percentage of respondents who watch TV was a relatively high. People in community seldom travel outside of their village. Almost 50% of them never even visit a nearby Tambun[3] in a year time. Nearly 90% (88.9) of respondents do not visit Bangkok in a year and almost 80% don't even visit Phuket which is only 2 and half hours away.

This shows that there is very little new information and ideas brought into the villages through traveling and meeting new people, exposure to new and different attitudes, approach and ideas.

[2] The upland area is referring to the region in the Northeastern and Northern of Thailand.
[3] Tambun is one of a administrative management zone of Thailand, which consists of number of villages

There were 6 occupations reported as main sources of incomes generation for the communities in the study area. More than two third (71.6% of 243 households) of households engaged in fishing as their main source of incomes, while nearly half (43.2%) of them also doing farming and wage labor (42.8%). The majority of wage labor worked as a boat crew (men) and net setting (women). The majority of fishing families were found in village no.7, 1 and 4 (72.5%, 70.7% and 60.0% respectively) while there was less in village no.2 and 3.

It was found that women are more active participants in aquaculture than fishing. Women were involved 64.8% of the time in aquaculture families but in fishing families 56.8%.

3.2 Pattern of resources utilization

As discussed in the previous chapter, there were 6 occupations reported as main sources of income for the community. More than two thirds of them engaged in fishing activities, most of those were self-employed as their main occupations. This indicates that too many people depend on coastal resources as their main sources of income. Fishermen have an average experience of more than 17 years, standard deviation at 10.49. From the result of analysis presented that there were few fishers that had experience less than 3 years. By contrast, more then 65% of them has experience for more than ten years. Therefore, the majority of fishers in the community can be considered as skillful fishermen. So that attempting to change their job may not easy method. On the other hand, fishers in Southeast Asia generally like their occupations, despite the risks, and few would change to another occupation even they could get a similar income (Pollnac. *et al*, 2001).With this finding, it is relatively difficult in terms of attempting to convert them to have alternative jobs which are not related to fishery activities. Thus, there is a need to provide truly alternative sources of income, to relieve dependency on coastal resources.

Pattern of resources utilization data is also particularly useful information for identifying threats to the coastal resources. There were 5 types of fishing methods commonly used by the communities. Fishing gears used in the community can be categorized in small-scale units which may not cause harms to fishery habitats because most of the gears operated with manual and fishing products only supply to local markets. Shrimp nets are the most frequently used, which were operated by more than three fourth (75.1%) of the fishermen. The secondary method was followed by crab nets, fish nets, fishing pools and squid trap.

There are two kinds of fishing boat: long tail and flat bottom boat, commonly used in the study area. After the tsunami disaster, about 80% of fishermen in community, but not village no.1, used long tail boat. In contrast, nearly two third of villagers in village no.1 is owned flat bottom boat. The boat has an average

length of 9.6 meters and standard deviation at 3.1. The longest boat in the community was 16 meters long (long tail) and the shortest one at 3 meters (flat bottom). Because the boat size is relatively small, fishers could not go further from shore. The majority of fishermen go fishing around Koh Kam and Koh Surin[4] Island. The findings provide an indication that fishing activities of the community is traditional fishing.

Concerning the boat availability of the fishermen and fishery employee households, more than half of them (55.4%) used replacement boats, while the rest either used their previous boat or work as boats crew for somebody. For instance, in village no.4 and no.3, more than two third (70% and 75%) of fishermen used donated boat, while the other three villages used them less than 50 percents.

Because of lower incomes from primary occupation such as fishing, people in the community also working as wage labor, farming (mostly para rubber), livestock rearing and aquaculture. The occupation diversity is an important attribute of the local livelihoods. Fishing methods which require going to the open sea, more than three fourths is men. In contrast, aquaculture works, trading at home or wage labor (nets setting), all kind of homework, found more than three fourths performed by women. The role of women in coastal fishing activities were limited to net setting, shell fish gleaning and fishing products sorting at landing site. The women were not aware of the importance of their role in fishing activities and tended not to mention their involvement until they were specifically asked about it. If one would like to get the true picture of the extent of women's involvement in fishing activities, a separate study is recommended.

