THE EFFECT OF POST-TSUNAMI PERCEPTIONS ON WILLINGNESS TO PARTICIPATE IN REHABILITATION PROJECTS

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THAILAND POST-TSUNAMI SUSTAINABLE COASTAL LIVELIHOODS PROGRAM

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ABSTRACT

Coastal hazards cause damage to communities that live on, and benefit from, the coast every year. Recovery from coastal hazards is often especially difficult because many of those that were affected by the disaster also lost the ability to practice their livelihoods. Outside assistance is often targeted at rebuilding as the donor agency deems appropriate. However, inappropriate assistance can lead to problems of donor reliance, especially during recovery efforts where the affected population may 'recover' only because of donations from assistance agencies. A better approach to assist recovery is to facilitate rehabilitation of livelihoods, hopefully in a more sustainable way than before the disaster. If successful, those affected by the coastal disaster will be able to control their own recovery because they will be making their own income and rebuilding households and communities to be more resilient in the case of another coastal disaster. How does an outside agency or organization effectively design livelihood rehabilitation projects to suit the needs of those that were affected by the coastal disaster? What perceptions in the aftermath of a coastal disaster affect an individual's willingness to participate in livelihood rehabilitation projects?

The purpose of this research is to evaluate how post-tsunami perceptions affect willingness to participate in proposed livelihood recovery projects. This investigation examines (1) attitudes toward the occupation of fishing and feelings about the future, (2) level of damage to productive and household materials, and (3) perceptions of ongoing and proposed livelihood recovery projects. The study area is five villages in Suk-Sumran, Thailand that were affected by the Boxing Day

Tsunami on December 26, 2004. This paper examines willingness to participate in order to inform designers and managers of livelihood rehabilitation projects for the Post-Tsunami Sustainable Coastal Livelihoods Program. Four hypotheses were tested in this investigation. Each was informed by relevant theory regarding alternative livelihood development, disaster recovery and acceptance of innovations. As a means of assessing post-tsunami perceptions, material damage to livelihoods and households, and perceptions of recovery projects, a household survey was administered to a sample of participants from each of the five villages in the study. Informing and supporting the data from the survey were key informant interviews and participant observation conducted over two months while the researcher lived in one, and worked in all, of the villages.

The study concluded that post-tsunami perceptions and damage to household and productive materials do significantly affect willingness to participate in livelihood recovery projects. Specifically, positive attitudes toward fishing, increased household and productive materials, and positive perceptions of ongoing projects increases willingness to participate in proposed livelihood recovery projects. Finally, the implications of this investigation for recovery efforts are explored as well as possible avenues for future study.

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CHAPTER I

INTRODUCTION

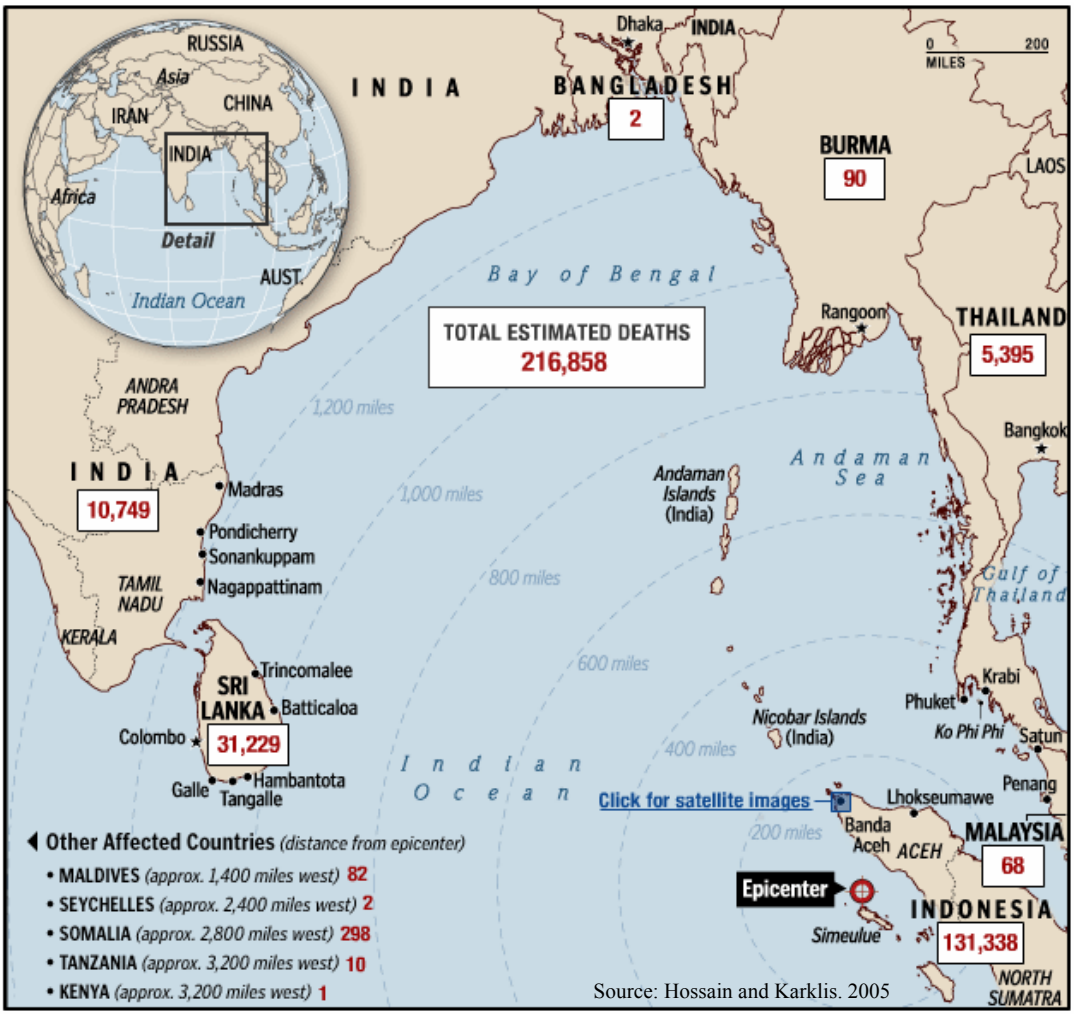
This chapter introduces the coastal hazard that affected the Andaman coast of Thailand and caused the highest death tolls and displacement of people of any natural disaster in recent history. In its wake, the Indian Ocean Tsunami left millions in South East Asia without any source of livelihood with which to rebuild their lives. In response to this tragedy, the Post-Tsunami Sustainable Coastal Livelihoods Program was conceived in order to assist five villages in Thailand to regain their ability to practice occupations. In addition, the program strives to institute livelihood practices that use natural resources more sustainably than prior to the tsunami. A brief overview of disaster research provides the framework for this investigation of the impacts of post-tsunami perceptions and livelihood and household damage on willingness to participate in rehabilitation livelihood projects. Next, the research objectives are presented and terms and operational definitions are described for the purposes of this investigation. The final section of this chapter describes the organization of this thesis.

1.2 Indian Ocean Tsunami and Its Effects

On December 26, 2004 an earthquake of magnitude 9.2 occurred in the Indian Ocean 155 miles (250 km) off the west coast of the island of Sumatra, Indonesia (Briggs et al. 2006, USGS 2006). The earthquake triggered a series of waves, called tsunamis, of up to 30 meters (98 feet) that affected twelve countries

bordering the Indian Ocean causing fatalities and damage to infrastructure as far as 2,800 miles (4500 kilometers) from the point of origin, on the east coat of Somalia (United Kingdom Department for International Development 2006, Hossain and Karklis 2005). These tsunamis inundated coastal areas of Indonesia, Sri Lanka, Tamil Nadu in India, the Maldives, Malaysia, Burma and the Andaman coast of Thailand (Figure 1).

Figure 1. Map of Affected Area and Reported Deaths



Statistics on the damage from these tsunamis range from 210,000-300,000 reported deaths and 1.6 million-2.5 million people displaced (Table 1). In India, the tsunami caused flooding up to three kilometers (two miles) inland, inundating agricultural fields with saline water and killing crops (Tighe 2006). In addition to injury and loss of life, millions that were affected also lost their means of livelihood.

Table 1. Estimates of Number of People Affected by Tsunami

Source/Date	Number of Deaths	Number Missing	Number Displaced	Livelihoods Affected
Science. (Miller 12 Aug 2005).	176,260	49,682	1,729,155	-[1]
United Kingdom Department for International Development. (DFID 1 Mar 2006).	300,000	-	1,600,000	-
Caritas Internationalis. (McNally 28 Feb 2006).	230,000	-	1,800,000-2,500,000	-
Bloomberg News Service. 27 Feb 2006	220,000	-	-	Over 2,000,000
Washington Post. 22 Dec 2005	216,858	-	-	-
UN office of the Special Envoy for Tsunami Recovery. 26 Dec 2005	230,000	-	2,089,000	1,500,000
Oxfam International. 14 Dec 2005.	181,516	49,936	1,800,000	1,400,000

In Thailand as a result of the tsunami, there were 5,395 reported deaths and the livelihoods of 100,000-120,000 people were affected (Miller 2005:1032, UNDP et al. 2005:5). Along the Andaman coast, about 490 fishing villages were impacted by the tsunami and the total estimated damage to the fishing industry is approximately 500 million baht (US$12.7 million)[2] (UNDP et al. 2005:5). This figure includes an estimated 3,402 small fishing boasts and 1,127 large trawlers that were either seriously damaged or destroyed by the series of waves. In addition, about 450 *rais* (177.75 acres) of aquaculture farms and over 7,000 aquaculture ponds were damaged or destroyed (UNDP et al. 2005:5). In response to the extent

[1] Note: An empty cell indicates that no statistic was published by this organization for this purpose.
[2] At the time of this estimate (10 January 2005), 39.230 baht was equal to 1 US$ (Bank of Thailand - Foreign Exchange Rates). http://www.bot.or.th/bothomepage/databank/FinMarkets/ExchangeRate/exchange_e.asp. (Accessed: 15 March 2006).

of the damage from this event, the U.S. government has provided $5.3 million for relief and reconstruction efforts to Thailand (Kujawa 2006).

1.3 The Post-Tsunami Sustainable Coastal Livelihoods Program (USAID project and goals)

In response to a request by the Royal Thai Government for international assistance to rehabilitate ecosystems and livelihoods immediately following the disaster, on March 15, 2005, the United States Agency for International Development (USAID) launched the Post-Tsunami Sustainable Coastal Livelihoods Program (the Program). This program focuses on increasing capacity for various levels of the Thai government to design and implement coastal rehabilitation projects (CRC 2005).

The first objective of this program is to implement diverse and sustainable livelihoods in fisheries, small-scale aquaculture and tourism. The second objective is for local government to adopt hazard mitigation construction standards and building requirements to reduce future vulnerability and rehabilitate coastal public infrastructure and shoreline protection. The third objective is to facilitate negotiations with various levels of government and communities to agree on a single approach to rehabilitation at the program sites (CRC 2005). To support these objectives, the program will provide information about livelihood options and establish a microfinance fund for small scale, start-up loans. The program will enhance capacity through training and education programs in sustainable livelihoods and public infrastructure rehabilitation for community members and

local and provincial authorities. It will also be used as a demonstration site for other coastal recovery programs affected by the tsunami.

1.4 Disaster Research

The Indian Ocean tsunami of 2004 generated a record $13.6 billion in pledged aid and $10.5 billion pledged for reconstruction of tsunami-affected countries (Oxfam International 2005a, United Nations Office of the Special Envoy for Tsunami Recovery 2005). However, one year later, only one in five of the 1.8 million people left homeless, were back in permanent housing, including 67,000 Indonesians still in tents in Banda Ache (Oxfam International 2005a). Disaster recovery programs are often multi-faceted projects in which livelihood rehabilitation is an important component. Reinstituting livelihoods for victims of a disaster serves the dual purpose of providing food and/or income and building capacity for the affected population to become more self-sufficient. However, well-meaning recovery programs are often designed without input from those affected by the disaster. Lack of this type of input can result in poorly designed programs that are more likely to fail. Furthermore, these programs may deliver inappropriate forms of aid that can have negative impacts on the society, including disruption of traditional systems of recovery (Oliver-Smith and Hoffman 2002:14). More effective recovery programs "require the positive and intelligent participation of those most…directly involved" (Bankoff 2004:35).

Designers and managers of livelihood recovery projects should, therefore, consult affected populations before and during the recovery process. Academic

literature recommends a holistic approach to recovery (McEntire et al. 2002, Mileti 1999, Oliver-Smith 2002, PERI 2001) that includes participatory methods for more effective sustainable redevelopment (Bankoff et al. 2004, Oliver-Smith and Hoffman 2002, Oliver-Smith 1996, PERI 2001). The recovery development community is echoing this call for consulting affected populations during recovery efforts (Oxford International 2005b). The UN's deputy special envoy for tsunami recovery suggested that success in recovery requires that "affected communities are engaged in the process" (Tighe 2006).

Applied anthropology can provide the link between affected populations in the aftermath of a disaster and designers of recovery programs. Since anthropologists study human adaptations in general, they are in a unique position to inform those who design recovery projects of the effects of a disaster on a social system (Oliver-Smith and Hoffman 2002:14). Cultural and social anthropology address how humans adapt to their environment naturally, over time (Patterson 1994). Although this type of research is usually used in long-term ethnographic study, these methods can be modified to assess change as a result of a hazard. When a hazard occurs, there is a discrete time period during which human adaptations occur quickly, and anthropologists can adapt their methods of research to observe them (Oliver-Smith 1996:304). Therefore, research that combines anthropological methods of participant observation, key informant interviews and sample surveys can create a baseline of data that provides information to design the structure, type and size of projects most likely to succeed in rehabilitation of livelihood activities.

Proposed recovery activities include changes, or innovations, directed at sustainable redevelopment, including new forms of livelihood to reduce pressure on natural resources. The process of development (Gow 2002, Hilhorst 2001, Kottak 2004, Rogers 2003) has been examined and analyzed to determine factors facilitating successful outcomes (Pollnac, Crawford and Gorospe 2001, Pollnac and Pomeroy 2005, Sievanen et al. 2005). Considerable research indicates that attitudes toward, and adoption of, such changes is influenced by a number of variables, both at the community and individual levels (Poggie 1978, Rogers 2003, Sievanen et al. 2005, Tango-Lowy and Robertson 2002). Participatory methods are useful in investigating variables that are likely to affect the success of livelihood projects, and will help to provide program managers with information that is site specific.

1.5 Research Objectives

The purpose of this research is to examine factors that may affect an individual's willingness to participate in livelihood recovery projects. Specifically, the factors to be analyzed are attitudes toward the occupation of fishing, future perspective, damage to productive and household materials, and perceptions of livelihood rehabilitation projects and willingness to participate. These variables will be examined in terms of their effects on an individual's willingness to participate in livelihood rehabilitation projects. *Job satisfaction* is the level of an individual's fulfillment, as determined by that individual, provided by their livelihood or occupation. This concept is closely related to *attitudes toward fishing*

in a community where most people are familiar with the occupation, and are likely to have developed perceptions of it. *Future perspective* may be defined as an individual's view of the future. *Fatalism* is defined by Rogers as "the degree to which an individual perceives a lack of ability to control his or her future" (2003:290). *Deferred gratification* is described by Pollnac and Poggie as the tendency to "postpone immediate desires in order to obtain what they consider to be more substantial rewards in the future" (1978:355). *Perception of projects* is an individual's evaluation of the likelihood that a project will aid recovery for their household and community. *Willingness to participate* is an individual's determination of their propensity to take part in a proposed project, based on a short explanation of the project as conceived by program managers.

Evaluating interactions of these factors will contribute to research from adoption of innovations, livelihood project development and disaster recovery, to better inform the design of livelihood rehabilitation efforts for greater participation and likelihood of effective recovery.

1.6 Organization of Thesis

Chapter One includes the introduction to the tsunami on December 24, 2004 and the situation created by its destruction and the research objectives of this investigation. Chapter Two reviews attitudes toward fishing and job satisfaction, future perspective, changes in perceptions following disasters, and perception of, and willingness to participate in, projects. The factors to be examined are explored in relation to acceptance of innovations and recovery and disaster research. The

hypotheses and expected findings of this research are also presented in Chapter Two. Chapter Three describes the methods of collecting data and explains the use of each variable in the overall research design. The analysis of data and description of findings is presented in Chapter Four. In Chapter Five, the results of the previous chapter are used to develop conclusions about each of the hypotheses and the research topic. The final chapter suggests implications of these findings for rehabilitation project development in the Post-Tsunami Sustainable Coastal Livelihoods Program as well as possibilities for future study.

