THAILAND POST-TSUNAMI SUSTAINABLE COASTAL LIVELIHOODS PROGRAM

FOLLOW UP ASSESSMENT OF TSUNAMI AFFECTED VILLAGES

TAMBON KAMPUAN, SUK SAMRAN DISTRICT, RANONG PROVINCE, THAILAND

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INTRODUCTION

This report describes the results of a survey of social and economic data of five villages in Suk Sumran, Ranong, Thailand. These villages were selected to participate in the Post-Tsunami Sustainable Coastal Livelihoods (SCL) Program to assist with rebuilding these coastal communities following the 2004 Indian Ocean Tsunami.

In June and July of 2005, researchers conducted a survey to provide a baseline of data in the SCL Program villages prior to the beginning of Program implementation. In February and March of 2007, a follow up survey was conducted in the villages near the conclusion of SCL Program implementation in order to document changes in the communities between the baseline and follow up surveys. Field research included participant observation, semi-structured interviews and household surveys conducted while living in the community and interacting daily with the residents of the Program villages. Participant observation included accompanying residents during livelihood and other daily activities. Semi-structured interviews were conducted with key informants in order to document livelihood activities including traditional livelihoods and those implemented as part of the SCL Program and other recovery efforts. In addition, interviews with residents from each village were conducted regarding perceptions of recovery, preparedness and livelihood rehabilitation. Household surveys were conducted with male and female heads of households in each of the five villages in the SCL Program area.

The follow up household surveys included many of the same questions that were used during the baseline assessment in order to directly compare results directly during the two time periods. Other questions were added to the survey to assess relevant perceptions regarding recovery from the tsunami and livelihoods (Bankoff et al. 2004). The methods used for data collection and analysis are adapted to assess recovery from the manual, *Assessing Behavioral Aspects of Coastal Resource Use* (Pollnac and Crawford 2000).

The following report is divided into sections into seven aspects of a socio-economic assessment that are significant for disaster recovery efforts in coastal communities: (1) livelihood distribution, (2) fishing practices, (3) attitudes toward the occupation of fishing, (4) investment orientation, (5) perceptions of coastal resources and factors related to their management, (6) subjective and material well-being and (7) perceptions of tsunami recovery activities.

Each section below begins with an explanation of the importance of monitoring the socio-economic aspects of the SCL Program villages during recovery and comparing values to data from the baseline. Next, quantitative and qualitative data is presented and interpreted regarding the topic of the section, followed by conclusions that describe what this data indicates about the recovery of the residents of SCL Program area. Finally, there is a list of references cited in that section of the report.

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Follow Up to Baseline – #1
Livelihoods

INTRODUCTION

One focus of the Sustainable Coastal Livelihoods (SCL) Program is livelihood assistance in order to provide affected residents with the tools to begin recovering on their own. In addition, the SCL Program strives to introduce alternative livelihoods that increase resilience at both the household and community levels by increasing the number of types of livelihoods available to residents.[1] Research on resilience suggests that communities that are more resilient use a diversity of natural and commercial resources sustainably and are therefore, able to respond more rapidly and effectively if one type of livelihood is disturbed (Marschke and Berkes 2006; Pomeroy et al. 2006). The concept of resilience in livelihoods can be applied to both the household and community levels. It is important, therefore, to document the types and distribution of livelihoods in the Program villages by households, and at both the beginning and conclusion of the SCL Program. This overview can provide managers with information about household and village use of local resources for food and income. This data can also inform researchers about community-level resource use in the Program area. The follow up survey acquired data on types of livelihood activities that contribute to household food and income for 204 households in the five villages included in the SCL Program.

CURRENT LIVELIHOOD DISTRIBUTION

Respondents were asked to list all sources of income and food generation that contributed to their household in the past year. For the purposes of this analysis, livelihood activities in the Program villages were grouped into the following seven categories:

1. Fishing – including all capture fishing activities from a boat or the shore whether boat owner or crew;
2. Aquaculture – including all types of fish and seafood production and raising;
3. Farming – including farming activities for both orchard and crop production;
4. Livestock – including all types of animal breeding and raising;
5. Trading – including, for example, groceries, handicrafts, construction materials, furniture and tree seedlings;
6. Unskilled labor –types of labor that do not require extensive knowledge or training including construction, cleaning, clearing land, making fishing nets, motorcycle taxi and drivers; and
7. Skilled labor – labor types that require informal or formal knowledge or training including boat-making, carpentry, cooking, sewing, teaching, mechanics and government officials.

The following table summarizes data from 204 households regarding livelihoods that contribute to household income and/or food generation (Table 1). Overall, fishing was the most common livelihood of surveyed households, with almost one-half (48%) participating in at least one type of fishing. Unskilled labor (45%) and skilled labor (44%) each were also practiced by almost half of all households in the overall sample. Aquaculture was practiced by the smallest percentage of households in the project villages (4%). It is interesting to note that semi-structured interviews and observation indicated that, almost all households practice some form of fishing (most often hook-and-line for household consumption) on occasion. Due to the location of the villages on adjacent to the Andaman Sea, fishing is a part of the life in all of the project villages but might not be mentioned as a contribution to household income if it contributes only a small percentage overall.

[1] Note that alternative income projects are discussed in the final section of this report.

Table 1. Percent Distribution of Livelihood Activities by Village

Village	Fishing	Unskilled Labor	Skilled Labor	Farming	Trading	Livestock	Aquaculture	No. of Households
1	60.0	69.7	48.5	27.3	6.1	12.1	6.1	35
2	34.1	48.8	53.7	34.1	19.5	7.3	2.4	41
3	29.3	34.1	43.9	43.9	22.0	24.4	4.9	41
4	43.9	41.5	46.3	41.5	34.1	2.4	2.4	41
7	69.6	37.0	30.4	10.9	32.6	4.3	2.2	46
Overall	47.5	45.0	44.1	31.2	23.8	9.9	3.5	204

* Note that percentages may total more than 100 due to households with multiple sources of income/food generation.

NUMBER OF LIVELIHOODS CONTRIBUTING TO HOUSEHOLDS

Two-thirds (66%) of all respondents listed two or more forms of income and/or food generation to household well-being (Table 2). Households that rely on more than one source of income or food are more likely to experience less severe damage during a natural disaster and, if affected, likely to recover more quickly. Hence, they are likely to be more resilient households and form a more resilient local economy (Adger 2000). In addition, semi-structured interviews and observations revealed numerous sources of informal income and food that may not have been captured by the survey. In Village 7, one interviewee reported that his income was from fishing and his wife, from processing seafood. Subsequent questions revealed that he also occasionally takes Thai tourists out on his boat and that he doesn't consider it a regular source of income because of its irregular contribution to household income. Although, these additional sources of income usually add only a small portion to overall household earnings, they contribute to resilience at the household level. These small contributions to household income indicate that residents are willing and able to participate in various types of livelihoods. Household livelihood diversity increases the capability to respond to changing conditions by relying on available sources of livelihood, as determined by current conditions, and increases household resilience (Marschke and Berkes 2006). Households in Village 1 report the highest income diversity. Less than one quarter (24%) of surveyed households reported only one source of income and almost one-tenth (9%) listed five sources. In contrast, 44% of households in Village 7 and over one-third (37%) mentioned only on type of livelihood in Village 4 indicate less household income diversity in these villages.