3.3 Community perceptions and attitude regarding to fisheries

Perceptions and attitude of the local people towards their fishing activities are the key elements towards sustainable use of natural resources. For understanding people's perceptions and attitudes, an agreement scale with seven steps weighting from -3 to 3 were used to differentiate the levels. The levels were used to compute weight average index (WAI). The seven classes of results with reference to the degree of agreement were: strongly agree, agree, slightly agree, neutral, slightly disagree, disagree, and strongly disagree. To obtain the data required for analysis, sampled respondents were asked to indicate the degree of their agreement to the following statements. The statements were:

- *Fishing is a safe occupation for the people in the community and there is no worry or risk of any sort.*

- *Fishing activities by the local community do not influence the fish resource in the ocean.*

[4] The two islands located about 10km off shore

- *There is no need to plan for the future, it is not within our control and we can not do anything about it.*

In the three statements, each of which involves some aspects of relationships between fisheries resources and human activities. These were used to control for response where either agree or disagree. If they indicate either agree or disagree, they were asked if they strongly agree (disagree) or slightly agree (disagree) just a little with this statement.

From the findings, the majority (80%) of the surveyed believed that fishing is not safe, but they still go for fishing. About 66 percents of them believed humans' activities have no impacts on fishery resources. In particular, Village no.4, where majority depend on fishing as their main occupation strongly believed (WAI=-1.957) that fisheries resources will avail for them forever. The result showed that the fishery resources are being threatened due to the lack of local people's awareness on sustainability of resources. Therefore, urgent management intervention relevant to public awareness is recommended, especially to villagers in village no.4. In addition, the people in the community do not pay much attention the loss of fishery resources even though the majority's livelihood depends on fishery. Almost equal percentages fishermen responded with the need to have plan for their future and no plan needed. The result is a warning sign that resources are being threatened or possibility over-harvested, if public awareness of sustainable uses is not introduced on time. It is proposed that responsible fishery project or public awareness intervention should be put in place before the resources getting worse.

More than half of fishers in the community were highly satisfied with their occupations. Reasons were easy income generation, can work without boss and fishing is their indigenous work. They stressed that the income from fishing is adequate to support their family's needs. Moreover, they realized that their limited education confines them to fishing since fishing does not need higher education and it also allowed them to stay close to their families. Those who were not satisfied cited less skill, dangerous work or too old as their reasons. The results indicated that those who lack skill in fishing might be young or new comers and those who mentioned about danger in fishing might be the one who experienced the tsunami.

Nearly 73% of fishermen chose non-fishing occupations for their children. The findings were not surprising given the fact that most of parents would like their children's position to improve. What parents want for their children, however, may differ from what the child desires. Similar findings reported from traditional fishermen in South Africa (Hanek, *et al*, 1991), Indonesia, and Vietnam (Pollnac, *et al.* 2001). Nearly half feel that fishing is a risky job and about one fifth wish their children to have higher education. However, about one fourth of the community would advice their children to be a fisher once they have gear in

hand. Among those, about two thirds gave reasons such as fishing can provides an easy income, and provide job to their children.

Inclination of fisher community to change their fishing occupation if an alternative is available for them was given by more than 85 percents. This agrees with more than half (53.3%) of Lake Kivu fishermen in South Africa that they wish to leave fishing and pursue other interests (Hanek, *et al.* 1991). The result in the present study different from reported by Pollnac, *et al.* (2001) that fishers in Southeast Asia generally like their occupation, despite the risks. The differentiations give evident that perceptions changes of the people might be related to the recent tsunami. Those who would not stay in fishing (85.2%), the primary reason were the difficulty in fishing and low income. In contrast, those who would stay in fishing mentioned that fishing is a good occupation, which could provide good income and it also their indigenous job. It is difficult to know whether they really give up their fishing job or not when alternative is available. Fishermen might accept new occupation to increase their household incomes or create job for their family member, especially women and children, if the new job is some sort of home-based works.