CHAPTER II

BACKGROUND AND RESEARCH OBJECTIVES

This chapter describes the theory that forms the basis for the hypotheses to be explored in this investigation. Theory of adoption of innovations and livelihood project research provide the framework for willingness to participate with respect to the factors of job satisfaction and attitudes toward fishing, future perspective and characteristics of proposed projects. Post-disaster studies inform the impact of the tsunami and its damage to household and productive material goods on perceptions. Theory supporting the importance of each of these factors effects on willingness to participate in proposed rehabilitation projects and the corresponding hypotheses and research topic are presented at the close of this chapter.

2.1 Adoption of Innovations

What factors influence an individual to try a new occupation? Considerable research indicates that attitudes towards and adoption of change, such as participation in alternative livelihood projects, is influenced by a number of community and individual level variables (Rogers 2003). Adoption research methods attempt to predict behavior regarding innovations as perceived by potential adopters by assessing acceptability of innovations (Tango-Lowy and Roberson 2002:242). This study will attempt to identify perceptions that affect an individual's willingness to accept an innovation. Rogers' theoretical framework forms the basis for adoption research and is used to structure a wide variety of studies including organizational culture conflict (Reeves-Ellington 1998),

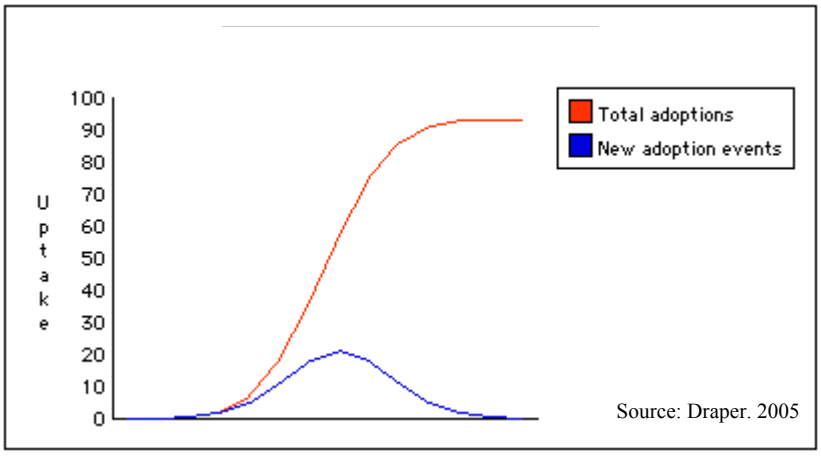
resistance to increased regulations in the shrimp fishery (Johnson et al. 1998) and coastal issues such as coastal development programs (Aswani and Weiant 2004, Pollnac and Pomeroy 2005). Innovation attributes are the perceived properties of an innovation that influence a potential adopter's decision (Rogers 2003). Adoption research assesses perception of innovation attributes by potential adopters to better explain adoption practices or better design innovations for project participants. In the context of this study, relationships of the factors of attitudes toward fishing, future perspective and perceptions of recovery activities with willingness to participate, will be investigated. This approach examines individual perceptions and experience with the disaster and how they affect acceptance of an innovation in general and it does not focus on attributes of the projects, themselves.

Rogers suggests that adoption of innovations is more likely if a need exists or arises (2003:136). High levels of job satisfaction imply that there is no need for new livelihood options and therefore, less willingness to participate in livelihood projects that would involve change of occupation. Future perspective is an individual characteristic that can be an indicator of willingness to adopt an innovation (Rogers 2003). As discussed in the introduction of variables, future perspective consists of both fatalism and gratification orientation. While fatalism is an attitude, gratification orientation is an indicator of one's tendency to prepare for future time. Fatalistic attitudes should be assessed when designing livelihood projects because "earlier adopters are less fatalistic than later adopters" (Rogers 2003:290). Gratification orientation is the tendency to save or invest in order to obtain rewards at a later time. Gratification orientation reveals perceptions about

the future that may not be apparent by evaluating fatalism alone. Individuals who are more likely to tend to save or invest are also more likely to adopt an innovation that promises payouts at a later time (Rogers 2003:291). The variables of fatalism and gratification orientation are each explored further below. Adoption research also suggests that perception of ongoing recovery projects may affect willingness to participate in future livelihood rehabilitation projects. If an individual views ongoing projects positively, when an opportunity to participate in a similar project arises, that individual is likely to participate.

Within a given population, various groups tend to adopt innovations at different rates, the graphical representation is known as the S-shaped, cumulative curve of total adoptions. Number of new adoption events plotted against time usually follows a normal distribution curve (Figure 2, Rogers 2003:272).

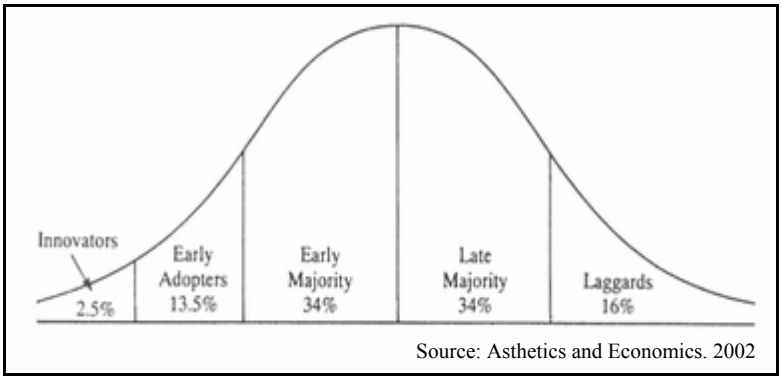
Figure 2. S-Shaped and Normality Curves of Adoption



The rate of adoption begins slowly with only a few individuals, innovators (about 2.5% of individuals), that test the innovation. Each of these people communicates

their experience to others. Given a positive experience and exposure to the perceptions of those innovators, early adopters (13.5%), in turn, innovate. This process continues with increasing rates of adoption for early majority adopters (34%). Next, the rate of adoption decreases with the late majority (34%), and lastly, laggards (16%) (Figure 3, Rogers 2003:275).

Figure 3. Distribution of Innovators



Given this process, if the dissemination of information from both participants and secondary sources is positive, individuals are likely to perceive a given project positively. In addition, perceptions regarding attitudes toward fishing, future perspective and ongoing projects may also significantly affect willingness to participate in proposed projects. This investigation aims to examine these interactions to more fully explain willingness to participate in rehabilitation projects.

2.2 Job Satisfaction and Attitudes Toward Fishing

Job satisfaction is perceived fulfillment from intrinsic and extrinsic aspects of an occupation (Johnson et al. 1998:406). In various parts of the world, studies have identified high levels of job satisfaction among fishers, and fishermen's reluctance to abandon fishing for other livelihoods because of high levels of job satisfaction (Pollnac, Pomeroy and Harkes 2001, Tango-Lowry and Robertson 2002). Often fishermen value fishing because it is a 'hunting activity' and are reluctant to abandon the capture fishery for alternative forms of livelihoods that are more similar to farming, such as aquaculture (Pollnac, Pomeroy and Harkes 2001, Tango-Lowry and Robertson 2002). Specifically, independence is one intrinsic aspect that researchers have identified as a factor contributing to job satisfaction in fishing. Independence in this context is the ability to determine one's own schedule, be one's own boss and be the primary decision-maker in occupational-related issues (Johnson et al. 1998, Pollnac et al. 1991). In coastal communities that have a high percentage of households involved fishing, both fishers and non-fishers have developed attitudes toward the occupation. These attitudes may be influenced by tradition (e.g. where fishing has passed from one generation to the next) and association (e.g. a family member fishes). Therefore, when considering livelihood projects in coastal communities, attempting to shift people from one livelihood to another should be carefully considered and assessed in order to retain some of the factors that contribute to satisfaction with a previous occupation in new livelihood projects (Pollnac, Pomeroy and Harkes 2001, Sievanen et al. 2005).

2.3 Future Perspective

Problems associated with a decrease in job satisfaction, may present an opportunity to introduce livelihood options to a community. One factor contributing to decreased job satisfaction is perceived control which is also associated with future perspective.

Future perspective is an individual's perception of the future and degree to which that individual prepares for it. An individual's future perspective affects household decision-making and investments, including type and number of income sources. Future perspective incorporates an individual's tendency toward deferred gratification and his/her level of fatalistic thinking. Deferred gratification is defined by Pollnac and Poggie as the tendency to "postpone immediate desires in order to obtain what they consider to be more substantial rewards in the future" (1978:355). Fatalism is the perception that one's actions will not affect outcomes in future time. Gratification orientations and fatalism have been addressed by researchers as measurable indicators of future perspective (Johnson et al. 1998, Poggie 1978, Pollnac and Ruiz-Stout 1976). Differences in future orientation or perspective can cause organizational conflict and prevent achieving desired goals (Reeves-Ellington 1998:102). Generally, people that feel positively about the future are more likely to accept a new type of livelihood and, therefore, their future perspective may impact willingness to participate in livelihood rehabilitation projects.

2.4.1 Gratification Orientation

Several studies have investigated participant propensity for saving money to invest in productive materials in various occupations (Poggie 1978, Pollnac and

Poggie 1978, Pollnac and Ruiz-Stout 1976). This is a type of deferred gratification is known as investment orientation (Poggie 1978, Pollnac and Poggie 1978). Jentoft and Davis suggest that certain fisheries require different levels of investment and that those fishers that participate in fisheries that require more investment might also tend to anticipate greater investment when participating in other livelihood projects (1993:14). This tendency to save for future investment, also known as deferred gratification, is generally greater in an occupation that requires more expensive materials.

One investigation revealed that fishermen on average are more likely to exhibit deferred gratification than people in the same community that are engaged in other occupations (Poggie 1978:121). Pollnac and Poggie also compared gratification orientations in various industries with respect to periodicity and concluded that participants working in occupations that exhibit moderate to high periodicity of income show a greater tendency to defer gratification (1978:365). Periodicity of income has also been linked to deferred orientations in Panama where first generation fishers that came from farming families showed a greater tendency to defer than second generation fishers (Pollnac and Ruiz-Stout 1976:9). In this area, the periodicity of income for agriculture is longer than for fishing (Pollnac and Ruiz-Stout 1976:10). Occupational periodicity and gratification orientation is likely to vary among coastal occupations because of seasonal fluctuations in population levels of target species and changing market values. Individuals that depend on coastal resources with a larger variation in catch are more likely to defer gratification than those that participate in a more reliable,

consistent catch level (Poggie 1978: 116). Therefore, gratification orientations may affect willingness to participate in rehabilitation projects.

2.4.2 Fatalism

Pollnac and Ruiz-Stout suggest that fatalism is linked to a sense of insecurity and external control (1976:22). Everett defines *fatalism* as "the degree to which an individual perceives a lack of ability to control his or her future" (Rogers 2003:290). Pollnac and Ruiz-Stout found that the more deferred an individual, the more optimistic he is about the future and, therefore, the less fatalistic (Pollnac and Ruiz-Stout 1976). Johnson et al. studied shrimp fishermen whose level fatalism increased, the authors concluded, because regulations (1) decreased their ability to control their income, forcing some fishers out of the industry and (2) decreased independence and control in their work environment (1998:406).

Other studies have identified a negative correlation between fatalism and optimism which may decrease willingness to participate in rehabilitation livelihood projects that attempt to introduce a new type of livelihood (Tango-Lowy and Roberson 2002). Fishermen who were optimistic about the state of a fishery, in a study of willingness to move from commercial fishing to open ocean aquaculture, were less likely to want to change occupations than those that perceived a problem in the fishery (Tango-Lowy and Roberson 2002:244). Fatalism could cause an individual to believe that they have no impact on the coastal resources on which they depend, even if there are problems with the resource. Therefore, when the goal of livelihood development is to ease stress on the fishery, fatalistic individuals may

be less likely to acknowledge that the resource is stressed and associate with resource overexploitation, therefore, less willing to change occupations (Sievanen et al. 2005).

2.4.3 Characteristics of Proposed Projects

Attributes of the proposed projects are also likely to affect individuals' willingness to participate (Rogers 2003). Pollnac and Pomeroy identify initial benefits and perception of benefits as influential to early participation in alternative livelihood projects (2005: 248). Organizational structure and type of livelihood are two factors that are likely to impact an individual's decision to participate in a given project. When considering organizational styles and livelihood options for recovery, individuals may be more likely to participate if structure and type are similar to former or current occupations. Various aspects of organizational structure and alternative livelihoods have been investigated in previous studies to provide guidance for future investigations and project design.

Studies have described fishers as generally manifesting characteristics such as independence and adversity to authority, especially as it concerns fishing practices (Pollnac 1988). However, there are significant differences in personality, even within coastal communities that must be accommodated when offering rehabilitation livelihood projects. The type of occupation in which an individual participates necessitates the type of working group structure (Tango-Lowy and Robertson 2002). Jentoft and Davis (1993) describe two personality types - "rugged individualism" and "utilitarian individualism" - of small boat fishers, each

associated with different perceived functions of a vessel owner-operated cooperative. Each personality type views responsibility to and expectations from the cooperative differently, such as financial management of the group. Pollnac et al. found that cooperative sponsored savings plans and fisher ownership of boats were among factors contributing to cooperative success in capture fishery cooperatives in Ecuador (1991:46). These two measures also illustrate organizational structure that requires deferred gratification. If an individual participated in an occupation in the past where greater deferred gratificaiton is required, they are more likely to participate in a proposed project that requires investment for future gains.

Development programs that are designed to ease stress on capture fisheries by introducing alternative sources of livelihood may be sustained and yet, do not succeed in decreasing exploitation of the resource (Pollnac 1992, Sevanian et al. 2005). For example, introducing aquaculture as an alternative income source does not necessarily decrease pressure on wild marine resources (Pollnac 1992, Sevanian, et al. 2005, Tango-Lowy and Robertson 2002). The alternative livelihood may provide a supplement to income from capture fisheries instead of a replacement (Sevanian et al. 2005:298). However, there is evidence that fishermen may switch occupations to aquaculture if the technology and work structure fit with existing social patterns, the technology used is appropriate to its needs and the community sees direct benefits (Tango-Lowy and Robertson 2002:241). Although the above studies focus on fishermen, this line of reasoning can be transferred to

other coastal occupations that provide the same advantages as fishing such as independence and control over income and decision-making.

Research suggests that previous adoption behavior predicts future adoption behavior (Rogers 2003). If an individual has experience with various types of occupations, or subdivisions within an occupation (i.e., numerous fisheries), he or she is likely to be more comfortable with different working group structures and types of livelihoods. Therefore, individuals that participate in various types of occupations are more likely to want to participate in proposed livelihood projects that have various organizational structures (Tango-Lowy and Robertson 2002).

Past and current recovery projects are also likely to impact individuals' willingness to participate in future projects. Despite funding agencies' attempts to publicize their efforts, affected populations often do not know what organization is sponsoring a given project and therefore, lump together all projects from foreign organizations (Personal Observation 2006). Therefore, projects from all funding organizations are likely to impact willingness to participate in future projects, regardless of funding agency. If a given area has been inundated with failed projects, residents may be less willing to participate in future projects. This situation is difficult to assess and more difficult to undo once the reputation has been established. However, surveying residents about ongoing projects provides some information about their perceptions.

2.4 Impact of the Tsunami on Perceptions

Rogers writes that recognition of a problem or need often prompts an individual to adopt an innovation. This recognition may arise because circumstances cause a change in social priorities (Rogers 2003:137). In the aftermath of a hazard, there is a reorganization of social problems and issues as affected individuals begin to identify needs for recovery (Bankoff et al. 2004). Changes in job satisfaction and attitudes toward occupations may change social priorities, triggering the need for new types of livelihoods. The tsunami occurred without warning and the affected population could only react to the situation by getting families, possessions and themselves out of the destructive path of waves as fast as possible. This type of disaster can cause a "dread factor" associated with the perception of risk of future occurrence (Dyer 2002:163). This situation may cause one's perception of the sea to change from a valuable productive asset to an uncontrollable/unpredictable force because individuals may associate this sense of risk and uncertainty with the ocean. Although these impacts may be mitigated by an individual's personal experience with the hazard itself, research has identified certain trends in human adaptations in the aftermath of a natural disaster.