Table 2. Percent distribution of number of livelihood activities

Village	One	Two	Three	Four	Five	N
1	24.2	36.4	30.3	0.0	9.1	33
2	31.7	41.5	22.0	4.9	0.0	41
3	24.4	41.5	22.0	7.3	0.0	41
4	36.6	24.4	29.3	9.8	0.0	41
7	43.5	21.7	30.4	2.2	0.0	46
Overall	32.7	32.7	26.7	5.0	1.5	202

INTER-VILLAGE VARIATION

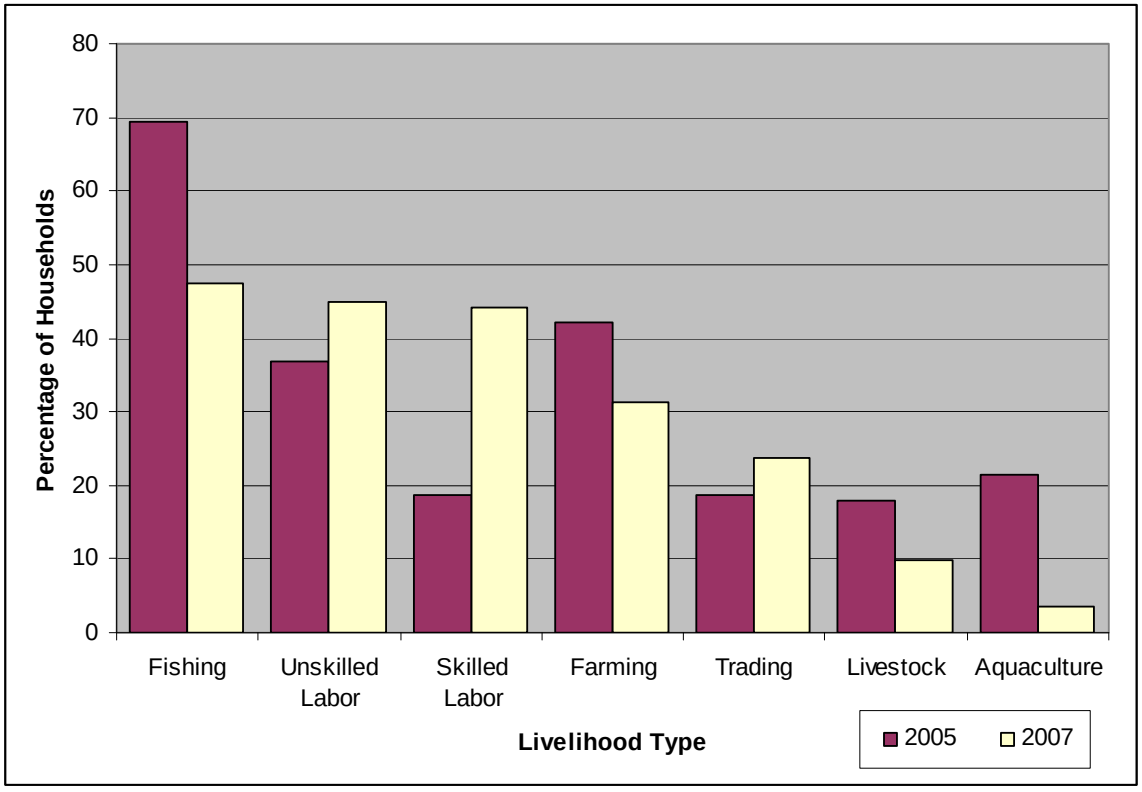
There were substantial differences in livelihood distribution between villages. Statistically significant differences occurred in fishing (chi-square = 39.6, df = 4, $p<0.001$), farming (chi-square = 28.7, df = 4, $p<0.001$), livestock (chi-square = 28.6, df = 4, $p<0.001$), trading (chi-square = 21.2, df = 4, $p<0.001$) and unskilled labor (chi-square = 23.5, df = 4, $p<0.001$). These differences support the notion that each village is individually characterized in terms of livelihoods and natural resource use. SCL Program activities were often tailored to meet the needs of the target village due to these differences. Notably, fishing is most common in households in Villages 7 (60%) and 1 (70%) which are smaller villages than the others, and each located adjacent to the sea. The residents of these villages rely more heavily on coastal resources and coastal ecosystem services. In contrast, Villages 2, 3 and 4 each consist of two separate areas of houses, of which,

one is adjacent to the sea and the other is separated from the coast by a main road (Route 4) that runs north/south through Suk-Sumran. In both of these villages, households located in the coastal sections are more likely engaged in fishing and those located on the inland side of Route 4 are often engaged in other types of livelihoods, especially trading and farming. Village 3 contains the least percentage of households engaged in fishing (29%), and the highest percentage in farming (44%). This is the village where the central market, and most other shops in Kamphuan, are located. In Village 3 is also where much of the farmland is located and therefore, many households engage in farming. In this village, skilled labor (44%) is also a common source of livelihood and reported by the same percentage of households as farming. Livestock raising is most common in Villages 3 (24%) and 1 (12%) which have more land area on which to raise animals, and is a much less common source of livelihood in the other villages (2, 4 and 7) where more households focus on fishing (Village 7), or farming and trading (Village 4).

BASELINE AND FOLLOW UP ASSESSMENT COMPARISONS

Figure 1 shows the percent distribution for livelihood activities for both the baseline (2005) and follow up (2007) assessments.

Figure 1. Percent Distribution of Livelihood Activities (2005 and 2007)

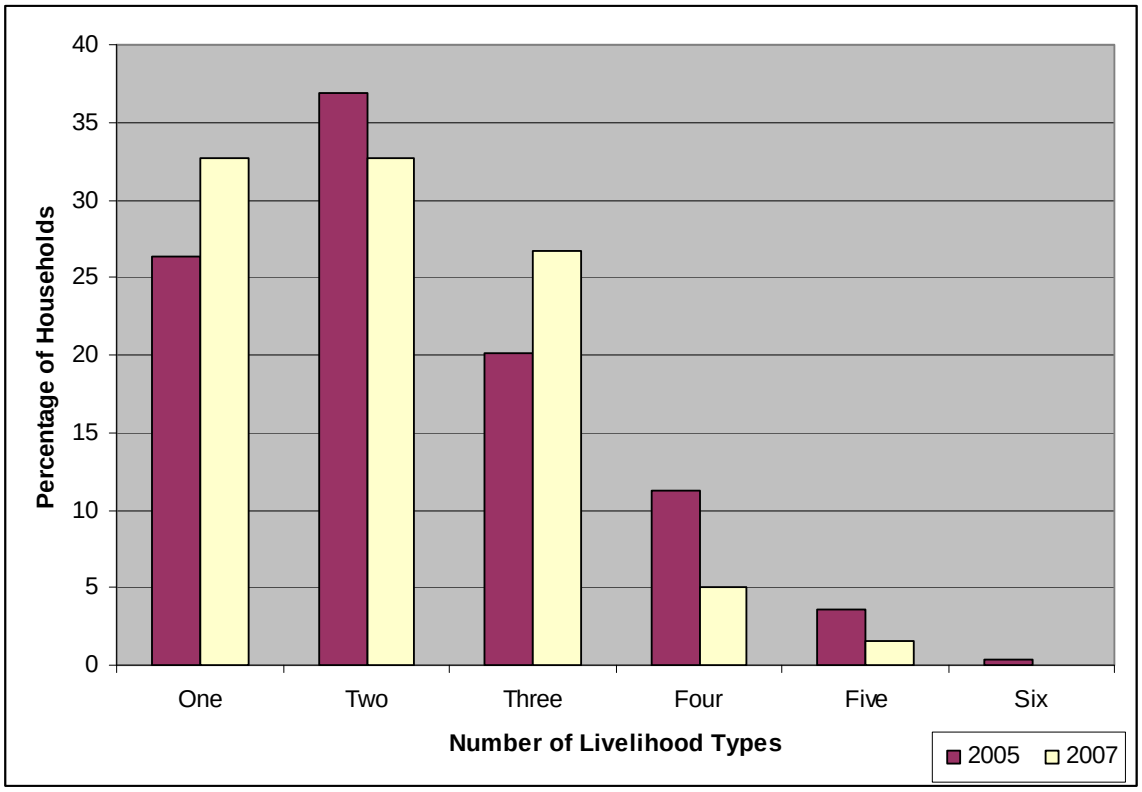


There were statistically significant differences between the two time periods for each livelihood category except ‘unskilled labor’. The largest change was an increase in skilled labor of one quarter (25%), between baseline and follow up assessments (chi-square = 68.4, df = 1, $p<0.001$). One possible explanation for this change is that the initial (baseline) assessment was conducted six months after the tsunami occurred. At this time, many affected residents had not yet replaced productive equipment (e.g. boat engines) that was damaged or washed away during the tsunami. Therefore, many skilled laborers were not able to practice the labor in which they were skilled during the 2005 assessment. This could also contribute to the decrease in fishing (21%, chi-

square = 44.3, df = 1, p<0.001), aquaculture (18%, chi-square = 62.6, df = 1, p<0.001) and raising livestock (chi-square = 11.7, df = 1, p<0.001). Prior to the baseline assessment, many residents were given donations, such as boats and gear, or the opportunity to participate in projects, especially aquaculture projects. Heads of households that do not normally practice fishing, aquaculture and livestock took advantage of opportunities to begin making income as soon as possible after the tsunami. During the time between the baseline and follow up assessments, residents saved money from these other types of livelihoods and invested their savings in productive materials in order to facilitate their return to their pre-tsunami livelihood. In addition, some livestock and aquaculture projects failed after the baseline data collection was conducted, causing participants to find other sources of income. Respondents making income from farming also decreased by more than one-fifth (11%, chi-square = 11.7, df = 1, p<0.001).