The tsunami made the community's well-being worse off. About three fourth of fishers complained that they are worse off after the tsunami because they don't have job to do or their income was getting lower with compared to the past. In this, some people mentioned that their well-being is getting worse-off because their fishing gears were damaged by the tsunami. Interestingly, despite the majority stating their situation well-being worse-off to day, more than half of them expected that they will be better-off in the next three years. Residents in village no.7, which more than half of its populations, mentioned their well-being a lot of worse-off at the present, is the one who has high expectation that their well-being would improved in the future. For achieving the goal, fishers seem to be ready to increase their catching effort when the opportunity comes. However, the answer may be reflecting a natural optimistic attitude of human beings for improving their life.

Community awareness and level of participation in the community affaires at the present, peoples' feel that they do not have much ability influence on the decision making. However, they are optimistic that they would have better ability to participate in community decision making in the future. Interestingly, fishermen from village no.1 and no.7 always have high expectations values in their ability to influence on the community affaire as compared with other villages. The results indicate a positive opportunity that, if any community-based project will go to the community, village no.1 and no.7 should be given the priority.

Coastal resources at the present time (WAI=4.81) slightly worse than before the tsunami, which is below the standard situation (WAI=5.00). However, as having seen the given value by villagers, they believe that their resources health would be recovered in the future. The findings considered as a strength factor of the

community, because if people in the community do not consider their resources are at risk, then it might be difficult to engage them to participate in terms of coastal resources management.
Enforcement of rules and regulations at the present are not effectively implemented (WAI=7.32) in the community. However, this level is increased as compared with before the tsunami (WAI=7.28). Moreover, the local people believed that rules and regulations will be enforced then the effectiveness will be increased in the future. As indicated by WAI value, the level of people compliances with the rules and regulations showed ascending in orders from the past up to the future. Fishermen in village no.1 acknowledged that the rules and regulations in their community is more effective compared to other villages. The effectiveness of the rules and regulations likely related to unity of their religion and household's productive activities of local people. On the other hand, the increasing number of people compliance with the rules and regulations in the community might be related to increasing number of high educated people in the community. The result gives evident that the rules and regulations are being enforced and it would be a good asset promoting conservation activities by strengthening their public awareness regarding sustainable use of aquatic resources of the area.

Future outlook questions in the study aimed to predict priority options of the local people to rehabilitate their livelihoods. The majority would still run the same business like what they have before the tsunami. However, some of them would like to invest in new interests. For examples, farming family wish to invest in fruits cultivations and traders wish to expend their business. Notably, for business at home planning, in which given by fisher and farmer families shown its percentages was dramatically dropped while their capital of investment was increased (9,000 Baht to 110,000 Baht). The figures show that small business investment plans that responded by some people, who is their background was not related to trading might not what they really wish. Given answers may be come from rapid thinking of people, because they themselves also do not clear kind of business that they really wish to have. Investment orientations of the local people might be changed if they really have these amounts of money in hand. So, if any loan project is going to the community, further study on business orientation is suggested.

This chapter is concluded that the majority of fishermen feel that fishing is not safe, but they believed their activities have no impacts on fishery resources. People in the community do not pay much attention the loss of fishery resources even though the majority's livelihood depends on fishery.

Fishermen were highly satisfied with their occupations. Reasons were easy income generation, their limited education and allowed them to stay close to their families. However, more than 70% chose non-fishing occupations for their children. Nearly half feel that fishing is a risky job and about one fifth wish their children to have higher education. Inclination of fishers to change their fishing

occupation was given by more than 85%. Those who would not stay, the primary reason were the difficulty in fishing and low income.

The tsunami made the community's well-being worse-off. About three fourth of fishers complained because they don't have job to do or their income was getting lower with compared to the past. Interestingly, despite the majority stating their situation well-being worse-off to day, more then half of them expected that they will be better-off in the future. Community awareness and level of participation in the community affaires at the present, peoples' feel that they do not have much ability influence on the decision making. However, they are optimistic that they would have better ability to participate in the future. Coastal resource at the present time is slightly worse than before the tsunami. However, the local people believed that their resources health would be recovered in the future. Enforcement of rules and regulations at the present are not effectively implemented in the community. However, this level is increased as compared with before the tsunami. Moreover, the local people believed that rules and regulations will be enforced then the effectiveness will be increased in the future.

The majority of the local people would still run the same business like what they have before the tsunami. However, some of them would like to invest in new interests.