Community-wide response to a natural hazard often includes significant alterations in social priorities. This may be a reflection of changes in individuals' perceptions because of a sense of powerlessness or lack of control over work environment and income (Heijmans 2004). Therefore, job satisfaction may decrease among individuals dependent on coastal resources for livelihood in the aftermath of the tsunami. An increase in fatalism is also a common psychosocial adaptation resulting from a disaster (Dyer 2002:162). In reaction to the tsunami, it

is likely that individuals working in the coastal zone may feel a sense of powerlessness and possibly even fear, about continuing their occupation. A third adaptation to hazards is a decreased tendency for deferred gratification. Logically, an increase in fatalism and decrease in optimism will cause less deferred gratification because an individual is less likely to save for future time if they are unsure what that future will bring (Heijmans 2004:123). Changing perceptions in response to a disaster imply that proposed recovery projects should address decreased perceived control and job satisfaction, increased fatalism and lesser tendency to defer gratification.

2.5 Implications for Proposed Projects

Individuals are more likely to be satisfied by an occupation that increases self-confidence and provides a sense of accomplishment. Barrett et al. suggest a positive correlation between participant satisfaction with an occupation and initiatives that allow fostering relationships, accomplished tasks and power decision-making (2005:90). The same characteristics that provide satisfaction with an occupation can influence satisfaction with a livelihood project. Barrett et al. indicate that in their study, effective leaders and achieving small, concrete successes increases the likelihood of an individual's satisfaction from a project (2005:98). Therefore, alternative livelihood projects suggested as part of rehabilitation projects should be designed to emphasize these factors.

Managers should attempt to implement projects that promote early return on investment and foster further optimism about future projects. Initial concrete

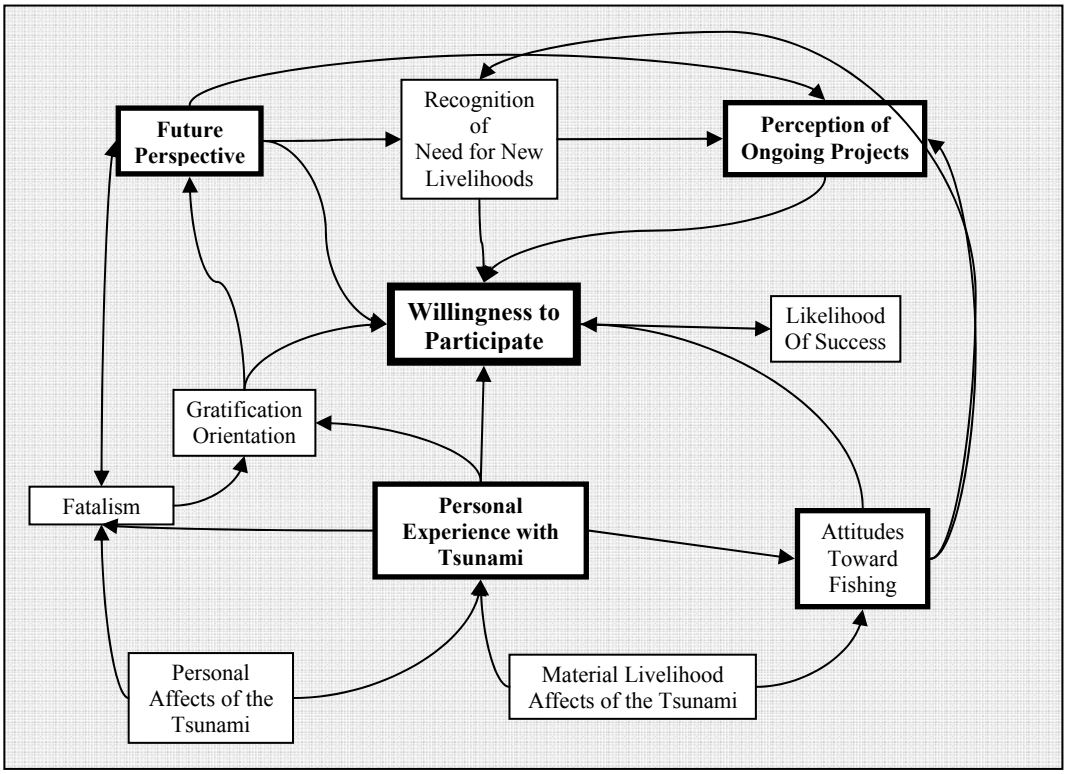
benefits and perception of benefits are two factors that have been identified in influencing sustainability (Pollnac and Pomeroy 2005). The benefits of successful livelihood projects should outweigh the cost of the time and energy for participation (Barrett et al. 2005:89, Rogers 2003). Participants are more likely to be satisfied by a given livelihood project if they see quick results before committing large amounts of time and effort to the initiative (Barrett et al. 2005:95). Successful accomplishment of short-term goals will also increase self-confidence and mutual trust among participants. Generally, involving communities in decision-making increases likelihood of acceptance (Tango-Lowy and Robertson 2002:241).

Rehabilitation projects should attempt to transfer organizational structure and type of former occupations as much as possible. If recovery programs cannot rehabilitate former livelihoods, training and social solidarity should be emphasized during early implementation activities to increase their likelihood of success (Pollnac et al. 1991).

2.6 Research Topic and Hypotheses

Given the information above, this study investigates the factors of attitudes toward fishing, future perspective, damage to productive and household materials from the tsunami and their affects on willingness to participate in rehabilitation livelihood projects. The hypothesized relationships to be investigated are graphically represented in the figure below (Figure 4).

Figure 4. Hypothesized Relationships to be Investigated



Using household surveys, participant observation and key informant interview techniques to assess the interactions of the factors above, the following hypotheses will be investigated to explore how perceptions of individuals impacted by the Indian Ocean tsunami and damage to personal materials affect willingness to participate in livelihood rehabilitation projects:

H1. Individuals that view fishing positively are less likely to be willing to participate in livelihood recovery projects that will cause them to practice a new livelihood.

H2. Individuals that are more forward-thinking and think more positively about the future, will show a greater willingness to participate in livelihood recovery projects.

H3. Individuals that perceive current recovery activities positively will show a greater willingness to participate in proposed livelihood activities.
H4. Individuals whose productive and household materials were more severely affected by the tsunami will show a greater willingness to participate in livelihood activities.

Results from tests of each of these hypotheses may be used, with results of previous studies presented above, to tailor project design and implementation for the specific needs of the communities, groups and individuals involved in the Program.

2.7 Summary

This chapter explores related literature in job satisfaction and attitudes toward fishing, future perspective, damage to productive materials and perception of projects with respect to adoption of innovations, alternative livelihood projects and disaster literature. Information presented in this chapter is used to inform the hypotheses to be tested in this study in order to further explain how perceptions of individuals impacted by the Indian Ocean tsunami and damage to personal materials affect willingness to participate in livelihood rehabilitation projects.

CHAPTER III

METHODOLOGY

This chapter describes the methods used to explore the research topic and test the hypotheses presented in the previous chapter. First, there is an explanation of the specific recovery effort, including the location of the study and a discussion of how this investigation assists in achieving goals for The Post-Tsunami Sustainable Coastal Livelihoods Program. Second, techniques used in a preliminary appraisal as well as in identification of baseline conditions and problem identification are further described as used in this study, including descriptions of the sampling technique and data gathered. Next, there is an explanation of each variable to be used in the statistical analysis, including the questions from the survey that were used to create summary measures for each variable. Finally, the methods of data assessment used to address the hypotheses of the study are described, including statistical analysis, participant observation and key informant interviews.

3.1 Location of Study

The study area consisted of five villages in the sub-district of Suk Sumran, Ranong Province, Thailand. Ranong is the northernmost province on the Andaman Coast and abuts the southernmost point of Myanmar (Figure 5).

Figure 5. Ranong Province, Thailand - Study Location

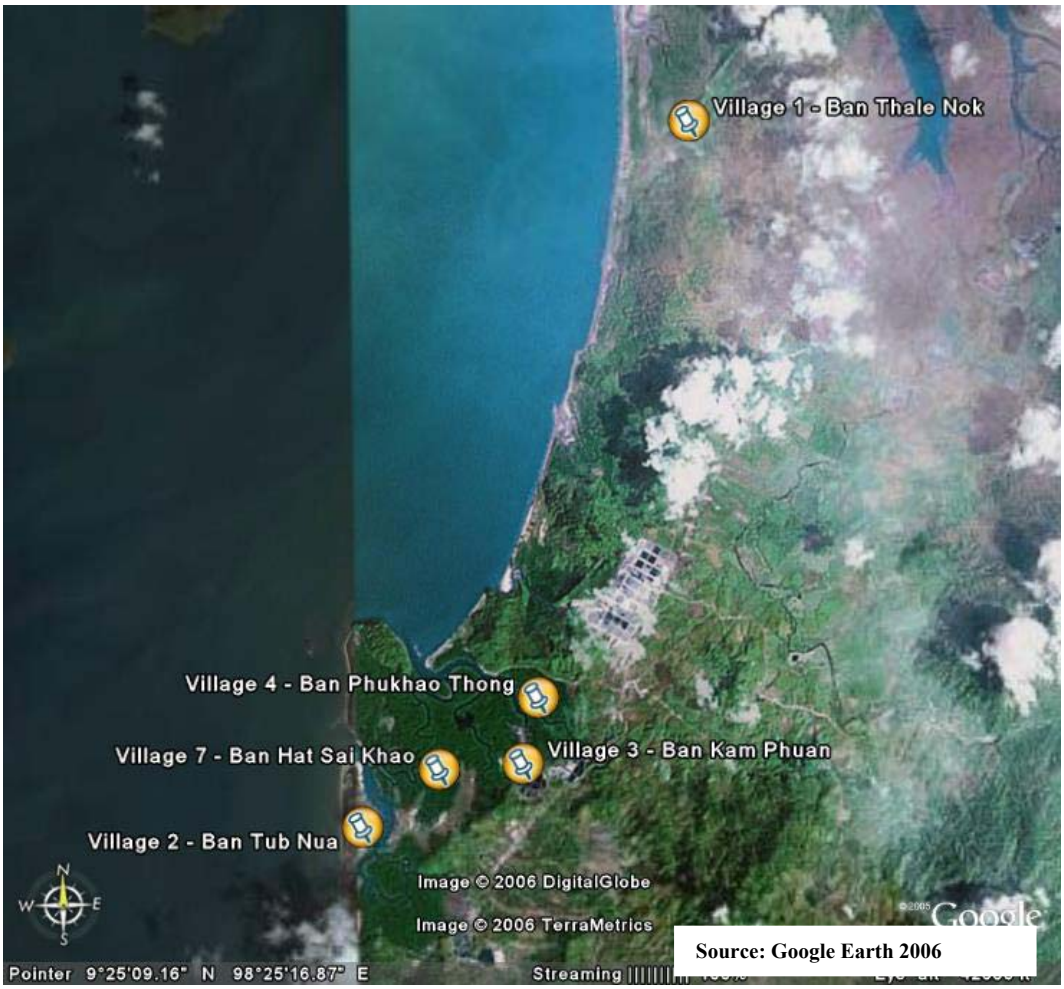
The study area was selected as a demonstration site for tsunami rehabilitation programs based on the following characteristics (1) they were either moderately or severely affected by the tsunami, (2) there was a potential for a diversity of livelihoods (e.g. fishing, farming, aquaculture, small-scale tourism), (3) the size of each village was manageable for project implementation (50-300 households), (4) the residents and local government officials were interested in participating in the Post-Tsunami Sustainable Coastal Livelihoods Program and improving natural resource management, (5) the area was not near large-scale tourism, providing the

opportunity for community-based, low-impact eco-tourism strategies, and (6) the villages were located with Laem Son National Park, which allowed a greater protection from large-scale industry and tourism while providing greater control over the resources for residential use (CRC 2005).

The five villages are Thale Nok (No. 1); Nua (No. 2); Kam Phuan (No. 3); Phu Khao Thong, also known as Ta Klang (No. 4); and Haad Sai Kao, also known as Haad Yao (No. 7).[3] These villages are adjacent to each other from Village 1, in the north to Village 2 in the south (Figure 6). After the tsunami, the combined

[3] Numbers for the villages, in parentheses, are official designations for the Tambon, which are used as terms of reference by some individuals and official documents. This study will also use these numbers for convenience.

Figure 6. Location of Villages Included in Study



Source: Google Earth 2006

population of these villages was estimated to be between 3300 and 4400[4]. Approximately 134 people were killed in the villages, affecting 82 households (Table 2**,** Pongquan et al. 2005:14, Suk-Sumran District Office 2005). All villages are located in the sub-district of Suk-Sumran

[4] One reason for large range of estimates is that after the tsunami, many residents left their homes to stay in other areas of the country and their area of residency was ambiguous when these data were gathered.

Table 2. Distribution of Village Populations 2005

Variable	Village 1	Village 2	Village 3	Village 4	Village 7
# of households	45 (40)	273 (309)	185 (264)	218 (208)	119 (115)
Population	135 (229)	1007 (1369)	718 (1233)	882 (1085)	484 (516)
Males	73	501	350	457	251
Females	62	506	368	425	233

Source: Suk-Sumran District Office 2005; Numbers in parentheses from Pongquan et al. 2005

whose central area is a market located in Village 3 along Route 4. Route 4 is a paved, two lane highway connecting Ranong with other cities along the Andaman coast. All villages lie adjacent to the coast except for Village 3 which is located east (inland) of Village 7. Villages 3 and 7 were divided from a single village in 2004. Many fishermen live in Village 3 as well because they can access the coast via Klong Ngao, the river that marks the boundary between Villages 2 and 3.

In villages 2, 4 and 7 mangroves extend a kilometer or more inland, with streams, rivers and man-made canals interspersed throughout. These waterways are used for local travel as well as links to the sea. Parts of the coastline in the southern part of Village 1 and the northern section of Village 4 have minimal to no mangroves. Villages 1 and 2 have relatively long stretches of white sand beach backed by paved roadway. Stretches of the roadway in each village were damaged by the tsunami. Seaward of the coast, the drop-off is relatively gradual, with sandy bottom and river mud deposits. There are a number of offshore islands within a few kilometers of the coast, many of which are surrounded by coral and artificial reefs. This area along with mangrove areas adjacent to the villages, form the two major sources for the harvest fishery. Village 3 is nucleated along Route 4. Settlement

patterns for all other villages, are or were (pre-tsunami) nucleated near the coast and, less densely, along Route 4.

3.2 Achieving Program Goals

The Post-Tsunami Sustainable Coastal Livelihoods Program strives to increase capacity various levels of the Thai government to design and implement rehabilitation projects. In order for the Program to meet its objects, the researcher participated in conducting a preliminary appraisal of the situation in the aftermath of the tsunami and creating a collection of date to use as a baseline for the program. This study assessed attitudes toward fishing, future perspective and perception of recovery efforts and their relationship to willingness to participate in livelihood rehabilitation projects in the five villages selected for the program. This information will be valuable for project design and implementation as well as monitoring and evaluation.

3.2.1 Preliminary Appraisal, Baseline Description and Problem Identification

The preliminary appraisal (Pollnac and Kotowicz 2005) used secondary information, observation and key informant interviews as described in Pollnac and Crawford (2000) and Pollnac (1998). The preliminary appraisal was designed to obtain information about the following topics: a description of coastal zone geography, population, settlement patterns, productive land use patters, occupations, coastal activities, community infrastructure, and prioritized lists of needs and problems (as defined during a Participatory Rural Assessment (PRA)).

For the most part, information was compiled prior to arriving at the research site and supplemented by key informant interviews and observation to form a more complete picture of the coastal areas and activities. The preliminary appraisal was used to structure the baseline assessment and problem identification. The researcher resided in Village 7 throughout the preliminary assessment and baseline survey. Village residence allowed continuous observation of village activities and access to key informants throughout this period.

Upon completing the preliminary assessment, the researchers collaborated to design the survey to obtain pre- and post-tsunami information on productive activities, household size and composition. Techniques used to design the survey include those discussed in Berkes et al. (2001), Bunce et al. (2000) and Pollnac and Crawford (2000). The survey also included questions to examine attitudes toward fishing, future perspective, experience with the tsunami, and perception of recovery activities.

Key informant interviews were semi-structured, to supplement or clarify information based on a set of open-ended questions or discussion points (Bunce et al. 2000:96). These interviews were performed by researchers during the preliminary assessment to obtain data about types of livelihoods practiced in the villages and other general information. After the baseline survey was performed, key informant interviews were again conducted to clarify information related to activities that were mentioned by the subjects, especially concerning recovery activities and proposed livelihood projects. These interviews were also used to validate information from secondary data and the initial assessment. Throughout

the study period, residents that wished to share their personal experience of the tsunami with the researchers were encouraged to do so.

3.3 Sampling Technique

Sample households were selected using systematic sampling in each of five villages (1, 2, 3, 4, 7) (Henry 1990: 26). Based on interview time length, number of interviewers, and days allotted for surveying, the target sample size for each village was fifty households (Table 3).