The following figure shows the percent distribution of number of types of income for data from the baseline and follow up assessments (Figure 2).

Figure 2. Percent Distribution of Number of Livelihood Activities (2005 and 2007)



From 2005 to 2007, the percentage of respondents that reported relying on one type of livelihood increased by 6%. More than one third (37% in 2005 and 35% in 2007) of the sample at each time period reported that more than two types of livelihood contributed to their household income and food. Overall, the surveyed households continue to practice a diverse set of livelihoods and rely on various natural and commercial resources for their income and food production which enhances household and community resilience.

CONCLUSIONS AND RECOMMENDATIONS

Although fishing was the most commonly reported type of livelihood during both assessments, fewer households reported income from fishing in the follow up assessment, than during the

baseline. This data indicates that the Program villages are less reliant on coastal and marine resources than during the baseline assessment which suggests they may be more resilient in the face of a future coastal disaster. However, as will be further discussed in the next section, fishermen that practice various types of fishing and target more than one species increase their resilience in the case that one species or coastal/marine habitat is stressed but others remain healthy.

In addition, the increase in skilled labor indicates a more diverse workforce than during the baseline assessment, also increasing community resilience. However, the decrease in the percentage of farming, livestock and aquaculture may indicate that a number of livelihood projects that were implemented before the initial assessment have already failed. These projects were implemented by other assistance agencies and were not part of the SCL Program. Specifically, semi-structured interviews indicate that aquaculture and livestock projects were implemented quickly and often without sufficient participant training. Often, participants were provided with materials and training regarding regular maintenance for raising animals, whether land or marine based, but not instructed as to how to respond to irregularities or whom to contact when questions or issues arose. Several respondents mentioned that if something went wrong (e.g. a donated goat became ill or a water filtration system malfunctioned), the participants were not prepared to respond to them and often abandoned the project. Overall, at both the household and community level, the data above illustrates a diversity of livelihoods using a variety of types of natural and commercial resources which can enhance community resilience in future disturbances.

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Follow Up to Baseline – #2
Fishing Practices

INTRODUCTION

One of the goals of the SCL Program is to diversify livelihoods and resource use in the five Program villages. Although all types of fishing use coastal resources, resource dependency occurs when fishing households and/or communities rely on one type of fishing. Households that rely on fishing can still be resilient if fishermen target several species, in different habitats and during different seasons (Salas and Gaertner 2004). Diversification of fishing types is one way to encourage resilient communities where fishing is traditionally a prominent source of income and food (Pomeroy et al 2006). Fishermen that conduct various types of fishing are also more likely to effectively adapt to biophysical changes in the fishery and external stresses on fishery resources.

Fishing in all five of the SCL Program villages is primarily conducted by fishermen that reside in the area, from relatively small boats (less than 15 meters), with crews of three people or less. Fishermen from each of the five villages fish in the same offshore fishing grounds. Although the villages are adjacent to each other, there are some differences in inshore and nearshore habitat type. Villages 4 and 7 are adjacent to significant mangrove stands that fishermen use regularly, especially during the rainy season when rough ocean conditions discourage fishing offshore. Villages 1 and 3 each have a river running through them which serves as an additional fishing area, and upon which fishermen store their boats and gear. Villages 1 and 2 have significant sandy beach areas from which to fish or collect shellfish. Semi-structured interviews indicate that fishermen target nearshore areas closest to the village where they reside, but also fish in areas adjacent to other villages in Kamphuan.[2] The follow up survey acquired data on fishing types that contribute to household food and income for 97 households (48% of the survey sample) in the five SCL Program villages. Respondents were asked to rank all types of fishing that contributed to household income and/or food generation over the past year.

CURRENT DISTRIBUTION OF FISHING PRACTICES

Ninety-two households (95% of households ranking fishing as a livelihood activity) consider fishing either a primary or secondary source of income and food generation (Table 1). The remaining 5% of surveyed households rely on fishing as a smaller proportion of household income and were not included in the remainder of this analysis.

Table 1. Percent of Fishing (Primary and Secondary) Households

Village	Primary	Secondary	No. of households
1	85.7	9.5	20
2	92.9	7.1	14
3	83.3	8.3	11
4	66.7	22.2	16
7	93.8	3.1	31
Overall	85.6	9.3	92

This data may indicate that survey respondents were less likely to note fishing among their livelihood sources if they rely on fishing for only a small percentage of total household income. Interview responses support this idea because several respondents that did not consider themselves fishermen (and were less likely to rank fishing among their livelihood activities) still reported fishing occasionally, especially if they received a donation boat or fishing gear from aid agencies. Due to the high percentage of fishing households in the Program villages and the

[2] For a full description of the types of fishing discussed below, refer to the baseline report (Pollnac and Kotowicz 2005).

corresponding importance of fishery resources to the local economy, it is necessary to assess fishing practices separately.

Table 2 illustrates the percent distribution of fishing types in the Program villages. Crab nets (53%), shrimp nets (49%) and fish nets (42%) are the three most common fishing practices listed by fishermen in the survey sample.

Table 2. Percent Distribution of Fishing Activities by Village

Village	Crab Net	Shrimp Net	Fish Net	Squid Trap	Hook and Line	Jelly Fishing	Crab Trap (Mangrove)	Gleaning	Crab Trap (Sea)	Fish Trap	Other	N
1	66.7	9.5	23.8	23.8	23.8	33.3	4.8	9.5	4.8	-	9.5	21
2	28.6	57.1	64.3	57.1	28.6	21.4	-	-	-	-	-	14
3	50.0	50.0	50.0	33.3	41.7	-	-	-	-	8.3	-	12
4	61.1	44.4	44.4	-	33.3	11.1	27.8	5.6	5.6	-	5.6	18
7	50.0	71.9	40.6	53.1	3.1	12.5	-	3.1	3.1	-	18.8	32
Overall	52.6	48.5	42.3	35.1	21.6	16.5	6.2	4.1	3.1	1.0	9.3	97

These types of nets are placed in offshore or nearshore areas where they are left for a time ranging from a few to twelve hours to collect catch. After this time, the net is gathered and either dragged to shore or onto a boat. Although each type of net differs in eye size, length and target species, personal observation indicates that the catch includes all species that become entangled in the nets. Almost all of the catch is used in some way, sold, eaten or used for bait, and very little goes to waste. However, this gear can entangle anything that swims into it, including juveniles and other sea animals, like turtles. Also of note is that this survey was conducted in the dry season when fishing with nets is more commonly practiced because the sea is relatively calm. Therefore, these activities are more likely to be emphasized by fishermen responses during this time of year. However, it is still important to note that the three most common forms of fishing are nets that entangle many types of organisms in addition to the target species.

Squid traps (35%) are the next most commonly reported type of fishing among the fishermen surveyed. Squid traps are more commonly used in the rainy season when they can be weighted and baited and dropped on the sea floor, then collected later with less chance of loss in rough seas than nets. Therefore, their use may have been overlooked by some of the fishermen because the survey was administered at a time of year when they are not often used.