3.4 Analysis of factors influencing the community perceptions and attitude toward the use of aquatic resources

This part examines the factors influencing the fishermen's perceptions and attitudes towards aquatic resources utilization. The relationship between dependent and independent variables is discussed. The important of each factor and its level of influence were analyzed using correlation between the variables and factor analysis.

The study hypothesis predicted that the perceptions and attitudes of post tsunami community on the use of aquatic resources would have changed. Since the baseline data or a survey of the community's perceptions and attitudes are not available, the assessment of the changes was based on correlation analysis tests. Indicative variables for assessment of the perceptions and attitude indicator variables were considered for the test including whether the fishermen would advise the next generation to be a fishermen, their own satisfaction with fishing, and whether they would leaving fishing if an alternative is available.

To assess the changes, both the dependent and independent variables were converted into numeric value or dichotomized as 1 and 0. The variables included age, number of years of fishing experiences, education level, household members injured are dichotomized at the sample mean, and those for self injured, having received a donated boat, occupation, have suffered damaged and having personal experienced the disaster are natural dichotomized.

The interrelationship explained that fishermen who are highly satisfied with their occupations had willingness to advise their children to work like them and would return to fishing again once they have facilities. As earlier discussion, reasons for being highly satisfied with their occupations are related to their level of educations and origin of their life. This study also suggests that fishermen consider that being a fisherman needs no higher education (Table 1).

Table 1: Correlation of attitudes and perceptions between selected fishing occupation variance and its various independent variables

Factors	Dependent Variables (dichotomized)		
	Advice the young to fish	**Satisfied With Fishing**	**Leave Fishing**
Independent Variables (dichotomized)	Correlation Coefficient	Correlation Coefficient	Correlation Coefficient
Advice the young to fish	1	**0.240****	**-0.164***
Satisfied with fishing	**0.240****	1	**-0.219****
Leave fishing	**-0.164****	**-0.219****	1
Given 9,000 B, buy gear	**0.151****	**0.260****	**-0.159***
Given 110,000 B, buy gear	**0.167****	**0.189****	**-0.250****
Fishing is safe	**0.249****	**0.202****	**-0.364****
Human impact on fish stocks	-0.017	**-0.133****	-0.103
Level of formal education	-0.015	**0.167****	0.033
Injured in tsunami	**0.098***	0.058	-0.029
Damaged by the tsunami	0.038	**0.179****	-0.066
Well changed	**0.139***	-0.013	-0.080
Experienced the tsunami	-0.022	**0.254****	-0.096
Household members injured	0.050	**0.106***	0.042
Age	-0.022	-0.030	**0.121***

Remark :

** . Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed)

The majorities of fishermen are still highly satisfied with their job and hope that fishery resources will still be available for them. The satisfaction was confirmed with the indicator that those who directly experienced the tsunami are still satisfied with fishing even though some of their household members or they themselves were injured or their properties were totally destroyed. These fishermen would not quit even if an alternative occupation could generates them the same amount of income as fishing for them. Fishermen would return to their pervious occupation once they have gear in hand.

Seventeen variables (Table 2) were considered to explain the cause toward fishermen's perceptions. There variables were identified through earlier discussion. Factor analysis using Principle Component Analysis (PCA) was conducted to reduce the data and to develop and test the convergent validity of meaningful constructs. For the propose of describing the underlying factor structure, the Eigen Value Criteria of more than one was used to determine the number of components to be extracted for further analysis.

The variables in the table 2 were extracted into seven factors based on eigen value criteria more than one. The table 2 presents the analysis of variance rotated factor loadings, communality, eigen value and percentages. The percentage of variance, which is the actual factor loading of each variable on each of the factors together accounted for cumulative percentage of 66.60 of the total variances. The individual variance explained by each factor is shown by its eigen value and percentages which retrieved that the first factor, the most important one. The first factor was explained 16.81% and was followed by 13.02, 9.52, 7.71, 7.08, 6.57 and 5.89% as second, third, fourth, fifth, sixth and seventh factor, respectively.