Table 3. Sample Size per Village[5]

Village	Number of HH	Sample Number	Percent of Households in Village
1	45	43	93.75
2	273	46	16.85
3	185	61	33.51
4	218	50	22.94
7	119	51	42.86
N	840	251	

Source: Suk-Sumran District Office 2005.

Village 1 had fewer than 50 households; therefore, the interviewers attempted to survey every household. Based on household statistics from both the Sub-District Office of Suk-Sumran and the PRA conducted by the USAID project prior to the beginning of this study, the number of households was approximated and divided by 50. Using a map of all streets and houses, every N^{th} house was selected for the sample (Henry 1990:28). In addition, all households that relocated to another

[5] Note: Tambon District Statistics used to determine sample because while at the field sites, researchers determined these to be the most accurate numbers based on personal observation.

location within the Tambon of Suk-Sumran as a result of the tsunami were surveyed. This departure from the sampling method described above was necessary to capture the portion of the population that moved as a result of the tsunami because much of the population moved out of the Tambon and, therefore, could not be surveyed. Actual sample size ranged from 62 (Village 3) to 43 (Village 1) and percent of village surveyed ranges from 93.75% (Village 1) to 16.85% (Village 2). The reason for the relatively larger sample size in Village 3 and smaller in Village 2 was lack of information regarding the border between Villages 2 and 3 in the Sub-District and Tambon office records.

3.4 Research Instrument

The research instrument included a series of questions (written survey to be read by interviewers) for both the male and female heads of a household. Questions included livelihood activities, environmental and future perceptions, tsunami impacts, recovery activities, and background (e.g., demographic) information (see Appendix A for the complete survey). Questions were designed to assess attitudes toward fishing, future perspective, perception of recovery activities, experience with the tsunami, and willingness to participate in proposed activities. Survey content and design were based on Berkes et al (2001) and Pollnac, Pomeroy and Harkes (2001). The survey included both open and closed-ended questions. The subjects were asked open-ended questions to investigate their views about future outlook, attitudes toward fishing and experience during the tsunami. Interviewers were instructed to ask follow up questions for open ended questions. Closed-ended

questions were either simple yes/no questions or used a Likert-type scale to assess future outlook, environmental perceptions and attitudes, and perceptions of ongoing and proposed recovery projects. Statements with which respondents were asked to agree or disagree, were phrased both positively and negatively in order to decrease the likelihood that respondents agree with every statement instead of accurately responding. Other types of questions included relative ranking of livelihood activities and number of people associated with the subject that were injured or killed during the tsunami.

Interviewers were instructed to be aware of the sensitivity of the subject and respect individual's wishes to answer certain questions. The number and name of the individuals surveyed were maintained by the interviewers until after data were translated to allow for follow up questions in cases where responses were unclear. The survey was translated into the local Southern Thai Dialect and then back-translated by a different translator to English to ensure that the questions were properly translated. The survey was approved for use by the Rhode Island International Review Board.

The household survey was administered by young women who lived in the study area. Each survey took approximately 45 minutes to complete and involved two parts. The first part contained questions for the household as a whole and the second contained individual questions, administered to both the male and female heads of the household (the questions for both sexes were identical).

3.5 The Survey

This assessment was conducted two months after the Program began, and prior to operation of any livelihood projects of the Program itself. At the time of the investigation, other funding agencies were implementing livelihood projects in these villages. Livelihood projects ongoing at the time of the study included a women's group for soap-making, livestock raising, making fishing nets, and shellfish farming.

The variables used for analysis are attitudes toward the occupation of fishing, level of fatalistic thinking, perception of the future, spending choices if given 9,000 baht, spending choices if given 110,000 baht, damage to productive and household materials from the tsunami, willingness to participate, and perceived value of the projects. Each of the variables was formed using one or more questions similar in style and content to those used in previous studies investigating willingness to adopt innovations (Poggie, 1978; Rogers, 2003; Tango-Lowy & Roberson, 2002).

3.5.1 Attitudes Toward Fishing

In order to assess attitudes toward fishing, three questions were asked to capture three different aspects of respondents' attitudes toward the occupation of fishing. Questions were adapted from previous studies that also investigated perceptions of fishing (Pollnac and Poggie 1988, Pollnac, Pomeroy and Harkes 2001, and Tango-Lowy and Robertson 2002). The respondents were asked the following questions:

1. Would you advise a young person to become a fisher today? Yes___ No___

2. Do you like fishing?

3. If you had the opportunity to change the primary source of your household's income to one that provided the same amount of income as fishing, would you change? Yes___ No___

The answers to the first two questions were coded 0 for a negative response and 1 for a positive response. For the third question, 0 was coded for 'Yes' and 1 was coded for 'No'. A summary measure was created for 'Perception of Fishing' by summing the value for each response to the questions and dividing by the number of questions answered by the respondent[6].

3.5.2 Future Perspective Questions

In the context of this investigation, future perspective is assessed using four variables: 1. Fatalistic Thinking; 2. Future Perception; 3. Investment Choice for 9,000 baht; and 4. Investment Choice for 110,000. The first uses the following two questions that employ a Likert Scale to assess an individual's tendency toward fatalistic thinking (Pollnac and Crawford 2000):

1. Human activities do not influence the number of fish in the ocean.
   Strong disagree(7)__ disagree(6)__ slight disagree(5)__
   neither(4)__ slight agree(3)__ agree(2)__ strong agree(1)__

2. There is no point in planning for the future, what happens, happens and we cannot do anything about it.
   Strong disagree(1)__ disagree(2)__ slight disagree(3)__
   neither(4)__ slight agree(5)__ agree(6)__ strong agree(7)__

[6] Some questions were not answered by non-fishers if they did not feel they had enough experience with fishing to respond.

The answers to the first question were inverted to standardize the scale with the second question and, therefore, the most fatalistic response would score 7 for each of the questions. 'Fatalistic Thinking' is a summary measure using the sum of the values from each response and dividing by the number of questions answered.

'Future Perception' was the second variable used to assess future perspective. The questions used a self-anchoring scale-style in which respondents were read a topic heading, followed by two statements describing the worse and best situations with respect to each topic (Pollnac and Crawford 2000). Respondents were told that the first statement represented the lowest 'rung' of the ladder (1) and the second statement corresponded to the highest 'rung' of the ladder (10). Interviewers showed respondents a drawing of a ladder and asked them to decide which rung represented the current state of their community (within the spectrum of the statements describing 1-10). Next, respondents were asked to indicate which rung they thought would represent the situation in their community three years hence (Pollnac and Crawford 2000). Respondents were asked the following questions regarding fatalism and future orientation:

1. **Overall well-being of community members.** The first step indicates very poor families, without enough food to eat, very little or no furniture in the house, and a very poor house that is too small and doesn't protect one from the weather. The highest step indicates wealthy families with more than enough food, and beautifully furnished well built houses.
2. **Empowerment : Control over resources.** The first step indicates a community where the people have no control over access to the community's coastal resources--anyone from anywhere is free to come and fish, gather shellfish, cultivate seaweed, etc. The highest step indicates a community where the people in the community have the right to control (e.g., develop rules) the use of the coastal resources of their community.

3. **Resource health.** First step represents a situation where the beach is filthy and polluted, the mangroves are dead or dying, and the waters are so bad that nothing can live in them. The highest step indicates a beautiful beach, pure waters and healthy mangroves filled with wildlife.
4. **Compliance** The first step represents a situation where the coastal area and the sea is basically lawless, no one obeys the fishery regulations, everyone does what they want. The highest step represents a situation where everyone obeys the law and takes care of the environment.

Each future response was subtracted from the current response in order to get value for projected change for each of the four questions. The change for each aspect was added together and divided by the number of topics for which that individual responded to produce the summary measure of 'Future Perception'. This variable will have a greater value for those that have a more negative view of the future (in order to compare with 'Fatalistic Individuals').

The third and fourth variables assess gratification orientations of survey respondents ('Investment Choice for 9,000 baht' and 'Investment Choice for 110,000') (Poggie 1978, Pollnac and Poggie 1978). Each individual was asked the following two questions:

1. If you were to suddenly inherit or win 9,000B in a lottery, what would you do with this money?
2. If you were to suddenly inherit or win in a lottery 110,000B, what would you do with this money?

The values of 9,000B and 110,000B are approximate median salaries for one month and one year, respectively, for residents living in the villages included in the study. Responses were separated according to level of gratification orientation including 0 (paying debts), 1 (immediate purchase), 2 (immediate purchase of productive

material) and 3 (saving for a future time). Where respondents named more than one intended type of investment, the first investment was weighted greater than the second (and third, if applicable) and a weighted mean was created. For example, if there were two responses, the first response was coded and multiplied by two-thirds and the second response was coded and multiplied by one-third. In the case of three responses, the summary measure was created by multiplying the first response by one-half, the second response by two-sixths and the third multiplied by one-sixth. Although this method of weighting was arbitrary, it reflected the priority of type of investment as indicated by the respondent.

3.5.3 Questions to Examine Effects of Tsunami on Productive and Household Materials

Questions regarding productive and household material loss also addressed an individual's proximity to the disaster, or *exposure of livelihood/income to vulnerability*. These questions included:

1. With regard to your house and/or its contents, was anything damaged or destroyed by the tsunami?
2. In terms of the income and food gathering activities we have been talking about, do you feel that your household is better off, worse off, or the same as it was before the tsunami?
3. In terms of the gear associated with the productive activities, was any of it damaged or destroyed by the tsunami? If yes, what and what was the extent of the damage?
4. REPLACEMENT (BOAT)[7] YES____ NO____

[7] Previous questions, as written in the survey, are about boats so this implies that the individual was using a replacement boat at the time of the survey.

These answers were combined to create a composite score 'Tsunami damage to productive/household materials' (Velasquez and Tanhueco 2005:92). For each household, 0 (for 'Not Lost') or 1 (for 'Lost'), was recorded for the following factors: boat, engine, gear, household items and livelihood activity impact. There were no intermediate scores to distinguish between damaged and destroyed. The values for each of these factors were added to create a summary measure of productive and household materials lost due to the tsunami.

3.5.4 Perception of Recovery Activities

Perception of recovery activities was assessed through four variables: 1. Participation in Current Projects, 2. Perceived Value of Current Projects, 3. Predicted Participation in Proposed Projects, 4. Perceived Value of Proposed Projects. Respondents were asked the following questions in order to create the variables describing perception of recovery activities:

> 1. Recovery Activity Knowledge
> What are the activities in your village that are directed at recovery from the effects of the tsunami?...(*For each activity*) Have you participated in or benefited from this activity?[8]
> *(Each of the above activities is to be evaluated using the following question: What kind of an impact has this activity had on the community? 0=made things a lot worse, 1=made things worse, 2=made things a little worse, 3=no impact, 4=made things a little better, 5=made things better, 6=made things a lot better.)*
>
> 2. The following types of activities have been proposed for your community.
> Each activity will be described with a standard description. (*For each proposed activity)* Would you participate in such an activity? Do you think you would benefit/not benefit from such an activity?

[8] This is phrased as two separate questions; 1. Have you participated in this activity? 2. Have you benefited in this activity?

(Each of the above activities is to be evaluated using the following question: What kind of an impact do you think this activity would have on the community? 0=make things a lot worse, 1=make things worse, 2=make things a little worse, 3=no impact, 4=make things a little better, 5=make things better, 6=make things a lot better.)

Proposed projects differed for each village, but none included direct involvement in the capture fishery. Each list of projects also included 'Small Groups' which was explained to the survey respondents as a group of people who are jointly given a small loan to begin some type of livelihood that the borrowers decide on their own, with restrictions including environmental and sustainability concerns. For each village, several examples were included. A complete list of proposed projects is included as Appendix B.

Each variable of 'Perception of Recovery Activities' is a summary measure. For the variable of participation in current projects, non-participation was coded as 0 and participation was coded as 1. Perceived project value was coded as per the directions included in the survey (and above) from 0 ('made things a lot worse') to 6 ('made things a lot better'). There were no intermediate values included but the summary measures were continuous values because the variable was an average of more than one evaluation. Willingness to participate in proposed projects was coded as 0 for non-willingness to participate and 1 for willingness to participate. Each of these four variables includes more than one value. For example, one respondent may have named four current projects and there could have been three proposed projects in the village in which they reside. Therefore, each actual participation for current projects were added and divided by the number of projects mentioned (in this example, four). Value of current projects, willingness to

participate in proposed projects and perceived value of proposed projects were each calculated in the same way (by adding each response and dividing by the number of responses) to create summary measures for each of the four variables of perception of recovery activities.

3.5.5 Background Information

Background information gathered from subjects included village of residence, address, household size, sex, age, religion, years of formal education, and years living in current village. Subjects were also asked to rank by relative significance, sources of livelihood for each household.

3.6 Statistical Analysis, Participant Observation and Key Informant Interviews

The variables used for statistical analysis are attitudes toward the occupation of fishing, level of fatalistic thinking, perception of the future, spending choices if given 9,000 baht, spending choices if given 110,000 baht, damage to productive and household materials from the tsunami, willingness to participate, and perceived value of the projects. Initially, a canonical correlation is performed as an exploratory technique for two or more sets of variables to assess overall correlation between the sets of variables (Harlow 2005: 180). Four standard multiple regressions were performed to follow up on the canonical correlation, each using one of the four variables of 'Perception of Recovery Activities' as a dependent variable with each of the other three 'Perception of Recovery Activities'

variables used as independent variables (Gotwals, Dunn and Wayment 2003). Data from participant observation and key informant interviews provide additional information to support and clarify the findings from statistical analysis (Pollnac and Crawford 2000).

3.7 Summary

This chapter describes the location of the study and how this investigation may assist the Post-Tsunami Sustainable Coastal Livelihood Program to effectively achieve its goals. The methods for data gathering and analysis are then explored. The questions from the survey used to create each variable to be analyzed are also discussed along with how the responses were coded and calculated.

CHAPTER IV

ANALYSIS AND RESULTS

This chapter will address the research question and hypotheses proposed in Chapter Two. First, this chapter will summarize relevant information from household surveys to provide an overview of the sampled population and their occupations. Measured variables, as discussed in Chapter Three, will be analyzed using canonical correlation, two follow-up multiple regressions and two multiple regressions using only those respondents that evaluated at least one current project. The results of the statistical analysis will be further explained with pertinent data from participant observation and key informant interviews.

4.1 Description of Overall Demographics

The sample of individuals surveyed in each village is between fifteen and twenty-four percent which gives an approximately even distribution among villages (Table 4).

Table 4. Residency Distribution of Sample

Village	Number	Percent
1	81	17.72
2	77	16.85
3	109	23.85
4	94	20.57
7	96	21.01
N	457	100

The number of individuals surveyed ranges from 77 (Village 2) to 109 (Village 3). This was the maximum number of surveys possible, given time and other research constraints. Overall, the sample size (N = 457) is adequate for the statistical analysis presented below (Harlow 2005). For the purposes of this study, the villages were analyzed as one group in order to address the research objective and hypotheses which aim to assess perceptions of individuals that were impacted by the tsunami as a whole. The villages were analyzed together due to the nature of this disaster and because the villages are closely clustered together. This analysis assumes that all respondents were impacted, either directly or indirectly.

The sample is almost equally divided between men (47 percent) and women (52 percent) (Table 5).

Table 5. Gender and Religion Distributions of Sample

	N	Percent
Gender		
Male	216	47.4
Female	240	52.6
Total	456	100.0
Religion		
Muslim	353	77.2
Buddhist	104	22.8
Total	457	100.0

This distribution ensures that overall analysis will represent views of both genders. The population in the study site is primarily Muslim, with a few small concentrations of Buddhists (primarily in Villages 4 and 7). Differences exist between Islam and Buddhism, both in general practice and in the aftermath of a natural disaster such as the tsunami. In this sample, Muslims comprise just over

three quarters (77 percent) of the individuals surveyed and Buddhists represent less than one quarter (23 percent). The sample is therefore sufficient to represent views of both religions as a reflection of relative proportions of the village as a whole. Age and level of education may also affect perceptions and willingness to participate in livelihood projects. In this sample, the mean age is 40 years with a standard deviation (14 years) that suggests there is a wide range of working age individuals in the sample (Table 6).

Table 6. Descriptive Statistics of Age and Education of Sample

	N	Mean	SD
Age	457	40.3	13.7
Yrs of Education	457	6.2	3.6

The mean level of education is 6 years with a standard deviation of 4 that suggests that the area is approximately equal to the national average of 6.4 years of education[9] (Ministry of Education 2000).

The percentage of households involved in fishing and aquaculture is another general statistic to note because the survey assesses attitudes toward fishing as an occupation. In this sample, 70 percent of the households were engaged in fishing for food and/or income at the time of the survey (Table 7).