Hook and line fishing (22%) was listed by over one-fifth of the sample. However, personal observation and semi-structured interviews indicate that almost all households fish using hook and line, although it may contribute only a small amount of food to the household. Residents often fish from piers, or the bank of rivers or estuary areas with fishing line tied around a plastic bottle and a hook on the end. They often catch mud crabs and other brackish water species which are usually for household consumption or feed for household animals in small numbers; too few to sell to a fish buyer or at market. Gleaning is also practiced by many households, although only reported by 4% of the surveyed sample. Older women and children often walk along the banks of rivers, estuaries and sandy beaches during low tide and collect various types of shellfish and shells (with no organism). The shells are sold directly or made into handicrafts on a small scale and then sold. Shellfish that are collected by gleaning is usually consumed by the household. Both gleaning and hook and line are considered part of daily life for most residents, not necessarily a livelihood and therefore, might not be captured by the survey even though respondents were asked to mention all types of fishing that contribute to their household.

Fishing households that practice multiple types of fishing are more resilient because they are more likely to adapt as conditions change within or around the fishery (Pomeroy et al. 2006). Overall, more than three quarters (78%) of fishing households surveyed listed two or more types of fishing and over one third (40%) mentioned three or more types (Table 3).

Table 3. Number of type of fishing activities

Village	One	Two	Three	Four	Five	N
1	33.3	38.1	14.3	14.3	-	21
2	28.6	35.7	7.1	7.1	21.4	14
3	8.3	50.0	41.7	-	-	12
4	16.7	44.4	22.2	16.7	-	18
7	18.8	31.3	28.1	18.8	3.1	32
Overall	21.6	38.1	22.7	13.4	4.1	97

This data suggests that within fishing households in the Program villages, residents practice numerous types of fishing. The advantage of this is that fishermen target several species, located in varying habitats, changing seasonally, and using different gear types, rather than stressing the same resource, or set of resources, continually. In addition, fishers that practice several types of fishing are more apt to learn a new type of fishing in order to adapt to changing conditions of the coastal and marine ecosystems. One example of fishermen adapting in the SCL Program villages is the jelly fishery. Jelly fishing was not identified during baseline data collection or the initial Participatory Rapid Appraisal, both conducted in 2005, but increasing numbers of fishermen have participated in this fishery in the past two seasons, from October till February (Crawford and Dunbar 2006). In this case, fishermen's willingness to adapt to changes in environmental conditions illustrates their resilience without abandoning their way of life as fishermen.

INTER-VILLAGE VARIATION IN FISHING PRACTICES

Although fishermen in all Program villages practice the same types of fishing, there were relative percentage differences among villages. The following three types of fishing showed statistically significant differences between villages: shrimp net (chi-square = 40.6, df = 4, $p<0.001$), mangrove crab trap (chi-square = 36.7, df = 4, $p<0.001$) and squid trap (chi-square = 37.0, df = 4, $p<0.001$). These differences most likely reflect the variations in habitat adjacent to each of the villages. For example, in Village 4 fishermen report no fishing with squid traps, usually placed offshore, but over one-quarter (28%) report fishing with crab traps in mangroves. Village 4 is located adjacent to an area of mangroves that shelter the village from the open water. The mangroves have passages cut into them for boats to travel between the village pier and the open water and provide healthy fishing grounds in closer proximity to the pier than offshore grounds. Similarly, shrimp net use is relatively low (10%) in Village 1 while crab net use (67%) is reported by two-thirds of the fishermen in this village. Although these nets are similar, the crab net is more often set in estuarine locations which are abundant adjacent to Village 1 a river empties out into the ocean, forming a large estuarine area, ideal for setting shrimp nets.

There are also statistically significant intervillage differences in the number of fishing activities reported by households (chi-square = 47.3, df = 16, $p<0.001$). Fishermen in Village 1 report practicing the least number of types of fishing. One third (33%) of surveyed fishermen in Village 1 report only one type of fishing and more than two thirds (71%) report two types of fishing. In contrast, less than one-fifth (17%) of fishermen in Village 4 report one type of fishing and half (50%) report either one or two types of fishing in Village 7. The other half (50%) of fishermen in Village 7 report three or four types, suggesting that fishermen in this village use the most different types of gear over the course of one year. Since data on all livelihoods suggests that households in Kamphuan are involved in more than one type of livelihood, it is interesting to note that villages where fishermen report the fewest types of fishing are also those where other livelihoods are also prominent. For example, the central market is located in Village 3 which is also the only village where no fishermen reported more than three types of fishing. This evidence suggests that other types of livelihoods are likely to supplement fishing in households where the fisher practices fewer types of fishing.

CHANGES SINCE INITIAL SOCIO-ECONOMIC SURVEY

While addressing changes in fishing since the baseline survey, it should be noted that methodological issues may have affected this data in addition to changes in the fishery in the survey area. First, there are significant seasonal changes in the types of fishing practiced and number of fishers in the SCL Program villages. Although the question in the survey asked the respondent to report all types of income in the past year, fishermen that do not fish year round may be less likely to report income from fishing. In addition, during the time of the follow up survey, many fishermen went to other provinces to fish. Some of their wives accompanied them to the other fishing grounds which resulted in omitting these households from the sample because there was no one to survey. Those wives that remained in the Program villages were more likely to be away from the house when the survey was administered because their children were also at school at this time which allowed them to run errands away from the house.[3]

Another change that could have affected survey results was higher than normal gasoline prices when the follow up survey was administered, which could also contribute to the decrease in reported fishing between the two time points. In semi-structured interviews, numerous fishermen noted that gasoline prices were high and significantly decreased their revenue from each trip. One respondent from Village 2 stated that he was less likely to go out to fish recently because there were more boats at his usual fishing spots and it was too costly for him to use the gasoline to get to these spots if he would get a smaller portion of the fish because of the increased crowds. This response highlights a contradiction between interview responses and observations. Several respondents noted the presence of more boats than before the tsunami, and fishermen stated that more fishermen were out fishing. However, there was a significant decrease in number of reported fishing households in the survey data. This contradiction could be due to a methodological oversight that sampled less fishing households for reasons described above or it could be that many fishermen observed this increase in fishing and have left the fishery in response.

Another difference since the baseline survey is the absence of several aid agencies from the area. During the baseline assessment, representatives from numerous aid agencies were present in the Program villages and many aid projects were beginning or underway. Several of these projects included donations, especially of boats and gear for fishermen. As mentioned above, many households practice some type of fishing even if it contributes a relatively small percentage to total household income. Therefore, that segment of households that are only occasionally involved in fishing may have been more likely to report fishing income during the baseline assessment in order to increase their likelihood of receiving donations of fishing productive materials. These materials could immediately be put to use, helping residents supply food (either directly or indirectly) and income to facilitate their recovery.[4] During the follow up assessment, there were fewer, if any aid agency representatives and the frenzy of donations had passed, resulting in fewer households reporting small contributions from fishing during the follow up survey.