Table 2: Rotated factor matrix of loading towards job satisfaction

Variables (dichotomized)	**Factors**						
	1	**2**	**3**	**4**	**5**	**6**	**7**
Main income from fishing	**0.990**	-	-	-	-	-	-
Fishing done by man	**0.990**	-	-	-	-	-	-
Year in fishing occupation		**0.817**		-		-	-
Age	-	-0.764			-		
Education level	-	0.510	-	-	-	-	-
Given 110 000B, buy gear	-		**0.727**	-		-	-
Given 9000B, buy gear	-		0.623	-	-	-	-
Satisfied with fishing	-	-	0.608	0.537	-	-	-
Leave fishing	-	0.465	-0.556	-	-	-	-
Fatal	-	-	-	**0.799**	-	-	-
Human impact on fish stocks	-		-	0.734	-	-	-
Received donated boat	-	-	-	-	**0.747**	-	-
Damaged by the tsunami			-	-	0.705	-	-
Injured in the tsunami	-	-	-	-	-	**0.802**	-
Experienced the tsunami	-		-	-	0.411	0.601	-
Well changed	-		-	-	-	-	**0.881**
Advise the young to fish	-	-	0.466	0.411	-		0.615
Eigen values	2.858	2.213	1.618	1.311	1.204	1.117	1.002
% Variance	16.81	13.02	9.52	7.71	7.08	6.57	5.89
% Cumulative	16.81	29.83	39.35	47.06	54.14	60.71	66.60

Remark : For the analysis, variable loadings less than 0.40 was omitted

Seven main factors accounted for influencing fishermen's perceptions being highly satisfied with their occupation. Of these seven, fishing occupation had a higher factor loading (0.99) influence on the job satisfaction and was followed by fishing experiences, and well-being changed.

To conclude, the tsunami disaster did not change the community's perceptions and attitudes toward going back to fishing. The finding was supported by the fact that fishermen, despite being injured, having their gear destroyed, losing their shelters, or having household members injured, still intend to buy fishing gears if they can afford it. It was found that source of household income from fishing activities, followed by years of fishing experiences, and lower levels of education

are the main factors influencing the community's perceptions and attitudes of going back to fishing.