[9] This statistic (the most recent year for which this information can be found) is from 1996/1997.

Table 7. Number and Percent of Households Involved in Fishing and Aquaculture

	N	Percent
Fishing Households[10]	323	70.7
Aquaculture Households[11]	99	21.7
Other	35	7.6
Total Households	457	100.0

In addition, at least one proposed project included in the survey for each village was related to aquaculture. Although there were households beginning to practice aquaculture during the time of study (as part of ongoing rehabilitation projects), some aquaculture existed in the area prior to the tsunami. Therefore, it is useful to note that at the time of the survey, less than one quarter (22 percent) of households in the sample were practicing aquaculture. These numbers include any household that stated fishing and/or aquaculture as a source of food and/or income, but does not imply that this is the primary source[12].

4.2 Occupational Distribution and Level of Development

Residents of the five villages were already involved in a variety of livelihood activities including fishing, aquaculture, farming and raising livestock (Table 8). Over half of the households surveyed listed at least three types of livelihoods that contributed food and/or income. Fishing was the most common livelihood in all of the villages except Village 3 where farming predominates. Trading, for the purposes of this study is defined as selling (or re-selling goods)

[10] Respondent resides in a household that ranked fishing as a source of income and/or food.
[11] Respondent resides in a household that ranked aquaculture as a source of income and/or food.
[12] The occupation (either fishing or aquaculture could have been ranked at any level of importance to household income/food).

Table 8. Percent Occupational Distribution by Village

Activity	Village 1	Village 2	Village 3	Village 4	Village 7
Fishing	92.3	58.7	47.5	76.0	86.3
Aquaculture	11.5	28.3	27.9	16.0	23.6
Farming	46.1	47.8	70.5	40.0	15.7
Livestock	42.2	19.6	16.4	8.0	15.6
Trading	19.2	30.5	42.6	22.0	31.4
Tourism	7.6	0.0	6.4	4.0	0.0
Labor	26.8	49.9	37.8	47.0	39.2
Taxi	3.8	2.2	4.8	2.0	4.0
Other	11.4	0.0	0.0	4.0	2.0

is relatively more common in Village 3 than in the other villages. This is expected because it is the center of commercial activity. Twice each week, there is a market in this village that draws local residents selling produce and merchants from nearby cities (Kuraburi and Ranong). In addition, several small shops are open daily in the area, offering dry goods, prepared meals and electronics. Each village has regular electricity, telephone access (via mobile phones) and access to media including newspapers, television and radio.

Overall, at the time of the study (six months after the tsunami struck), the villages were functioning better than the researcher anticipated. There was regular access to drinking water during the researcher's stay in the area. However, results of the Participatory Rural Appraisal (PRA) included complaints from residents of Village 1 and 2 concerning availability of water during the dry season, and residents of Village 3 were concerned with salt intrusion into domestic water sources (Pongquan et al. 2005). There were functioning elementary schools located in four of the five villages. Children from Village 7, where there is no school, can attend school in one of the other villages.

4.3 Statistical Analysis

The analysis was performed using SAS version 9.1 using the summary measures for variables as described in Chapter Three. First, the data were analyzed using a canonical correlation to examine the relationship between post-tsunami perceptions and material damage (attitudes toward the occupation of fishing, level of fatalistic thinking, perception of the future, spending choices if given 9,000 baht, spending choices if given 110,000 baht, damage to productive and household materials from the tsunami) and perceptions of rehabilitation livelihood projects (willingness to participate and perceived value of ongoing and proposed projects). This experimental test was preliminary because this investigation combines theory from disaster recovery and livelihood development (as discussed in Chapter Two). Canonical correlation is an exploratory statistical analysis that is often followed up with multiple regressions on each of the dependent variables with the other variables used as independent variables (Gotwals, Dunn and Wayment 2003). Two follow-up, standard multiple regressions were used to identify the factors contributing most strongly to the first canonical variate identified in the canonical correlation. Finally, to address the affects of perceptions of ongoing projects, multiple regressions were run a second time on the same dependent variables using only individuals that rated at least one ongoing livelihood project and added the perception of value and actual participation of ongoing projects as independent variables (in addition to the others used in the first two multiple regressions).

4.3.1. Descriptive Statistics of Measured Variables

A summary of the descriptive statistics on variables used for the analysis is presented in Table 9. Assumptions of normality for the variables are met with the exception of perceived value of project which has a high skew (-3) and kurtosis (13) (Table 9).

Table 9. Descriptive Statistics for Continuous Variables Used in Canonical Correlations and Follow-up Multiple Regressions[13]

Variable	N	Mean	SD	Skewness	Kurtosis
Perception of Fishing	447	0.51	0.31	-0.08	-0.78
Fatalistic Thinking	457	3.59	2.08	0.37	-1.19
Future Perception	423	-1.49	1.34	0.29	1.35
Investment - 9,000 baht	455	1.90	0.88	-0.75	0.04
Investment - 110,000 baht	456	1.80	0.92	-0.41	-0.67
Predicted Participation in Proposed Projects	453	0.66	0.36	-0.60	-0.99
Perceived Value of Proposed Projects	457	5.30	0.97	**-3.16**	**13.57**

Given this deviation from assumptions, results should be interpreted with caution. However, the large sample size improves interpretability. The lower recommended limit for sample size is 5 per variable (Harlow 2005). For this analysis with eight variables, the sample used is 423, well above the recommended size of 40. In addition, least squares models are robust to violations of parametric assumptions. Multicollinearity occurs when two or more independent variables are highly related and, therefore, parameter estimates are not uniquely determined (Onwuegbuzie and Daniel 2003). Since correlations between independent variables were lower than their correlations with dependent variables, multicollinearity is not suspected among these variables.

[13] Note: Values in bold do not conform to assumptions of normality.

For the third and fourth multiple regressions, certain cases were selected from the original sample for the analysis. Therefore, descriptive statistics for the variables are similar and variables meet assumptions of normality except for perceived value of the project which is similarly skewed (-3) and kurtotic (13) (Table 10).

Table 10. Descriptive Statistics for Continuous Variables Used in Multiple Regressions for Individuals that Rated Ongoing Projects

Variable	Mean	SD	Skewness	Kurtosis
Perception of Fishing	0.53	0.30	-0.68	-0.68
Fatalistic Thinking	3.41	1.98	0.47	-0.99
Future Perception	-1.39	1.24	-0.01	1.41
Investment - 9,000 baht	1.96	0.95	-0.77	-0.24
Investment - 110,000 baht	1.80	1.00	-0.41	-0.92
Tsunami damage to productive/household materials	2.61	1.96	0.14	-1.20
Participation in Current Projects	0.29	0.40	0.93	-0.77
Perceived Value of Current Projects	5.36	0.81	-1.41	2.25
Willingness to Partipate in Proposed Projects	0.75	0.33	-1.04	-0.11
Perceived Value of Proposed Projects	5.34	0.89	**-3.01**	**13.83**

In addition, because the sample is now smaller (226), interpretability is less reliable. However, the recommended sample size for an analysis with ten variables is 50 (5 for each variable). Therefore, this sample size is also well above the lower limit suggested for this analysis (50) and, therefore, interpretability is still reasonable (Harlow 2005). Table 10 shows descriptive statistics for the same variables used in these multiple regressions, including only cases where the individual rated the value of at least one ongoing project.

4.3.2. Canonical Correlation

This canonical correlation is used to examine the correlations between two sets of variables, post-tsunami perceptions (attitudes toward the occupation of fishing, level of fatalistic thinking, perception of the future, spending choices if given 9,000 baht, spending choices if given 110,000 baht, damage to productive and household materials from the tsunami) and perceptions of rehabilitation livelihood projects (willingness to participate and perceived value of ongoing and proposed projects). The overall canonical correlation test was statistically significant, Wilks' $\Lambda = 0.897$, $F\ (12, 800) = 3.71$, $p < 0.01$, with a small effect size ($R^2 = 0.103$). Of the two canonical correlations extracted from the data, the first function was statistically significant ($R_C = 0.288$, $p < 0.01$, $R^2 = 0.08$) with a small multivariate effect size. This canonical function explains 81% of the shared variance in this set of variables. These results indicate the first pair of canonical variates were marginally related. There were four variables that exceeded the criteria for interpretability used in this analysis (>|.30|) (Harlow 2005). Attitudes toward the occupation of fishing (0.86), damage to productive and household materials from tsunami (0.61), and fatalistic thinking (-0.35) were strongly associated with the first post-tsunami perceptions canonical variate (

Table 11).

Table 11. Canonical Variate Loadings and Canonical Correlations for Post-Tsunami Perceptions and Perceptions of Proposed Livelihood Projects

	First canonical variate canonical loading[14]
POST-TSUNAMI PERCEPTIONS	
Perception of Fishing	**0.86**
Fatalistic Thinking	**-0.35**
Future Perception	-0.20
Investment - 9,000 baht	0.20
Investment - 110,000 baht	0.13
Tsunami damage to productive/household materials	**0.61**
PERCEPTIONS OF LIVELIHOOD PROJECTS	
Willingness to Participate in Proposed Projects	**0.98**
Perceived Value of Proposed Projects	0.10
CANONICAL CORRELATION	**0.29**

On the perceptions of proposed project canonical variate, willingness to participate shows a strong positive association (0.98). None of the redundancy coefficients were sufficiently high enough to be interpreted (>|.30|) (Harlow 2005). Positive attitudes about fishing, greater damage to productive and household materials and an individual that is less fatalistic is associated with greater willingness to participate in proposed projects.

4.3.3. Multiple Regressions to Follow-up on Canonical Correlations

Two multiple regressions were performed as follow up analysis using willingness to participate and perceived value of the project, each as a dependent variable. The first assesses the independent variables, attitudes toward the occupation of fishing, level of fatalistic thinking, perception of the future, spending choices if given 9,000 baht, spending choices if given 110,000 baht, damage to

[14] Note: Canonical loadings that are interpretable (>0.30) are in bold.

productive and household materials from the tsunami and willingness to participate were used here as the independent variables on the outcome of perceived value of projects. The variable of willingness to participate is used here as a dependent variable in order to assess the correlation between the two project variables while accounting for the other independent variables. The model is significant overall at $F(7, 408) = 6.53$, $p < 0.05$ with ($R^2 = 0.10$) a small multivariate effect size. Unstandardized regression coefficients (B), the intercept, standardized regression coeffients (β), the semi-partial correlation (sr_i^2), R^2, and adjusted R^2 are shown in Table 12.

Table 12. Standardized Multiple Regression of Post-tsunami Perceived Value of Proposed Projects[15]

	Unstandardized Coefficients		Standardized Coefficients	
	B	Std. Error	β	sr^2 (unique)
Intercept	5.029	0.161	0	
Perception of Fishing	-0.126	0.140	0.047	0.002
Fatalistic Thinking	0.028	0.019	0.071	0.005
Future Perception	-0.057	0.030	0.094	0.008
Investment - 9,000 baht	-0.064	0.048	0.066	0.004
Investment - 110,000 baht	-0.059	0.045	0.065	0.004
Tsunami damage to productive/household materials	0.008	0.022	0.019	0.00003
Willingness to Participate in Proposed Projects	**0.669**	**0.112**	**0.296**	**0.081****
$R^2 = 0.103$				
Adjusted $R^2 = 0.087$				
$R = 0.320$				

* = Significant predictor at $p < 0.05$; ** = Significant predictor at $p < 0.01$

[15] Note: Significant predictors are in bold ($p < 0.05$).

One predictor, willingness to participate (t = 5.99) with a standardized beta weight of 0.30 and a small effect size (squared semi-partial correlation = 0.08) was a significant predictor of perceived value of the project at the $p < 0.05$ level. As indicated from the squared semi-partial correlation (sr^2), 8% is the unique variance contributed by willingness to participate in proposed projects to predictor variables. The results of this analysis indicate that more positive views of proposed projects can be statistically significantly predicted by greater willingness to participate in those projects.

The second multiple regression assessed all of the independent variables used in the canonical correlation and the perceived value of the project used here as an independent variable on the outcome of willingness to participate. The variable of perceived value of proposed project is used here as a dependent variable in order to assess the correlation between the two project variables, inclusive of the other independent variables. The model is significant overall at $F(7, 408) = 10.61$, $p < 0.05$ with ($R^2 = 0.16$) a medium multivariate effect size. Unstandardized regression coefficients (B), the intercept, standardized regression coefficients (β), the semi-partial correlation (sr_i^2), R^2, and adjusted R^2 are shown in

Table 13.

Table 13. Standard Multiple Regression of Willingness to Participate in Proposed Projects[16]

	Unstandardized Coefficients		Standardized Coefficients	
	B	Std. Error	β	sr^2 (unique)
Intercept	-0.202	0.128	0	
Perception of Fishing	**0.226**	**0.059**	**0.190**	**0.031****
Fatalistic Thinking	-0.015	0.008	-0.085	0.007
Future Perception	-0.004	0.013	-0.013	0.0002
Investment - 9,000 baht	0.016	0.021	0.038	0.001
Investment - 110,000 baht	0.022	0.019	0.055	0.003
Tsunami damage to productive/household materials	**0.020**	**0.009**	**0.107**	**0.010***
Perceived Value of Proposed Projects	**0.123**	**0.021**	**0.278**	**0.076****
$R^2 = 0.157$				
Adjusted $R^2 = 0.142$				
$R = 0.396$				

* = Significant predictor at $p < 0.05$; ** = Significant predictor at $p < 0.01$

The following three factors were statistically significant predictors of willingness to participate in proposed projects at the $p < 0.05$ level: attitudes toward the occupation of fishing ($t = 3.83$) with a standardized beta weight of 0.19 and for a small effect size ($sr^2 = 0.03$); damage to household and productive materials from the tsunami ($t = 2.14$) with a standardized beta weight of 0.11 and a small effect size ($sr^2 = 0.01$); and perceived value of project ($t = 5.99$) with a standardized beta weight of 0.28 and a small effect size ($sr^2 = 0.08$) (

[16] Note: Significant predictors are in bold ($p < 0.05$).

Table 13). As indicated by the squared semi-partial correlations (sr^2), perceived value of proposed projects contributed 8% to the unique variance contributed by perceived value of proposed project to the predictor variables. In addition, attitudes toward fishing contributed 3% and damage to productive and household materials contributed 1% of unique variance to predictor variables. The results of this analysis indicate that greater willingness to participate can be statistically significantly predicted by more positive attitudes toward fishing, greater damage to personal materials from the tsunami and greater perceived value of proposed projects.

This analysis suggests that attitudes toward fishing and direct damage to household and/or productive materials are of important concern when assessing willingness to participate in proposed projects.

4.3.4. Multiple Regressions with Perceptions of Current Projects

Two additional multiple regressions used only cases for which the individual listed at least one livelihood project in order to address the third hypothesis which assessed how perceptions of current projects affects perceptions of proposed projects. Therefore, the analysis below examines the effect of perceptions of ongoing projects on perceptions of proposed projects. The following two multiple regressions assess an individual's perceived value of ongoing livelihood projects and their actual participation in addition to the independent variables used in the previous analyses.

This multiple regression assesses the six post-tsunami perceptions and material damage (variables listed above), participation in ongoing projects, and perceived value of ongoing projects and willingness to participate in proposed projects on the outcome of perceived value of proposed projects. The variable of willingness to participate is used here as a dependent variable also, in order to assess the correlation between the two proposed project variables while accounting for the interaction of perceptions of ongoing projects and post-tsunami perceptions and material damage. The model is significant overall at $F(9, 226) = 6.10$, $p < 0.05$ with ($R^2 = 0.20$) a medium multivariate effect size.

Table 14. Multiple Regression of Perceived Value of Proposed Projects for Individuals that Rated Ongoing Projects[17]

	Unstandardized Coefficients		Standardized Coefficients	
	B	Std. Error	β	sr^2 (unique)
Intercept	3.415	0.330	0	
Perception of Fishing	0.014	0.153	0.006	0.00003
Fatalistic Thinking	**0.054**	**0.022**	**0.155**	**0.022***
Future Perception	-0.016	0.035	-0.029	0.0008
Investment - 9,000 baht	-0.023	0.047	-0.030	0.0009
Investment - 110,000 baht	-0.077	0.046	-0.107	0.011
Tsunami damage to productive/household materials	0.003	0.023	0.007	0.00004
Participation in Ongoing Projects	-0.013	0.105	-0.008	0.00005
Perceived Value of Ongoing Projects	**0.325**	**0.054**	**0.374**	**0.135****
Willingness to Participate in Proposed Projects	**0.296**	**0.128**	**0.146**	**0.020***
$R^2 = 0.203$				
Adjusted $R^2 = 0.170$				
$R = 0.450$				

* = Significant predictor at $p < 0.05$; ** = Significant predictor at $p < 0.01$

[17] Note: Significant predictors are in bold ($p < 0.05$).