Supporting the data in the survey were several statements during semi-structured interviews that weather conditions were less conducive to fishing in the years since the tsunami. Both fishermen and non-fishermen remarked that there were more days, even during high fishing season, when they could not go out to sea due to wind, waves and/or storms. It is undocumented whether this

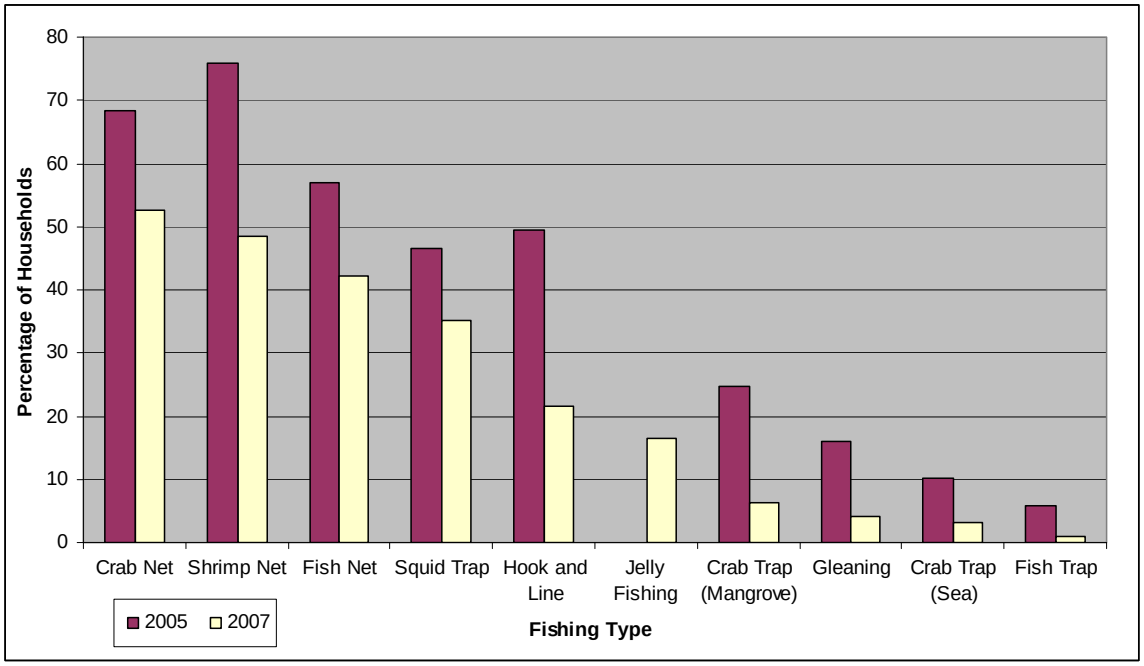
[3] There was an attempt to include households where people were away from their homes during daytime hours but returned in the evening. However, these households were more difficult to survey and therefore, it can be assumed that they are not proportionally represented in the sample.

[4] As noted in semi-structured interviews, productive materials that could be immediately put to use and were donated to a single household were much preferred to group livelihood projects that involved training and time before they produced income or productive materials that were to be shared and subject to issues of group dynamics.

observation is truly the case or merely the perception of residents, but the sentiment was echoed several times by respondents in all SCL Program villages. This perception, however, may influence some fishers to rely less on fishing for income or exit the fishery entirely. In addition, it may be coincidence that the two full years after the tsunami have had weather less conducive to fishing and subsequent years may be better, with more fishermen fishing and fishing more often.

It is, however, important to observe differences in data on fishing type and number of types of fishing between the baseline and follow up assessments. There is a statistically significant difference in the mean number of fishing types reported by survey respondents in the baseline and follow up surveys (two tailed t-test = 10.8, df = 540 $p<0.001$). A closer evaluation of the data further illustrates this decrease, as two thirds (60%) of fishermen in the sample reported one or two types of fishing in the follow up survey (2007). In contrast, over three quarters (77%) of fishermen surveyed for the baseline assessment reported that three or more types of fishing contribute to household fishing income/food. Figure 1 further illustrates that less important types of fishing, with respect to income generation, were less likely to be reported during the follow up survey because hook and line was reported by almost half of surveyed households involved in fishing (49%) during the baseline survey and just over one fifth (22%) in the follow up assessment.

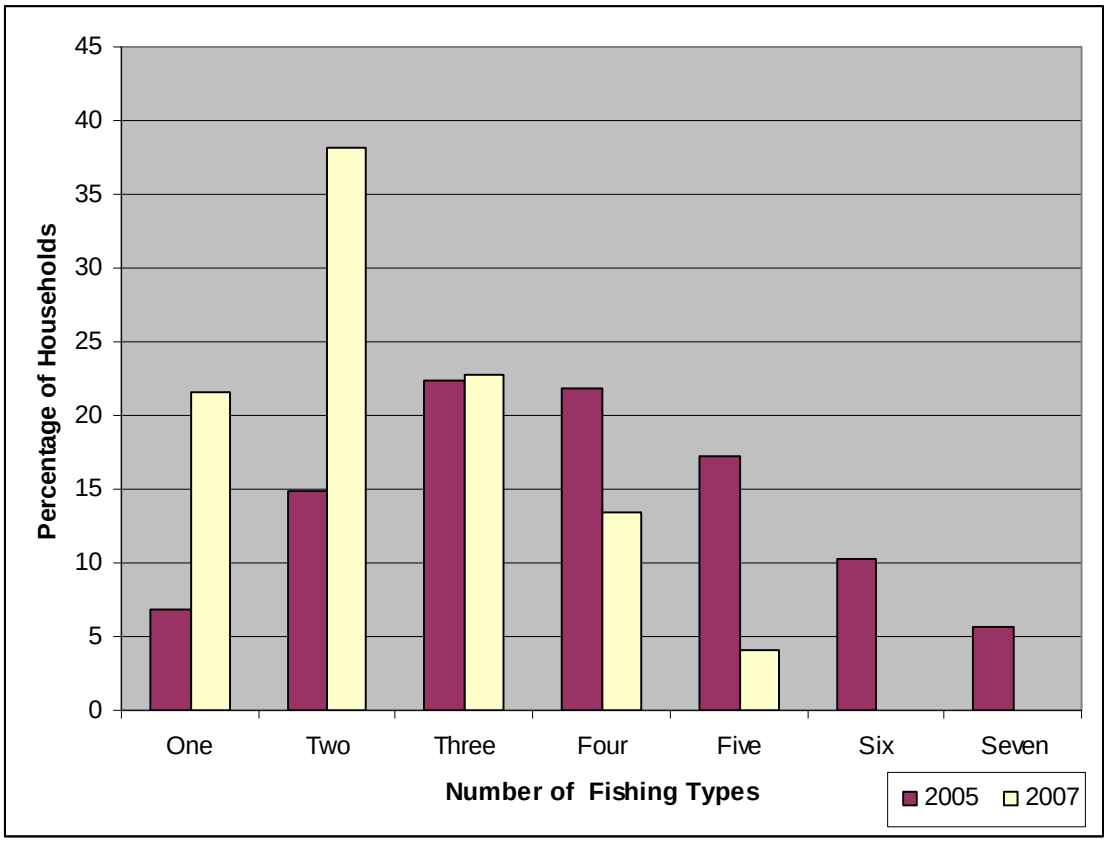
Figure 1. Percent Distribution of Fishing Types (2005 and 2007)



Hook and line fishing usually serves as a supplementary form of fishing and its catch is often used for household consumption or feed for household animals. Therefore, hook and line fishing is very common in fishing households but usually forms a small overall percentage of income and food source for a household and, therefore, may serve as a proxy for assessing respondents' likeliness to include fishing types with smaller contributions.

For all types of fishing except squid traps and fish traps, there was a statistically significant change from baseline to follow up results. However, due to the decrease in number of types of fishing reported, this decrease is expected and does not accurately describe changes in the fishery (Figure 2).

Figure 2. Percent Distribution of Number of Fishing Types (2005 and 2007)



Interesting to note is the relative frequencies of reported fishing types at each time point to assess relative percentages of coastal and marine resources and habitats that are targeted most often by fishermen in SCL Program villages. During the baseline survey, shrimp nets (76%), crab nets (68%) and fish nets (57%) were the most often reported types of fishing, respectively. Fishing types most often reported during the follow up assessment were crab nets (53%), shrimp nets (49%) and fish nets (42%). This data suggests that the same broad type of fishing (using various types of nets), is most common at both time periods and the other types of fishing generally follow the same trend, although in smaller percentages in data from the follow up survey. A difference from the baseline to the follow up data is that "other" types of fishing were reported by one quarter (26%) of respondents in the baseline survey and less than ten (9%) in the follow up survey.[5] This is further evidence that fishing types that contribute less to overall household contribution from fishing were less often reported during the follow up survey. Another difference between time periods is the addition of jelly fishing in the SCL Program villages, which illustrates (as stated above) fishermen's ability to adapt to changing conditions of the fishery.