4 Conclusions and Recommendation

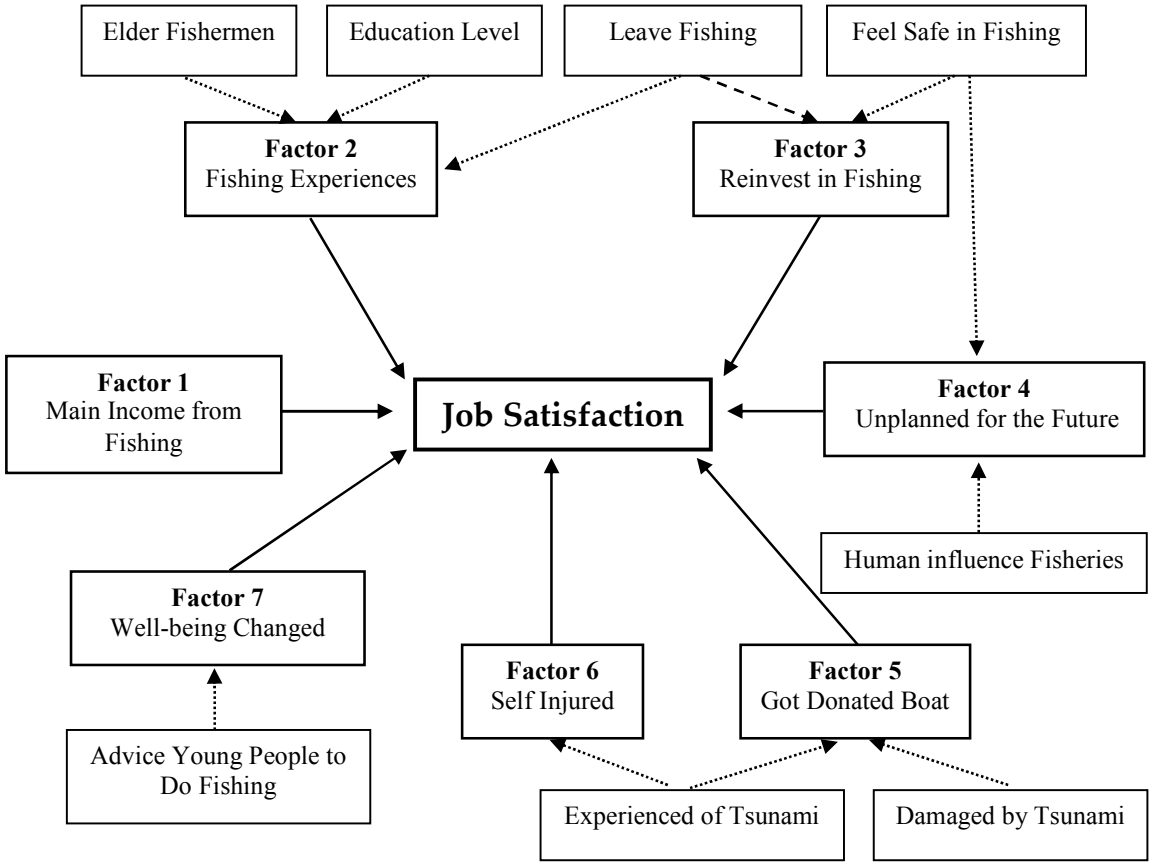
4.1 Conclusions

The recent tsunami disaster did not influence changes of community behavior in terms of going back to fishing. The majority of fishermen were still highly satisfied with their job in the hope that fishery resources still available for them. The satisfactions were confirmed with the indicators that fishermen would reinvest in fishing once they have opportunity even their loved ones or they were severely injured, their fishing facilities, and their properties were completely damaged. The fishermen who were highly satisfied with their job would not quit even if alternative could generates the same amount of income. Fishermen would return to their previous occupations whenever they have gears in hand.

Important reasons for not adopting an alternative occupation for these fisherfolk relate to fishing as their main source of income, their low levels of educations, the high number of years of experience they have in fishing, and their age.

This is graphically presented in Figure 1 where the correlation between the factors influencing fishing community's perceptions and attitudes toward their job satisfaction and their willingness to return back for fishing are drawn out.

Figure 1: Factors Influencing Fishermen Satisfaction in Their Occupations



Remark:

———	= Actual Factor Loadings Influencing Fishermen's Perceptions
.....	= Positive variable with higher factor loading
- - - - - - -	= Negative variable with higher factor loading
Factor	= Each factor ranked by Eigen value, which revealed the first factor the most important one.

4.2 Recommendations for Policy Makers

- It is relatively difficult in attempting to convert older fishermen to have alternative jobs which are not related to fishery activities. Thus, there is a need is to provide a truly alternative livelihoods which is relatively dependence on coastal resources or it should have some sort of the same characteristics as they considered desirable in fishing.
- The local community showed lack of care about the future plans for their next generation. The result gave sign that resources are being threatened or possibility over-harvested, if public awareness of responsible fishing is not

introduced on time. Therefore, intervention related to awareness of sustainable uses of natural resources is recommended.

- Boats donated to the tsunami victims seemed to encourage them to go fishing again. Thus, a first priority should be to raise public awareness about responsible fisheries.

- Attempts to provide alternative occupations should be focused on the young and therefore actions should be taken soon because it is clear that giving alternatives to elder fishermen will be very difficult, since most of them responded as being highly satisfied with their occupation despite all that has happened to them and their community.

- Villages No.1 and 7 responded with a high level of compliance to the rules and regulations and care about their resources. The above outputs may relate to the unity of their profession (fishing) and the isolation of their geographical location. So that if any community-based management project is going to be proposed, Village No.1 and 7 should be given priority.

4.3 Recommendations for Future Study

- The role of women in coastal fishing activities were limited to net setting, shell fish gleaning, and fishing product sorting at landing site. The women were not aware of the importance of their role in fishing activities and tended not to mention their involvement until they were specifically asked about it. To get the true picture of the extent of women's involvement in fishing activities, a separate study is recommended.

- If aquaculture is a potential alternative livelihood for the community, a study about market for the products is needed. Otherwise, fishermen would return back to fishing again if they see the fishing could give more attractive returns than this product.

- A study on alternative livelihoods which have the same satisfaction as fishing is recommended for future study.

- Business at home as an investment orientation options given by the local community was not clear. So if alternative going to provide them for run these business, further study on business orientation is suggested.

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