The following three factors were statistically significantly related to perceived value of proposed projects at the $p < 0.05$ level: fatalistic thinking ($t = 2.42$) with a standardized beta weight of 0.155 and a small effect size ($sr^2 = 0.02$); perceived value of ongoing projects ($t = 6.05$) with a standardized beta weight of 0.37 and a medium effect size ($sr^2 = 0.14$); and willingness to participate in proposed projects ($t = 2.31$) with a standardized beta weight of 0.15 and a small effect size ($sr^2 = 0.02$) (Table 14). The squared semi-partial correlations (sr^2) indicate that 14% is the unique variance contributed by perceived value of ongoing projects to the predictor variables in this model. Fatalistic thinking contributed 2% and willingness to participate in proposed projects contributed 2% unique variance the predictor variable of perceived value of proposed projects in this analysis. The results of this analysis indicate that more positive perceptions of proposed projects can be significantly predicted by a more positive perceived value of ongoing projects, greater fatalistic thinking and greater willingness to participate in proposed projects.

The following multiple regression assesses the same variables as the previous analysis except the outcome of perceived value of proposed projects is used as an independent variable and predicted value of proposed projects is used as a dependent variable. The perceived value of proposed projects is used here as a dependent variable in order to assess the correlation between the two proposed project variables while accounting for the interactions of perceptions of ongoing projects and post-tsunami perceptions and material damage. The model is significant overall at $F(9, 226) = 2.49$, $p < 0.05$ with ($R^2 = 0.09$) a small

multivariate effect size. The following two factors were statistically significant predictors of willingness to participate in proposed projects at the $p < 0.05$ level: perception of the occupation of fishing ($t = 1.99$) with a standardized beta weight of 0.14 and a small effect size ($sr^2 = 0.01$) and perceived value of proposed projects ($t = 2.31$) with a standardized beta weight of 0.17 and a small effect size ($sr^2 = 0.02$) (Table 15).

Table 15. Multiple Regression of Willingness to Participate in Proposed Projects for Individuals that Rated Ongoing Projects[18]

	Unstandardized Coefficients		Standardized Coefficients	
	B	Std. Error	β	sr^2 (unique)
Intercept	0.0002	0.212	0	
Perception of Fishing	**0.158**	**0.079**	**0.140**	**0.017***
Fatalistic Thinking	0.0006	0.012	0.003	0.00001
Future Perception	0.004	0.018	0.015	0.0002
Investment - 9,000 baht	0.021	0.025	0.057	0.003
Investment - 110,000 baht	0.044	0.024	0.124	0.014
Tsunami damage to productive/household materials	0.021	0.012	0.119	0.012
Participation in Ongoing Projects	0.048	0.055	0.058	0.003
Perceived Value of Ongoing Projects	0.003	0.030	0.008	0.00005
Perceived Value of Proposed Projects	**0.082**	**0.035**	**0.166**	**0.022***
$R^2 = 0.094$				
Adjusted $R^2 = 0.056$				
$R = 0.307$				

* = Significant predictor at $p < 0.05$; ** = Significant predictor at $p < 0.01$

As indicated by the squared semi-partial correlations (sr^2), 2% is the unique variance contributed by perceived value of proposed projects and 2% of the unique variance is contributed by attitudes toward fishing 2% to willingness to participate in proposed projects, the dependent variable. The results of this analysis indicate

[18] Note: Significant predictors are in bold ($p < 0.05$).

that greater willingness to participate in proposed projects is statistically significantly related to a more positive perceived value of proposed projects and more positive attitudes toward fishing.

These two multiple regressions assess the factors that significantly predict more positive perceptions of proposed projects using only individuals that were familiar with at least one livelihood project that was ongoing at the time of the survey. This analysis indicates that more positive perceptions of ongoing projects, greater fatalistic thinking and more positive attitudes toward fishing will predict greater willingness to participate and more positive perceived value of proposed projects. As in the earlier analysis, greater willingness to participate and more positive perceptions of the value of proposed projects statistically significantly impact each other.

In summary, several findings result from the statistical analysis of survey responses. Although the R^2 values are weak, with various tests identifying the same relationships, there is a basis for further investigation of these findings with data from key informant interviews and participant observations. In each of the multiple regressions, willingness to participate and perceived value of the project are positively related. Attitudes toward the occupation of fishing are significantly associated with the canonical variate as well as significantly predicting willingness to participate using all cases as well as cases that evaluate at least one ongoing project. Direct damage to productive and household materials is also significantly associated with the canonical variate as well as predicting willingness to participate in proposed projects. Fatalistic thinking is negatively associated with the canonical

variate and positively contributes to perceived value of projects assessing only responses of individuals that evaluate at least one ongoing project. Individuals' perception of ongoing projects is also a predictor of willingness to participate in proposed projects analyzing only individuals that evaluated at least one livelihood project.

4.4. Participant Observation and Key Informant Interviews

The following information was taken from data gathered using the methods of participant observation and key informant interviews (Pollnac 1988, Pollnac and Crawford 2000). Relevant data were used to further explain significant factors identified in the statistical analysis above. Specifically, this exploration will address perceived value of proposed projects, attitudes toward fishing, damage to productive and material goods, fatalistic thinking and perceived value of ongoing projects.

4.4.1. Perceived value of proposed projects

Data from key informants and participant observation support the idea that individuals value projects based on their knowledge, skills, and access to productive materials in addition to monetary income. For example, one of the proposed projects in Village 7 was catfish farming. In order to participate in this project, individuals attended numerous coordination and informational meetings that did not provide any monetary reward. One of the attendees stated that learning how to raise catfish was an important reason for his participation. He was aware

that as part of the project, the funding agency would donate some of the equipment and infrastructure needed to start the process and provide training in catfish hatchery spawning. The interviewee mentioned that if the formal project failed, he could continue to practice catfish spawning because the productive materials would be there and he would have the skills from training.

4.4.2. Attitudes toward fishing

Replacement of fishing gear facilitates rehabilitation access to income for a household. Therefore, residents may view the occupation positively if re-entry into fishing is facilitated by donations. Numerous outside donors (both domestic and international) pledged to give boats to fishermen whose boats were damaged by the tsunami. In Suk-Sumran, the local government compiled a list of households that had lost a boat and/or gear for distribution to donors. However, this list was not coordinated by any single entity. Therefore, families received duplicate replacement boats and/or gear. One key informant stated that he was using a replacement boat donated to him from an outside donor. Another donor also promised him a boat. Therefore, he said that he would give the second boat to his son for him to begin fishing on his own. This situation allows easy entrance of former fishermen back into the capture fishery because their productive materials are replaced. In addition, former fishermen already have experience and skills to restart their occupation and contribute to food and income for their households.

In addition, many of the proposed projects could be practiced in combination with fishing and thus, not perceived as a tradeoff to replace fishing. In

many cases, both the male and female heads of a household practiced at least one type of livelihood. For example, one proposed project was raising goats. This activity was already practiced by families in the study area and often women and children would attend to the goats. This responsibility was often in addition to another occupation or attending school (for children). Residents also wanted to generate as much income as possible in the aftermath of the tsunami in order to return to the style of life that they enjoyed before the disaster occurred. At the time of the survey, daily rains and choppy seas prevented or inhibited fishing offshore. During this time of year, fishermen often fished in the canals and mangrove areas, providing them with more time to participate in other livelihood projects. Therefore, positive attitudes toward fishing could be correlated with greater willingness to participate in projects because individuals intend to do as many projects to generate income and food as possible in order to aid recovery of their household.

4.4.3. Damage to Productive and Material Goods

Residents living in 'tsunami houses'[19] mentioned the need to acquire savings for improving their homes. While the houses provided shelter, residents complained of their quality. For instance, after several days of heavy rain, the walls of the bathroom showed water stains where the window was not well sealed in the house where the researcher stayed. A resident in Village 7 also had to repair the roof of their 'tsunami house' because the aluminum sheeting used on the roof did

[19] "Tsunami house" was the term assigned to the houses built by the Thai Air Force soon after the tsunami in order to provide housing for residents that lost their houses.

not join completely at the peak of the roof and water would come through the roof when rain came from a certain direction. Therefore, although these residents were living in houses, they needed money for repairs and improvements in addition to income for regular household needs.

Some residents also lost savings and the ability to practice their occupation as a result of the tsunami. Because there was no commercial bank in the area, residents stored money and other valuables inside their houses. When houses were washed away by the waves, money, jewelry and other valuables were also lost, creating a more severe loss for the household by eliminating savings in addition to the house and its contents. For example, a seamstress lost her sewing machine, fabric and all of her needles and thread when her house washed away. In order for her to begin recovery, she had to find another source of income in order to begin saving money to purchase a sewing machine and materials needed to re-start her pre-tsunami occupation. Fishermen in particular, lost productive materials including boats, engines and gear because of the tsunami. One fisherman whose house was located inland of water inundation lost his boat because it was resting on a bank of the river. The water was focused into rivers and streams which flooded riverbanks further inland of the inundation on land. Other fishermen had set gear in the sea that was lost when the waves moved through.

4.4.4. Fatalistic Thinking

When the survey was pre-tested (in Village 1), some interviewees did not respond to the ladder-scale questions for future time (see Methods section for the

actual questions). The translator[20] and researchers discussed this issue with the interviewers who stated that the Islamic religion prohibits fortune-telling and therefore, some of the respondents did not want to predict what the future holds. However, the researcher later conducted a key informant interview in Village 7 regarding future thinking, fortune-telling and Islam. The respondent was forthcoming with information. He said that he could not tell what would happen in the future but that he thought mangrove areas would be healthier in coming years because there were tree planting projects underway in areas where mangroves were damaged by the tsunami. He also noted that many boats were donated to residents in the area and, in his opinion, there would be more boats after the tsunami than before it. Therefore, he projected that there would be less fish to catch because of the increase in boats. In summary, there appears to be differing views about future thinking as interpreted by the residents of Suk-Sumran.

However, in the aftermath of the tsunami, residents often spoke about rebuilding their homes, occupations and lives. Several families set aside a portion of their income for savings. Some examples of intended use for these savings were investment in material goods, productive goods, home improvements and education for their children. There is still a lack of access to local financial institutions so savings was, again, stored in houses.

4.4.5. Perceived value of Ongoing Projects

[20] The translator was Buddhist and not familiar with conventions of Thai Islam.

Key informants and participant observation revealed that some individuals recognized the value of learning a skill while participating in livelihood projects. During a key informant interview with three members of a sewing project, there were two individuals that named “learning to sew” and “use of a sewing machine” as advantages to participating in the project (in addition to payment for the bags they made for the donor). The third member was a seamstress prior to the tsunami and led the group by teaching the others the skill. This member also kept the sewing machine at her house and used it (with approval from the donors) for alterations/repairs for hire. Other members of the group were allowed to use the machine as well, for their personal needs, unless it was needed to make the bags (the original task for which the group was paid per piece produced).

4.5.Summary

This chapter discussed the interpretation of data gathered from the study site. The data were analyzed using canonical correlation and multiple regression. These analyses found statistically significant contributions of perceived value of proposed projects, attitudes toward fishing, damage to productive and household materials, fatalistic thinking, and perceived value of ongoing projects to willingness to participate in proposed livelihood rehabilitation projects. Each of these factors were further explored and clarified with key informant interview responses and participant observations. In the next chapter, the results described above will be discussed with respect to each of the four hypotheses presented at the end of Chapter Two and their relation to the relevant literature. These findings will also

address the general research topic of how perceptions of individuals that were impacted by the Indian Ocean tsunami affect willingness to participate in livelihood rehabilitation projects.

CHAPTER V

DISCUSSION

The previous chapter described the results of the data analysis. The factors that were found to significantly contribute to willingness to participate in proposed projects were perceived value of proposed projects, attitudes toward fishing, damage to productive and household materials, fatalistic thinking, and perceived value of ongoing projects. This chapter will discuss these results with respect to the four hypotheses presented in Chapter Two. The analysis indicates that for the sample analyzed in this study: 1. Individuals that viewed fishing positively were more likely to show a greater willingness to participate in rehabilitation projects; 2. Tendency toward forward-thinking and positive views of the future, overall, do not significantly affect willingness to participate in livelihood projects; 3. Individuals that perceive current recovery activities positively also show a greater willingness to participate in proposed livelihood activities; and 4. Individuals whose household and productive materials were more severely affected by the tsunami show a greater willingness to participate in livelihood recovery projects.

Findings related to these hypotheses will be synthesized to describe what this investigation reveals about how perceptions of individuals and damage to productive materials from the Indian Ocean tsunami affects willingness to participate in livelihood rehabilitation projects. This chapter closes with a discussion of the limitations of the study.

5.1 Individuals that view fishing negatively are more likely to show a greater willingness to participate in rehabilitation livelihood projects that introduce a new occupation.

"Relative ease of obtaining food and income" and "reasons related to tradition" were two characteristics identified by fishers in the Philippines and Maluku Islands, Indonesia in a previous study regarding job satisfaction in fishers (Pollnac, Pomeroy and Harkes 2001: 542). These reasons may provide an explanation for the finding that individuals with positive attitudes toward fishing (not negative, as proposed in the original hypothesis) are more likely to show a greater willingness to participate in proposed livelihood projects. The situation at the study site allows easy access to productive materials that facilitate "relative ease of obtaining food and income" for those individuals who were involved in fishing prior to the tsunami. In addition, for fishers and non-fishers that view fishing positively, "tradition" may be a reason that they continue to view fishing positively even after the tsunami caused damage to productive materials, fishermen's source of occupation, and most importantly, human loss of life[21].

Access to boats, engines and gear from donors allowed rapid re-entry into fishing. If able to go fishing, a fisherman could rapidly begin producing income and food for a household. This would speed recovery and decrease donor reliance within the household. Participation in rehabilitation livelihood projects is not mutually exclusive of fishing. Seasonally, the number of hours spent fishing each

[21] Note: Many fishermen were offshore when the tsunami occurred, and were not harmed because the waves did not crest until they reached land (or very near land). Therefore, people in boats were only lifted and lowered with the wave. However, much of the fishermen's gear was destroyed by debris washed out to sea with the receding tides.

day changes because of distance to desired fishing grounds, weather and labor associated with the specific type of fishing. During monsoon season, fishermen have more time to participate in other livelihoods.[22]

Previous studies have found that fishermen are reluctant to trade fishing for another type of livelihood because it is a form of "hunting activity" that allows pursuit of the catch (Pollnac, Pomeroy and Harkes 2001, Tango-Lowry and Robertson 2002), a job characteristic enjoyed by many fishers. The projects proposed in this study did not involve activity in the capture fishery and more closely resemble farming with respect to work type (e.g., aquaculture). Therefore, fishers (and others that view fishing positively) that participate in fishing in addition to other rehabilitation projects may gain greater satisfaction than those who do not return to fishing, because they would gain additional income while maintaining a connection to the capture fishery, and its relative advantages. The results of this survey did not require an individual to choose only one livelihood and, therefore, it is beyond the scope of this investigation to determine if fishermen intended to participate in rehabilitation projects alone, or in addition to the capture fishery.

Limited psychological evidence suggests that individuals may tend to maintain attitudes held prior to a disaster because they discount or ignore conflicting information if it requires a significant change in attitude/belief (Mileti 1991:141). This idea could provide support for the correlation between positive attitudes toward fishing revealed by this survey and willingness to participate. It is

[22] The survey was administered during the monsoon season.

possible that positive attitudes toward fishing were a strongly held belief prior to the tsunami, and one conflicting incident (i.e., the Indian Ocean tsunami) did not impact attitudes enough to change perceptions of the occupation of fishing. Additionally, the survey was conducted six months after the disaster occurred. Because this is just one event in a long history of fishing in the area, it is possible that the initially negative views of fishing decreased over time, becoming more congruent with traditionally positive attitudes. Although not all surveyed in this study were actually involved in fishing, many families in the area of study were, so that each household surveyed would have developed views of the occupation. "Tradition" may provide some explanation for positive attitudes toward fishing as revealed by the survey. Fishing provides coherence among residents of the villages, for example, in the form of a fishermen's association that involves all fishermen in the sub-district of Suk-Sumran[23].

Working group structure was an aspect of livelihood projects that individuals may not have considered when responding to the survey. Capture fishermen in the study area are accustomed to relative independence because there is little enforced management over the occupation of fishing. Since independence has been identified as a contributor to job satisfaction in fishing, individuals working in the capture fishery may not be satisfied with projects that rely on working and decision-making in groups (Johnson et al. 1998, Pollnac and Poggie 1988).