CONCLUSIONS

Given the data presented above and methodological issues, the conclusions stated here are preliminary and additional assessments of fishing in the SCL Program villages are likely to provide further information about changes in the occupation of fishing overtime. Seasonal

[5] "Other" types of fishing were those types of fishing that were reported by less than 5% of respondents during the baseline assessment. For the follow up assessment, the same categories were used unless there was an additional type of fishing reported by over 5% of the responedents.

changes in relative rates of fishing pressure along with areas of fishing could have affected the survey results. However, the survey was conducted during the dry season when weather conditions are better for fishing. This could result in fewer surveys conducted in households involved in fishing. Another seasonal effect on the data could be that fishermen are more likely to report the dominant form of fishing and forget to report types of fishing that contribute smaller percentages to overall fishing income and food.

The prominence of fishermen fishing in areas away from local fishing grounds could be due to a decrease in fish catch in fishing grounds closer to the SCL Program villages or it could be a reaction to more boats and fishermen at nearby fishing grounds during the initial recovery period. During baseline data collection, fishermen that were interviewed did not mention going to other provinces to fish. Although this does not rule out that traveling to fishing grounds is not a common occurrence, it does suggest that this practice was more frequent in the area during follow up data collection than when the baseline survey was administered. Therefore, this may be a trend that continues to attract fishermen to grounds in other provinces that could impact both the local fishery and local economy of the SCL Program villages in the future. For example, those fishermen that are fishing in far away fishing grounds may decide to move from Suk Sumran with their families. These fishermen are likely to be more experienced fishers, to be knowledgeable about a greater number of fishing grounds, and financially better off, in order to front funds needed to travel to other provinces for fishing. However, current data cannot determine the effect of these changes and additional studies could provide more information on longer term impacts on fishing.

Those households that do rely on fishing, practice several types and exhibit the ability to adapt to changes in coastal and marine resources and habitats. This suggests that fishermen, and the fishery in the SCL Program villages, is relatively resilient with respect to economic and social concerns. However, the data presented above implies that fishing practices may stress coastal and marine resources overtime. The prominence of net fishing (various types), which entangles all organisms larger than a certain size, could cause biophysical stresses on the fishery and/or coastal ecosystem in the future. In addition, although the increase in jelly fishing indicates that fishermen are more resilient in terms of adapting to biophysical changes in the fishery, the prominence of jellyfish indicates the absence of other organisms of higher trophic levels and a shift in the marine ecosystem (Pauly and Christensen 1995). Although it is not clear whether the increase in jelly fishing is due to an increase in number of jellyfish because fishermen perceive this practice as more profitable than other types of fishing, this trend of fishing has been associated with fishing “down the food chain” in other fisheries. If jellyfish populations are increasing, this suggests that the fishery is less robust, with fewer higher trophic level organisms than before the prominence of jellyfish and therefore, less ecologically resilient (Pauly et al 2003). However, the biophysical state of the fishery can only be determined by an analysis of coastal and marine ecosystems that is beyond the scope of this report.

If there is less fishing, as described by comparing baseline and follow up data, it indicates that there is less pressure on the fishery (at least on local fishing grounds). However, because there is no comparative data for pre-tsunami fishing practices, it is unclear if this shift is truly away from fishing or if there was only a temporary increase in fishing pressure after the 2004 tsunami. If there was a temporary increase, it was likely due to large numbers of donated boats and gear. Residents took advantage of the donations in order to begin self-recovery and, in some cases, to facilitate their entrance (or return to) other forms of livelihood that were not possible in the early months of recovery (i.e. during the baseline assessment). This may mean that a decrease in fishing since the baseline is simply returning to pre-tsunami conditions. However, if this trend continues and fewer households rely on fishing, it could indicate a shift in the local economy away from fishery resources. Still, the follow up data suggests that almost half of the households in SCL Program villages rely on fishing to some degree and therefore, attention to coastal and marine resource management should be a continuing priority.

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Follow Up to Baseline – #3
Perceptions of Fishing

INTRODUCTION

In the aftermath of the tsunami, it was debated whether fishermen would be reluctant to resume fishing due to concerns about safety or dissatisfaction with the occupation. However, during baseline data collection, observations and survey results suggested that fishermen were going back to fishing when they received replacement gear and boats. In order to assess attitudes toward fishing in the aftermath of the tsunami, we asked individuals in households where fishing contributed as a primary or secondary income to a household, the following five questions:

1. *Would you advise a young person to become a fisher today?*
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?*
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. *Have you considered exiting the fishery?*

In addition, to evaluate attitudes toward safety in the occupation of fishing, surveyors asked respondents to rate the following statement on a Likert scale with possible responses ranging from 'Strongly Disagree' to 'Strongly Agree':

1. *There is no need to worry when a fisher goes out fishing, the job is very safe. Do you agree or disagree?*

ATTITUDES TOWARD FISHING

Since the tsunami, much of the recovery effort has been geared toward helping fishermen get back to work, especially in the form of replacing boats and gear. During semi-structured interviews, respondents frequently commented about significantly more boats at piers and local fishing spots since the tsunami. Lack of coordination among donors and miscommunication resulted in numerous fishermen receiving more than one boat and widows in fishing households receiving boats with no adult male in the household to use it. In one interview, a family where the head male was a mechanic specializing in boat motors and not involved in fishing prior to the tsunami, received a donation boat. This man began fishing because it was the quickest and most easily accessible way for him make money and begin saving to replace equipment to fix boat motors. This case and others indicate that because fishing gear and boats were available, residents took advantage of this opportunity to begin making income quickly, regardless of fear of another tsunami and intention to remain in the fishery.

Table 1. Percent Distribution of Attitudes toward Fishing

Village	Would Advise Fishing	Likes Fishing	Would not change job	Considered stopping fishing	N
1	24.3	43.2	8.1	64.9	37
2	5.3	5.3	5.3	95.0	19
3	18.8	18.8	12.5	93.8	16
4	24.3	62.2	35.1	59.5	37
7	27.4	32.7	25.0	72.5	52
Overall	22.8	37.3	19.9	72.7	161

Table 1 presents percentages of attitudes toward fishing from women and men of households involved in fishing. Overall, less than one quarter (23%) of individuals from fishing households would advise a young person to enter the fishery and differences between villages are not statistically significant. One possible explanation that semi-structured interviews revealed is that

residents recognize the addition of more boats, and anticipate it becoming more difficult to make enough money from fishing to provide for their families. For example, one respondent observed, “now there are ten boats trying to fish from one spot and only three get fish”. Almost one-fifth (20%) of respondents in the sample reported that they would not change their primary source of income from fishing. More than one-third (37%) of respondents report that they like the occupation of fishing. These values are considerably lower than those reported by fishers in other countries in Southeast Asia (Pollnac et al 2001). In addition, almost three quarters (73%) of respondents have considered exiting the fishery.

Table 2. Percent Distribution of Attitudes toward Fishing among males of fishing households

Village	Would Advise Fishing	Likes Fishing	Would not change job	Considered stopping fishing	N
1	22.2	50.0	11.1	55.6	18
2	0	7.7	0	92.3	13
3	20.0	30.0	20.0	100.0	10
4	25.0	100.0	50.0	58.3	12
7	42.9	42.9	39.3	63.0	28
Overall	25.9	45.7	25.9	70.0	81

Among only males in households where fishing is a primary source of income, responses to all four of these questions favors fishing more than when the questions were asked of both males and females in fishing households. Approximately one quarter (26% each) of fishermen would advise a young person to become a fisher and would not change their occupation from fishing. Less than half (46%) of fishermen surveyed, report that they like fishing. Seventy percent of the sample report that they have considered stopping fishing. Although the responses to this question imply dissatisfaction with fishing, it is important to note that these responses are from males that were fishing as a primary or secondary source of income, at the time of data collection. Observations and interviews indicate that although residents acknowledge an increase in boats and fishers, and are aware that this increase implies less fish to be caught by each fisher, almost half of the surveyed sample continue to rely on fishing as a primary or secondary source of income.