[23] This encompasses both the villages in this study and two other villages that were not as severely affected but are also in Suk-Sumran.

Another possibility for the association of positive attitudes toward fishing and willingness to participate is that this analysis addressed attitudes toward fishing, not actual fishers. Individuals that perceive fishing positively do not necessarily practice fishing or enjoy the independence it affords. Those that view fishing positively do not necessarily factor independence into their decision to participate, which is more likely to be a factor in the decision of a fisher to participate in rehabilitation projects that require working in groups. It is also possible that respondents do not realize that most livelihood projects rely on working groups to make decisions to sustain its functioning. Generally, however, this investigation reveals that attitudes towards fishing and willingness to participate are positively correlated in this sample.

5.2 Individuals that show a greater tendency for forward-thinking, and think more positively about the future, will show a greater willingness to participate in livelihood recovery projects.

The two aspects of future perception, fatalism and future perspective, used in the analysis in this investigation, did not reveal a statistically significant effect on willingness to participate in rehabilitation projects. However, fatalism was positively associated with willingness to participate and negatively associated with the canonical variate of post-tsunami individual perceptions.

Although there is considerable research addressing future perspective in individuals with respect to occupations in general, there is relatively little that focuses on gratification orientations in the aftermath of a disaster. There are several

possible reasons for this, but, the most practical is that it is logistically difficult, and possibly intrusive, to assess people's attitudes toward the future during recovery efforts, especially, in the initial hours, days, and weeks after a disaster strikes. However, an indication of future perspective can be observed in the activities of the affected populations during this time period.

Coping strategies in the short-term differ among different communities but generally focus on food, shelter and income generation (Heijmans 2004: 120). After satisfying initial needs, many household decisions involve implicitly calculating risks and making choices from which they expect the most benefit and the least risk. The next steps in recovery include occupation re-establishment and generating income for daily expenses such as food, clothing and material goods. Longer-term rebuilding at the household level often includes savings for larger purchases, for example productive materials to enhance income generation (Heijmans 2004: 120).

At each of these stages of recovery, different future perspective is likely to dominate. For example, in the earliest stages of recovery, focus is likely to be on meeting immediate recovery needs for daily sustenance. Later in the recovery process, individuals are likely to focus on saving money to rebuild their standard of living to that enjoyed prior to the disaster event. At this stage, individuals are more likely to orient their thoughts toward future purchases and needs.

The residents of the villages of Suk-Sumran were affected at various levels by the disaster. Some lost houses, family members, occupations and productive materials required for those occupations. Others were less severely affected, or not

directly affected at all. In addition, individual perceptions differ regarding level of recovery at the time of the survey. Therefore, the residents were at different stages of recovery at the time of the survey and are likely to have different investment orientations and reasoning for willingness to participate, or not participate, in proposed projects.

In a related investigation of factors affecting perceptions of vulnerability, powerlessness was identified as one of the most often mentioned factors among vulnerable populations in various sites in Asia (Delica-Willison and Willison 2004: 153). The authors specifically cite powerlessness in the face of more powerful individuals. However, in the context of this study, powerlessness and vulnerability can also be addressed in terms of recovery. Fatalism, as defined in this investigation, is similar to powerlessness and may affect an individual's willingness to participate differently, depending on the individual. Individuals that are fatalistic may decide that participation in rehabilitation efforts will not affect their ability to recover because 'fate' will determine whether they recover, regardless of their own actions. Therefore, a fatalistic individual may not be willing to participate in rehabilitation projects. In contrast, if one is fatalistic and decides to participate, they may do so because they are interested in the project itself, not because they feel that it will affect their 'fate', or recovery.

Delica-Willison and Willison also link stress with feelings of uncertainty about surviving which may cause individuals to be "less able to prepare for, to mitigate against, and to survive hazards" (2004: 152). Individuals may look to familial and community support mechanisms to assist them in decreasing their

sense of vulnerability. If rehabilitation projects are perceived favorably, they may take on the character of a community support mechanism which could mean that individuals would participate in projects to increase ties to their 'community'. Others may be overly concerned with coping with the future and become highly stressed and more prone to overly analyze the situation. This stress might deter them from participation in rehabilitation projects. Rogers supports this idea when describing innovators as "better able to cope with uncertainty and risk than…later adopters" (2003: 209). This statement may also support conflicting evidence regarding future perception and willingness to participate because those that are less able to cope with uncertainty and risk may also show greater willingness to participate if they perceive rehabilitation livelihood projects to be the only option for livelihood rehabilitation.

In summary, perception of future, as measured by fatalistic thinking and investment orientation, may be a combination of other factors such as stress and vulnerability that could be assessed in conjunction with future perspective in order to gain a more complete understanding of influences on willingness to participate in a disaster recovery context.

5.3 Individuals that perceive current recovery activities positively will show a greater willingness to participate in proposed livelihood activities.

Rogers' description of innovators may provide some explanation for the confirmation of this hypothesis from the data gathered from the five villages included in this study. The findings in this investigation indicate that perceptions of

ongoing activities are positively associated with willingness to participate in proposed projects.

Adoption of innovation theory describes the normal-shaped distribution of adopters as discussed in Chapter Two. Early adopters are more adventurous than later adopters (Rogers 2003, Tango-Lowy and Robertson 2002). Individuals that adopt an innovation and view it positively are more likely to try another, similar innovation. In addition, as the number of innovators increases, if a majority of these innovators also view the innovation positively, more of the population will follow suit. As defined by Rogers, the innovators will be the earliest to participate, followed by adopters, then early and late majority and finally, laggards (2003). This trend will result in more people participating in rehabilitation projects, if individuals view the early projects positively (whether or not they are actually participating in them).

The results of this study extend similar findings from Pollnac and Pomeroy's study of integrated coastal management projects that perception of benefits and initial benefits impact actual participation in alternative livelihood projects (2005). In the current investigation, perception of ongoing activities influenced perceptions of, and willingness to participate in future activities. This finding has important implications in recovery efforts such as that of Suk-Sumran, where many donors are conducting rehabilitation projects in the same communities. As discussed earlier, residents generally do not differentiate between organizations. Therefore, donor groups would greatly benefit from coordinating their efforts. In Suk-Sumran, the local government (at the suggestion of several donor

organizations) began to hold monthly coordination meetings where all organizations working (or planning to work) in the tsunami-affected area could meet to exchange information and report on their individual projects and joint efforts. At the end of the researchers' stay at the study site, coordination seemed to be improving. This type of coordination is difficult in the early stages of disaster recovery. It is also most important at the outset of recovery efforts in order to implement projects in an organized and effective way.

Another possible explanation for an association between positive perceptions of ongoing activities and willingness to participate in proposed projects is that individuals may associate rehabilitation projects with access to skills, knowledge and technology not otherwise available to them. Therefore, they might hope to participate in as many projects as possible if they perceive these benefits in addition to greater income (Delica-Willison and Willison 2004: 156). As noted in the previous chapter, key informants acknowledged that proposed rehabilitation projects might not all succeed but that access to skills, knowledge and materials, may provide benefits even if a project fails.

Adoption of innovations theory, vulnerability mitigation and recovery research support the findings with respect to this hypothesis. This finding illustrates the importance of beginning recovery efforts with coordinated and effective projects and with projects that have a value beyond that of income.

5.4 Individuals whose household and productive materials were more severely affected by the tsunami will show a greater willingness to participate in livelihood recovery projects.

Greater direct damage to materials from the tsunami was correlated with a greater need to generate income and food to rehabilitate a household to a pre-disaster standard of living. Those who lost their houses likely also lost other material goods, savings, and possibly, productive materials. Even if these residents were provided with a house, they may not have an occupation. Therefore, access to livelihood projects may be the only avenue through which they can begin to earn income again.

Affected individuals may not have productive materials needed to practice their former occupation and if there is no household savings (or savings were lost in the disaster) there may be no other option. By participating in rehabilitation projects, they will begin earning income and/or producing food for their families. In addition, participants will learn new skills needed to practice this livelihood. Both technical skills and business skills (e.g. accounting, budgeting) will be provided to participants through training for many proposed rehabilitation projects. Many of these skills are transferable to other occupations. In the event that the formal project does not continue, individuals can use the skills toward income generation via other avenues.

Participants may also choose to participate in projects for the purpose of saving in order to re-enter their pre-tsunami occupation. Although they may only participate until they can purchase the productive materials needed to rehabilitate

their former source of livelihood, they are still willing to participate until they save enough to purchase these materials. This has an important implication for long-term sustainability of recovery livelihood projects.

Although damage to household and productive materials is not a perception, per se, it is an important factor to consider with respect to livelihood recovery projects. In this analysis, increased damage to household and productive materials was positively associated with willingness to participate in rehabilitation projects.

5.5 Perceptions of individuals impacted by the Indian Ocean tsunami and damage to personal materials affect willingness to participate in livelihood rehabilitation projects

Generally, willingness to participate in livelihood projects is an opportunity to overcome habit. There is little literature regarding the role of habit in disaster recovery. Mileti notes "a persuasive message can achieve behavioral change only if it overcomes the obstacle of existing habits" in reference to adopting mitigation strategies (1999:142). During recovery efforts, livelihood rehabilitation can be directed toward more sustainable (and less vulnerable) practices because habitual actions are often altered post-disaster.

In this study, easy access to re-enter the capture fishery was facilitated by donations of boats, gear and engines. This situation prevented the Program from capitalizing on the opportunity to introduce more sustainable options when "habit" was interrupted.

The findings of this investigation overall illustrate that individuals want to recover to a pre-disaster state, and they view livelihood projects as assistance to achieve this goal. Individuals value the opportunity to gain knowledge provided by the project and skills in addition to income, and they would be willing to participate in as many projects as possible in order to assist their recovery. This study shows that the individuals in this study were willing to participate in rehabilitation projects in addition to existing occupations. An opportunity still exists to encourage sustainable practices in both rehabilitation projects and existing occupations to improve resource use in the area and provide greater likelihood that these resources can continue to be used by future generations.

5.6 Limitations of the Study

This study assessed certain perceptions with respect to proposed projects for livelihood recovery. The findings of this investigation can be used for designing recovery programs for the villages included in this survey but, the study does not attempt to make generalizations about livelihood recovery efforts in general. The statistical analysis produced statistically significant, yet relatively weak results, which may indicate that the practical implications are small. Nevertheless, additional data (from key informant interviews and participant observation) supports these results and their practical significance.

Another procedural limitation of this study is that the interviewers were all young women. The respondents might have answered differently if interviewed by a male. However, use of female interviewers makes interviewer effect more

constant, hence not impacting statistical tests. One reason for the selection of all women is practical; most young men were involved in occupational activities during the day when the surveys were administered. In addition, men are more likely to have influence with government or elected officials which might have skewed responses in a different way. Each household interview was conducted by two interviewers, often with one of two other researchers observing. The researchers were both foreign, one male and one female, and neither was fluent in Southern Thai. The presence of this 'outsider' may have also affected responses, especially because residents generally associated foreigners with donations.

Additionally, this investigation assesses all five villages as one group; however, there are clear differences between them. These differences include pre- and post-tsunami occupational distribution, impact from the tsunami and community solidarity. Each of these differences may affect households differently and may impact perceptions and willingness to participate in proposed livelihood rehabilitation projects. However, the Post-Tsunami Sustainable Coastal Livelihoods Program targeted all of these villages in one program and, therefore, analyzing these villages as one group most adequately provides information for the program as a whole.

Although every recovery effort differs, there are a few factors to note that apply to this investigation, specifically. First, the survey was administered six months after the tsunami occurred, during the monsoon season in Southern Thailand. Heavy rain and rough seas dominate weather conditions during this time of year at the study site. In prior years, much of the fishing effort was lower during

this season, and income levels decrease in this area due to difficulties presented by weather. If the study were conducted during the dry season, the analysis may have generated different results. Specifically, fishermen may not have been willing to participate in proposed projects because they would be spending more time fishing. In addition, attitudes are likely to change with time since the event. Responses may be biased in this study by the presence of the monsoon season which brings waves and rough seas that might remind residents of the tsunami. An option for follow-up investigation is to assess attitudes periodically in the aftermath of the disaster to gain understanding of the changes overtime.

Individuals at the study site were inundated with donations in the aftermath of the tsunami. Many donors did not address residents directly, dealing with local government instead, but donations were distributed to the residents. During the course of this survey, individuals may have been more likely to say that they were willing to participate in projects because they wanted the option of participating in the projects. If the project was actually offered, some individuals may not have actually participated, given constraints such as time.

There are also cultural differences between the locations (e.g. Philippines, New England and Panama) where some of these attitude and perception questions have been used in previous surveys. In translating these surveys, the researchers worked with translators that were familiar with the Southern Thai Dialect and could accurately translate the questions. However, the translators were Buddhist, not Muslim. Although they were aware of the Islamic culture in general, the nuances of

certain attitudes and perceptions may be better investigated in different ways for future study.

5.7 Summary

This chapter describes possible explanations for the results of the data analysis described in the previous chapter with respect to the hypotheses and research topic presented in Chapter Two. The study reveals that post-tsunami perceptions and damage to productive materials do, indeed, affect willingness to participate in livelihood rehabilitation projects. It identifies trends that appear to affect the results of this analysis including willingness to practice numerous occupations that contribute to one household. It also discusses the impact of the existing state of the recovery effort, especially with respect to the large number of boats and engines donated to residents of these villages. The chapter concludes with a discussion of the limitations of the study.

CHAPTER VI

IMPLICATIONS FOR RECOVERY EFFORTS

This chapter expands upon the conclusions discussed in the last chapter with respect to perceptions of individuals impacted by the Indian Ocean tsunami and damage to personal materials and their effect on willingness to participate in livelihood rehabilitation projects. Specifically, this chapter explores practical applications of these findings for managers and practitioners involved in recovery efforts. Next, it addresses environmental issues associated with the recovery effort in Suk-Sumran and its implications for future resilience of the area in the case of another coastal hazard. Lastly, options are explored for future study including more detailed investigation of future perception, longitudinal assessment and comparative analysis.

6.1 Implications for Practitioners and Managers

The findings of this investigation can be used to design livelihood rehabilitation projects that might increase willingness to participate among the affected population at the study site. This information might also be useful for designing livelihood recovery projects in other areas showing some similarities with the communities in this study. First, the positive correlation between attitudes toward fishing and willingness to participate can be used to design rehabilitation projects that retain some characteristics of participating in the captive fishery. For example, one appropriate project could be small-scale tourism where former

fishermen can provide boat tours for visitors to Suk-Sumran. This livelihood would preserve some of the physical characteristics of fishing by allowing fishermen to get out on the sea and transfer technical skills such as boat repair and knowledge of tides and currents in the area. In addition, running boat tours also affords boat captains some level of independence which is an organizational characteristic valued by many fishermen (Johnson et al. 1998, Pollnac et al. 1991). Another advantage of a rehabilitation option such as boat tours is that it preserves the community's use of the ocean for livelihoods and maintains a connection to the coast without overexploiting its resources.

In addition, livelihood projects that emphasize training, especially in skills that are transferable in the event of project failure, may also increase the number of people willing to participate. Many individuals that participated in projects spoke of the likelihood that the project in which they were participating might fail. However, they recognized the value of learning new skills that they could then use elsewhere in the case that the initial project fails.

The data gathered from five villages in Suk-Sumran also revealed a significant association between perceptions of current recovery projects and future projects. This finding highlights the importance of a coordinated and well-planned recovery effort at the outset of the program. Although there are some types of disaster assistance that must begin immediately even if it is not well-planned, livelihood recovery projects may be delayed to allow planning and coordination. As discussed earlier, potential participants rarely differentiate between projects organized by different donor agencies. Therefore, there is an incentive for all

donors in an area to coordinate before they begin recovery efforts. However, the likelihood of accomplishing this is small. One possibility is for local governments to have a designated position that would be able to coordinate outside assistance in the event of a disaster.

Another advantage to a coordinated recovery effort is the opportunity to redirect those that lost productive materials in the disaster to more sustainable livelihoods. Donor agencies committed to replacing boats before they arrived at the site to see what was needed, in part because boat replacement is something that people around the world can understand as they write a check for "Tsunami Recovery". Although the gesture of goodwill is surely appreciated by both the agencies receiving funds and the individuals that lost so much in the disaster, these funds could be put to better use if allocation was to the overall project.