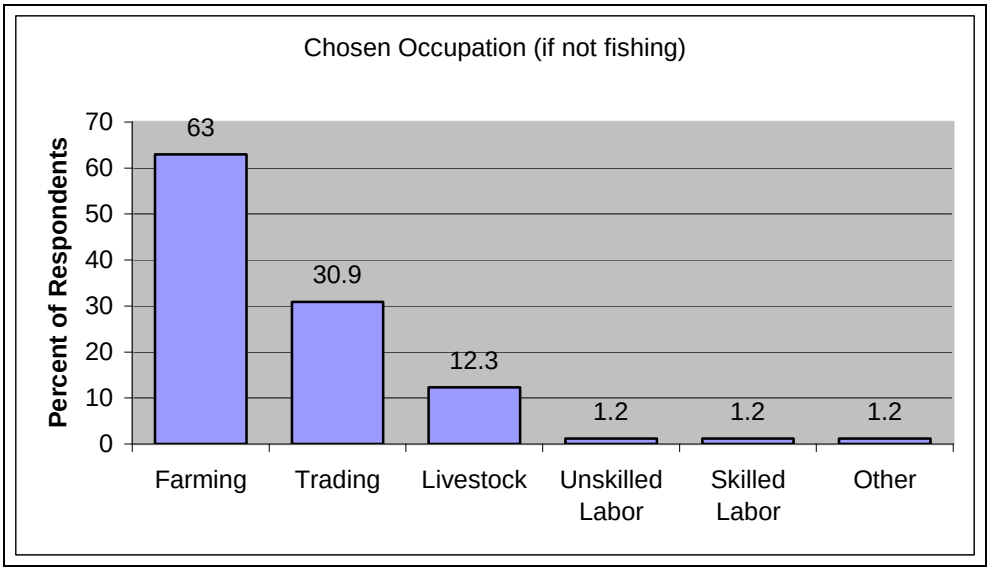
There are statistically significant intervillage differences in percent of respondents who ‘like fishing’ for all heads of households (males and females) and only males of fishing households (Tables 2 and 3; chi-square = 25.2 df = 8, $p<0.001$ for all respondents and chi-square = 27.0, df = 8, $p < 0.001$ for males from fishing households). Notably, responses in Village 2 are lowest (5% in Table 2 and 8% in Table 3) and highest in Village 4 (62% in Table 2 and 100% in Table 3). This discrepancy in responses between villages could be explained by the difference in concentration of households in each village and relative experience with the tsunami. Whereas, much of Village 4 is located adjacent to the ocean, Village 2 has a smaller portion of houses adjacent to the coast. Observations and interviews indicate that village leadership in Village 4 represents interests of fishermen more often than those of Village 2. For example, one respondent reported that an aquaculture project (not funded by the SCL Program) was headed by a resident in the inland area of Village 2 but infrastructure for it was located in the coastal section. Miscommunication between the head of the project and residents in the coastal area lead to failure of the project and resulted in abandoned aquaculture equipment because residents do not know how to use it. Fishermen in this village report that they feel prejudiced against because they are fishermen. In addition, the tsunami washed over the entire spit of land where houses and infrastructure were located, and caused severe damage in Village 2. Water washed away or destroyed most houses and a primary school from this area, as well as boats and gear docked or stored in the coastal section of the village. During baseline data collection, many families had not yet moved back into houses that were rebuilt in the coastal section of the village. In contrast, a healthy mangrove area protected houses in Village 4 adjacent to the sea from the greatest impact

of the tsunami. Although there was significant damage to some houses, boats and gear in this section of the village, most houses were left intact.

PREFERRED OCCUPATION (IF NOT FISHING)

Fishermen were asked what type of occupation in which they would prefer to participate if their income had to be derived from a source other than fishing. The responses of 81 males from fishing households are represented in Figure 1.

Figure 1. Preferred occupation if not fishing among males of fishing households



Almost two thirds of the respondents chose farming (63%) as an alternative if their income could not be derived from fishing. One possible reason for this selection is that interviews suggest farming, especially of rubber, is a relatively lucrative livelihood in the Program villages. Almost one third (31%) of the surveyed fishermen chose trading and twelve (12%) percent chose raising livestock as an alternative livelihood. It is interesting to note that less than two percent of the sample chose both skilled and unskilled labor (1.2%). Earlier studies of job satisfaction in fishing note that independence and being one's own boss are characteristics of alternative occupations that are most likely to satisfy former fishermen (Pollnac and Poggie 1988; Sievanen et al. 2005). Supporting these ideas, the most common alternative sources of income to fishing in this survey - farming, trading and raising livestock - each preserve aspects of independence and being one's own boss. Alternatively, labor often involves working with and for others, thereby sacrificing the characteristics of independence and being one's own boss.

ATTITUDES TOWARD THE SAFETY OF FISHING

Following a natural hazard such as the tsunami, perceptions about the safety of fishing may be affected. Although, there is no pre-tsunami data to compare with this information, it is important to evaluate current views regarding fishing safety as it may have consequences for fishermen and policies pertaining to fishing. Table 3 illustrates 379 responses from male and female heads of households in the Program villages.

Table 3. Percent Distribution of Attitudes toward the safety of fishing*

Village	Strongly Disagree	Disagree	Slightly Disagree	Neither	Slightly Agree	Agree	Strongly Agree	N
1	**29.0**	19.4	4.8	1.6	17.7	24.2	3.2	62
2	24.0	**48.0**	6.7	4.0	2.7	13.3	1.3	75
3	19.5	**40.3**	5.2	1.3	11.7	22.1	-	77
4	27.0	**31.1**	14.9	10.8	8.1	2.7	5.4	74
7	13.2	22.0	3.3	7.7	7.7	**44.0**	2.2	91
Overall	21.9	**32.2**	6.9	5.3	9.2	22.2	2.4	379

* Most common (modal) responses for each question are in bold.

Overall, respondents most often 'disagreed' (32%) that fishing was safe and there is no reason to worry when a fishermen goes out to sea. Along with over one-fifth of respondents who 'strongly disagreed' (22%) overall, over two-thirds (61%) of the sample do not think that fishing is safe (adding the percentage of responses for 'slightly disagree', 'disagree' and 'strongly disagree'). There are statistically significant differences among villages (Kruskall-Wallis one-way analysis of variance coefficient=27.5, df=4, $p<0.001$). Analysis of responses by village show Village 7 in contrast to the others, where respondents in this village most often 'agree' (44%) with the statement that fishing is safe. In addition, although respondents most often 'strongly disagreed' in Village 1 (29%), almost one quarter (24%) from this village 'agreed' with the statement. Villages 1 and 7 also contain the greatest percentage of households that report fishing among livelihoods that contribute to household income and food generation. This data suggests that those villages where more households are engaged in fishing are also villages where more people are likely to agree that fishing is safe.

Table 4. Percent Distribution of Attitudes toward the safety of fishing among males of fishing households*

Village	Strongly Disagree	Disagree	Slightly Disagree	Neither	Slightly Agree	Agree	Strongly Agree	N
1	**27.8**	16.7	11.1	5.6	11.1	**27.8**	-	18
2	**38.5**	**38.5**	7.7	7.7	7.7	-	-	13
3	30.0	20.0	-	10.0	10.0	**40.0**	-	10
4	**41.7**	16.7	-	8.3	8.3	-	25.0	12
7	14.3	25.0	7.1	17.9	17.9	**32.1**	-	28
Overall	**27.2**	23.5	6.2	12.3	12.3	22.2	3.7	81

* Most common (modal) responses for each question are in bold.

Among only males of fishing households, there are no statistically significant differences between villages in response to the statement that fishing is safe (Table 4). Over one quarter of fishermen (27%) sampled 'strongly disagreed' that fishing is safe, but over one fifth (22%) of the sample also 'agreed' with the statement. However, over half of the fishermen in the sample (57%) do not agree that fishing is safe. These attitudes toward the safety of fishing indicate a general disagreement that fishing is safe which might be affected by the tsunami. In addition, many fishermen, during interviews, noted more days this year when conditions were not conducive for fishing due to waves and storms. The experience with the tsunami in addition to the turbulent conditions of the current year may have influenced responses during the time of the survey.