6.2 Implications for the Environment

Although this investigation focused on perceptions that affect willingness to participate in livelihood projects in general, it does not directly address the larger issue of easing stress on the fishery. It is estimated that the fishing grounds used by fishers in the area targeted for the recovery project were heavily fished prior to the tsunami (Oxford International 2005b). Donations of boats, gear and engines allowed easy re-entry into the fishery for former fishers which eliminated the need for fishers to adopt a livelihood that does not stress natural stocks. If a goal of the Post-Tsunami Sustainable Coastal Livelihoods Program is to introduce "diverse

and sustainable livelihoods", the abundance of fisheries-related donations does not aid its achievement.

With respect to this study, discussion in the previous chapter suggests that households that viewed fishing positively are also more willing to participate in livelihood rehabilitation projects. Given that over two-thirds of the individuals surveyed lived in households involved in fishing, respondents probably did not imagine that participating in rehabilitation projects proposed would preclude their involvement in the fishery. Therefore, these projects may aid rehabilitation but will likely provide a supplement, rather than an alternative, to fishing income.

6.3 Implications for Future Hazard Resilience

Successful rehabilitation of diverse and sustainable livelihoods should increase community resilience with respect to future coastal disasters. Increased livelihood diversity allows for greater overall ecosystem health which was associated with lessening coastal damage in the case of the tsunami in both coral reefs and mangrove areas (Kinver 2005). Communities that make a priority of preserving natural buffers are less likely to experience as much damage as those that convert mangroves to aquaculture ponds and use coral reefs for building material. These alternative uses will contribute to household income for some time but they are not sustainable uses of the resources. Therefore, they will stop providing income and stop providing natural buffering qualities if overexploited.

Diverse use of natural resources also allows for faster recovery in the case of a disaster because the community is more likely to be able to rely on other

sources of livelihood if, for example, their fisheries were impacted by a coastal disaster. Individuals that are involved in diverse livelihood activities are also more likely to be able to transfer the skills they know from one occupation to another and, therefore, if one occupation can no longer be practiced, they can more easily transition to a different livelihood activity.

Ideally, at the conclusion of the recovery effort, specifically, the Post-Tsunami Sustainable Coastal Livelihoods Program, the communities affected by the tsunami will not only be recovered but also better prepared for future coastal hazards. Although there are many aspects of resilience, appropriate outside assistance can provide communities with the some of the tools to increase their resilience so that they do not have to rely as heavily on outside assistance next time.

6.4 Possibilities for Future Study

A follow-up investigation into future perception is one way to expand upon this research. Since an individual's perception of the future consists of many aspects, each of these aspects deserves greater attention to gain a more complete understanding of its affects on willingness to participate in rehabilitation projects. A second complement to this investigation could be a longitudinal study of perceptions and willingness to participate at the conclusion of the three-year, Post-Tsunami Sustainable Coastal Livelihoods Program. This information could show how these perceptions change over time in the years following a disaster and their corresponding willingness to, and actual participation in, livelihood projects.

Longitudinal data would also provide some information about people's response to the recovery effort in general.

Another way to expand upon this research is to compare the villages in this study with others that were affected by the Indian Ocean tsunami both in Thailand and other countries. Although there will be differences at each site, some overall ideas might emerge by repeating the study in other areas. These data could be compared with other communities recovering from coastal hazards as well. In light of current forecasts of increased severe weather events and sea level rise, any lessons that could be applied to future recovery efforts could greatly benefit future populations that will be affected by coastal hazards.

6.5 Summary

This chapter explored some practical applications for the results of this study as well as future questions that may be explored in light of the findings of this study. This investigation provides information for managers and practitioners at the study site that are designing livelihood rehabilitation projects. There are additional questions about the recovery effort including environmental health and future resilience that were highlighted by the results of this study. Finally, this study provides a starting point for more detailed as well as larger-scale investigations to contribute to disaster recovery knowledge.

APPENDIX A

BASELINE EVALUATION SURVEY FORM

Pollnac, Kotowicz & Hep URI-CRC & AIT 2005

A. HOUSEHOLD INFORMATION

1. DATE_____ 2. QUESTIONNAIRE NUMBER_____
3. INTERVIEWER_____ 4. VILLAGE_____
5. ADDRESS_____
6. HOUSEHOLD SIZE *(number of people in household, including person interviewed)*_____

B. PRODUCTIVE ACTIVITIES

LIST ALL ACTIVITIES PRACTICED BY HOUSEHOLD MEMBERS THAT CONTRIBUTE TO HOUSEHOLD INCOME AND FOOD **AT THE PRESENT TIME** (*After obtaining initial response, probe "Are there any more?", then request the respondent to rank each activity in terms of relative importance to household 1= MOST IMPORTANT. The remarks column is provided for additional information. For example, if a person replies "trading", ask what types of items are traded. Additional information on any type of fishing activity (e.g., gleaning, fry collection, etc.) should be detailed in the space provided in the "fishing" question below*.) *"WHO" refers to who conducts the activity: 1) adult males; 2) adult females; 3) both adult males & females; 4) children (less than 15 years old); 5) adult males and children (less than 15 years old); 6) adult females & children (less than 15 years old); 7) adults & children (less than 15 years old).*

1. ACTIVITY	RANK	REMARKS	WHO
A_FISHING_____	_____	_____	_____
B_AQUACULTURE____	_____	_____	_____
C_FARMING_____	_____	_____	_____
D_LIVESTOCK_____	_____	_____	_____
E_TRADING_____	_____	_____	_____
F_TOURISM_____	_____	_____	_____
G_LABOR_____	_____	_____	_____
H_MOTORCYCLE TAXI	_____	_____	_____
I_____	_____	_____	_____
J_____	_____	_____	_____

2. If farming, what is the area farmed?

3. If aquaculture, what is the size of the pond(s)/cage(s)?

4. EXCEPT FOR FISHING, WERE ANY OF THESE ACTIVITIES DIFFERENT BEFORE THE TSUNAMI? YES____ NO____

5. IF YES, WHICH WERE DIFFERENT AND HOW WERE THEY DIFFERENT

IF FISHING IS PRACTICED

6. GEAR TYPE RANK SPECIES HARVESTED WHO
A_SHRIMP NET _____
B_CRAB NET_____
C_FISH NET_____
D_CRAB TRAPS OCEAN_____
E_CRAB TRAPS MANGROVE _____
F_SQUID TRAPS_____
G_GLEANING_____
H _____
I _____
J_____

7. BOAT TYPE_____ 8. SIZE_____ 9. MOTOR_____
10. REPLACEMENT YES____ NO____

11. WERE ANY OF THESE ACTIVITIES OR GEARS DIFFERENT BEFORE THE TSUNAMI? YES____ NO____ **IF YES**, WHICH WERE DIFFERENT AND HOW WERE THEY DIFFERENT?

12. In terms of the gear associated with the productive activities, was any of it damaged or destroyed by the tsunami? YES____ NO____ If yes, what and what was the extent of the damage?

(If any female members of the household practice fishing activities, ask the following question.)
13. How frequently do female members of the family participate in any fishing activity?
rarely___ occasionally___ frequently___ almost always___

(If aquaculture is practiced, ask the following question.)
14a. With respect to any of the aquaculture practices, do any of the female members of the family participate in any way? yes__ no__
b. If yes, how frequently? rarely___ occasionally___ frequently___ almost always___

15. In terms of the income and food gathering activities we have been talking about, do you feel that your household is better off, worse off, or the same as it was before the tsunami? (*If better or worse off, ask if they are a little better/worse off, better/worse off, or a lot better/worse off. Put a check beside the response*).

A lot worse off____
Worse off____
A little worse off____
The same____

A little better off____
Better off____
A lot better off____
Why?

C. MATERIAL STYLE OF LIFE (HOUSEHOLD WEALTH INDICATOR)
Circle items that apply.
1. HOUSE CONSTRUCTION:
a) HOUSE WALLS: bamboo/ wood/ concrete block/ other
b) FLOOR: dirt/wood/concrete/tile/other
c) ROOF: nipa/wood/tin/tile/other
d) WINDOWS: open/wood shutters/glass/other
e) Tsunami house
f) Tsunami house with improvements

2. FACILITIES AND APPLIANCES:
a) ELECTRICITY……_____
b) ELECTRIC FAN……_____
c) REFRIGERATOR…….……...._____
d) ENCLOSED TOILET……...…….……...._____
e) PIPED WATER…….……_____
f) MATCHED LIVINGROOM SET……_____
g) DISPLAY CABINET……_____
h) RADIO/CASSETT PLAYER……...._____
i) VCD PLAYER …….._____
j) VIDEO GAME ……..._____
k) TELEVISION……_____
l) >1 BURNER COOKING RANGE……_____
m) WASHING MACHINE...……..._____
n) COMPUTER……_____
o) AIR CONDITIONING……_____

3. With regard to your house and/or its contents, was anything damaged or destroyed by the tsunami? If Yes, what?

4. Have you received any housing assistance for repairs YES____ NO____
5. Have you received reconstruction YES____ NO____
6. Have you received replacement of household items YES____ NO____
7. If yes, who provided the assistance?

INDIVIDUAL QUESTIONS
D. EXPOSURE TO MASS MEDIA & COSMOPOLITNESS

1. How many times per week do you listen to, watch or read
    a. radio news_____
    b. television _____
    c. newspapers_____

2. How often do you travel to:
    a. Ka Peur_____
    b. Kuraburi_____
    c. Ranong_____
    d. Phuket_____
    e. Bangkok_____

E. FUTURE OUTLOOK

1. In terms of household well-being are you better off or worse off or the same as you were before the tsunami? If worse off, Why?

2. Do you expect your standard of living to be better in 5 years? (better, worse, don't know)

F. JOB SATISFACTION/ALTERNATIVE LIVELIHOOD

The following questions in this section are to be asked if the household is or was involved in the capture fishery:

1. Would you advise a young person to become a fisher today? Yes___ no___ Why or why not?

2. Do you like fishing?

3. If you had the opportunity to change the primary source of your household's income to one that provided the same amount of income as fishing, would you change? _____ Why or why not?

4. If your household's income had to be derived from a source other than fishing, what type of work would you prefer to do?

5. There is no need to worry when a fisher goes out fishing, the job is very safe. Do you agree or disagree? *If agree/disagree ask if he/she strongly agrees(disagrees), agrees (disagrees), or just slightly agrees(disagrees).*

Strong disagree(1)__ disagree(2)__ slight disagree(3)__ neither(4)__ slight agree(5)__ agree(6)__ strong agree(7)__

G. ATTITUDES/PERCEPTIONS (ENVIRONMENTAL)
For each of the following questions ask the respondent if he/she agrees or disagrees. For either response ask if he/she strongly agrees(disagrees), agrees (disagrees), or just slightly agrees(disagrees).

1. Human activities do not influence the number of fish in the ocean.
Strong disagree(7)__ disagree(6)__ slight disagree(5)__ neither(4)__ slight agree(3)__ agree(2)__ strong agree(1)__

2. There is no point in planning for the future, what happens, happens and we cannot do anything about it.
Strong disagree(1)__ disagree(2)__ slight disagree(3)__ neither(4)__ slight agree(5)__ agree(6)__ strong agree(7)__

H. FUTURE ORIENTATION
1. If you were to suddenly inherit or win 9,000B in a lottery, what would you do with this money?

2. Now I will ask the same question involving more money. If you were to suddenly inherit or win in a lottery 110,000B, what would you do with this money?

I. LADDER QUESTIONS
The following questions involve showing the respondent a ladder-like diagram with 10 steps. The respondent is told that the first step represents the worst possible situation and the highest step is best situation. The subject would then be asked where on this ladder (ruler, scale, whatever is appropriate for the subjects involved) the local area is today (the self-anchoring aspect of the scale). The subject would then be asked to indicate where it was pre-tsunami (1 year ago) and where he/she believes it will be 3 years in the future. The step numbers are entered on the form for each time period.

1. Overall well-being of community members.
The first step indicates very poor families, without enough food to eat, very little or no furniture in the house, and a very poor house that is too small and doesn't protect one from the weather. The highest step indicates wealthy families with more than enough food, and beautifully furnished well built houses.
TODAY___ 1 YEAR AGO___ 3 YEARS IN THE FUTURE___

2. Empowerment : Control over resources.

The first step indicates a community where the people have no control over access to the community's coastal resources--anyone from anywhere is free to come and fish, gather shellfish, cultivate seaweed, etc. The highest step indicates a community where the people in the community have the right to control (e.g., develop rules) the use of the coastal resources of their community.

TODAY___ 1 YEAR AGO___ 3 YEARS IN THE FUTURE___

3. Benefit: Resource health

First step represents a situation where the beach is filthy and polluted, the mangroves are dead or dying, and the waters are so bad that nothing can live in them. The highest step indicates a beautiful beach, pure waters and healthy mangroves filled with wildlife.

TODAY___ 1 YEAR AGO___ 3 YEARS IN THE FUTURE___

4. Management: Compliance

The first step represents a situation where the coastal area and the sea is basically lawless, no one obeys the fishery regulations, everyone does what they want. The highest step represents a situation where everyone obeys the law and takes care of the environment.

TODAY___ 1 YEAR AGO___ 3 YEARS IN THE FUTURE___

J. PROJECT QUESTIONS

1. Recovery Activity Knowledge

What are the activities in your village that are directed at recovery from the effects of the tsunami? (*For each activity*) Who is directing this activity? (*For each activity*) Have you participated in or benefited from this activity? How?

(Each of the above activities are to be evaluated using the following question: What kind of an impact has this activity had on the community? 0=made things a lot worse, 1=made things worse, 2=made things a little worse, 3=no impact, 4=made things a little better, 5=made things better, 6=made things a lot better.)

ACTIVITY & WHO	PART.	BENEFIT	HOW PARTICIPATE/ BENEFIT	VALUE
a._____	_____	_____	_____	_____
b._____	_____	_____	_____	_____
c._____	_____	_____	_____	_____
d._____	_____	_____	_____	_____
e._____	_____	_____	_____	_____

2. The following types of activities have been proposed for your community. Each activity will be described with a standard description. (*For each proposed activity)* Would you

participate in such an activity? Do you think you would benefit/not benefit from such an activity? How would you benefit/not benefit from such an activity?
(Each of the above activities are to be evaluated using the following question: What kind of an impact do you think this activity would have on the community? 0=make things a lot worse, 1=make things worse, 2=make things a little worse, 3=no impact, 4=make things a little better, 5=make things better, 6=make things a lot better.)

ACTIVITY	*PART.*	*BENEFIT*	*HOW BENEFIT*	*VALUE*
a._____	_____	_____	_____	_____
b._____	_____	_____	_____	_____
c._____	_____	_____	_____	_____
d._____	_____	_____	_____	_____

K. MIGRATION

1. Were you born in the village? YES__ NO__ If no, how long have you lived in this village? __ years

2. If you were not born in this village, where did you move from?

3. If you moved to this village in the last three years, why?

4. Did any member of your household or a relative permanently leave this village since the tsunami? NO__ YES___ Why?

L. IMPACT OF TSUNAMI

1. As a result of the tsunami, were you injured? Yes____ No___

For the following 3 questions enter the number following yes. If no, just enter an "x" in the space.

2a. Were any members of your household killed? yes___ no___
b. or injured? Yes___ no___

3a. Were any of your kin outside your household killed? yes___ no___
b. or injured? Yes___ no___

4a. Were any close friends killed? yes___ no___
b. or injured? Yes___ no___

5. Where were you when the tsunami struck?

6. What did you see?

7. Is there anything else that you'd like to tell us about the tsunami?

M. GENERAL INFORMATION

1. Name_____
2. Sex_____
3. Age_____

4. Ethnic group membership (if any)_____

5. Religion_____

6. Years of formal education_____

APPENDIX B

Proposed Projects

Village (No. and Name)	Project
1 - Thale Nok	
	Mangrove Replanting
	Catering
	Small Groups (e.g., Thai Sweets Making, Livestock Raising, Cashew Nut Processing)
2 - Nua	
	Mangrove Seedling Collecting
	Catfish Culture Training
	Small Groups (e.g., Goat Raising, Steamed Mackerel, Net Making)
3 - Phu Khao Thong (Ta Klang)	
	Catfish Culture Training
	Small Groups (e.g., Woman's Occupational Development, Thai Sweet Making, Dress Making)
4 - Ta Klang	
	Mangrove Seedling Collecting
	Catfish Culture Training
	Small Groups (e.g. Shrimp Net Making, Fish Cage Culture, Shrimp Paste Making)
7 - Haad Sai Kao (Haad Yao)	
	Mangrove Seedling Collecting
	Catfish Culture Training
	Shopping Bag Sewing
	Small Group (e.g. Fish Sauce Group, Thai Sweets Making, Curry Paste Group)

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