Evaluating village responses separately, respondents most often 'strongly disagreed' that fishing is safe in Villages 1, 2 and 4. Fishermen surveyed in Village 7 reflect the same attitudes as the entire sample from this village (Table 3), and most often 'agree' that fishing is safe (32%). It is interesting to note that fishermen in Village 3 also most often 'agree' that fishing is safe (40%). One possible explanation for this is that due to the inland location of Village 3, many fishermen store their boats and gear on riverbeds that are not subject to as much turbulence from storms and waves. Although fishermen travel to the same fishing grounds as those from other villages, this difference may affect their attitudes toward the safety of fishing.

CHANGES SINCE INITIAL SOCIO-ECONOMIC SURVEY

Attitudes toward the occupation of fishing and safety in fishing were predicted to change in the aftermath of the tsunami. Studies of other hazards suggest that perceptions of hazards change with increasing time after the hazard occurs and actions pertaining to risk of future hazards change as well (Tobin and Montz 1997). In an area such as Suk Sumran where almost half of the households are engaged in fishing, it is important to assess changes in perceptions of fishing because of its impact on fishing and hazard preparedness.

Table 5. Percent Distribution of Attitudes toward Fishing (2005 and 2007)[6]

Year	Would Advise Fishing	Likes Fishing	Would not change job	N
2005	26.2	55.0	22.4	401
2007	22.8	37.3	19.9	161
Change*	-3.4	-17.7	-2.5	

Responses are not statistically significant between the baseline and follow up surveys for whether to advise a young person to fish and those that would not change jobs for the entire sample (Table 5). Results indicate slightly less positive attitudes toward fishing in the follow up surveys than the baseline for both questions (change of –3.4% 'would advise fishing', and –2.5% 'would not change job'). There is a statistically significant difference in responses from baseline to follow up surveys on whether the respondent 'likes fishing' (chi-square = 14.8, df = 1, $p<0.001$). Eighteen percent (18%) fewer respondents noted that they 'liked fishing' during the follow up survey. It is important to note the change in sample size between time periods as well (baseline = 401, follow up = 161) which suggests that others many more survey respondents were engaged in fishing during the baseline survey. Overall, however, these changes suggest less positive views of the occupation of fishing.

Table 6. Percent Distribution of Attitudes toward Fishing among males of fishing households (2005 and 2007) [1]

Year	Would Advise Fishing	Likes Fishing	Would not change job	N
2005	29.8	81.1	21.1	111
2007	25.9	45.7	25.9	81
Change*	-3.9	-35.4	4.8	

Similar to the results for all respondents, responses from males of fishing households was not statistically significantly different between the baseline and follow up surveys for the questions whether to advise someone to go into fishing and if they would not change jobs (Table 6). However, the percent of fishermen that would advise a young person to go into fishing decreased (-3.9%) while the percent of surveyed fishermen who would not change jobs increased (4.8%). Although these changes are not statistically significant, it may indicate that there is less confidence in the future of the fishery (i.e. prospects for the livelihood of a young person) but those who are already fishing, will continue to do so. Of those that do continue to fish, however, thirty five percent (-35%) less of the sample stated that they 'liked fishing'. This difference between responses to the baseline and follow up surveys is statistically significant (chi-square = 26.2, df = 1, $p<0.001$) which suggests that fishermen are less satisfied with fishing than they were during the baseline survey.

[6] Note: The baseline survey did not include a question regarding if fishermen considered exiting the fishery.

The decrease in attitudes of fishers toward fishing may be due to sampling differences between the baseline and follow up surveys. Specifically, the baseline survey was conducted during the rainy season when fishermen were more likely to be surveyed because they were not out fishing as often. The follow up survey was administered during the dry season when more fishermen were out fishing more often and some were fishing in other provinces. Therefore, these fishermen were not surveyed which could have affected results.

Table 7. Percent Distribution of Attitudes toward the safety of fishing (2005 and 2007)

Village	Strongly Disagree	Disagree	Slightly Disagree	Neither	Slightly Agree	Agree	Strongly Agree	N
2005	**44.5**	25.0	10.1	2.4	4.6	6.1	7.2	456
2007	21.9	**32.2**	6.9	5.3	9.2	22.2	2.4	379
Change*	-22.6	7.2	-3.2	2.9	4.6	16.1	-4.8	

Responses of the entire sample regarding the safety of fishing show statistically significant differences between the baseline and follow up assessments (Kruskall-Wallis one-way analysis of variance coefficient=41.9, df = 1, $p<0.001$). The change in percentage of respondents who 'strongly disagree' that fishing is safe decreased by over one fifth (-23%) and the percentage of the sample that disagreed ('strongly disagree', 'disagree' and 'slightly disagree') decreased from 80% (baseline survey) to 61% (follow up). These results suggest that fewer residents that were surveyed feel that fishing is a dangerous occupation but a majority of respondents still do not agree that fishing is safe.

Table 8. Percent Distribution of Attitudes toward the safety of fishing among males of fishing households (2005 and 2007)

Village	Strongly Disagree	Disagree	Slightly Disagree	Neither	Slightly Agree	Agree	Strongly Agree	N
2005	**48.7**	19.1	9.6	2.6	3.5	7.0	9.6	115
2007	**27.2**	23.5	6.2	12.3	12.3	22.2	3.7	81
Change*	-21.5	4.4	-3.4	9.7	8.8	15.2	-5.9	

Among males of fishing households, responses regarding the safety of fishing also showed a statistically significant difference between baseline and follow up responses. However, the significance is weaker than for the change among all survey respondents (Table 8; Kruskall-Wallis one-way analysis of variance coefficient=8.2, df = 1, $p<0.01$). The largest percent difference is a decrease of over one-fifth (-22%) of fishermen who 'strongly disagree' that fishing is safe. The results for fishermen also follow the same trend as for all respondents in the percent of the sample who disagree (all levels of disagreement) that fishing is safe. Over three quarters of the sample (77%) disagreed during the baseline survey and just under two thirds (57%) disagreed with the statement during the follow up survey. Similar to results for the entire sample, however, over half of the respondents still do not agree that fishing is safe.

Table 9. Percent Distribution of Preferred Occupation if not fishing among males of fishing households (2005 and 2007)

Year	Farming	Trading	Livestock	Unskilled Labor	Skilled Labor	Aquaculture	Other	N
2005	38.4	**45.5**	2.7	6.3	1.8	4.5	-	112
2007	**63.0**	30.9	12.3	1.2	1.2	-	1.2	81
Change*	24.6	-14.6	9.6	-5.1	-0.6	-4.5	1.2	

Farming was commonly preferred during the baseline and follow up assessments, as an alternative to fishing (Table 9; 39% and 63%, respectively). However, the most common preferred

occupation during the baseline assessment was trading (46%). Respondents during the follow up assessment chose trading as an alternative occupation fifteen (-15%) less often, and farming one quarter (25%) more often than during the baseline survey. Several interviewees noted the number of new small stores during the follow up survey, often started by residents that received small loans. It is possible that fishermen observe this increase in trading and are less likely to choose it as a replacement for fishing. Another notable difference between baseline and follow up responses to this question is that no respondents stated they would like to practice aquaculture if not fishing during the follow up survey. However, five percent (5%) of the fishermen surveyed during the baseline, selected aquaculture. This difference could be accounted for by the large number of aquaculture projects that failed during the reconstruction period between the baseline and follow up surveys.

CONCLUSIONS AND RECOMMENDATIONS

Attitudes toward fishing are less positive overall, than in other similar studies of Southeast Asian fisheries (Pollnac et al 2001). However, comparing data from the baseline and follow up surveys shows that in some aspects, specifically attitudes toward the safety of fishing, perceptions were less negative during the follow up survey. Again, there is no pre-tsunami data for comparison so it cannot be determined whether residents in SCL Program villages were more concerned about the safety of fishing in the early months after the tsunami and attitudes are now returning to those of the area before the tsunami or if there is another reason for the change.

Relative to other studies, there was a small percentage of fishing households that would not change occupations from fishing and a high percent of respondents that have considered stopping fishing. These views could be a result of an initial increase in fishers and boats as discussed above, which may subside overtime with more residents returning to pre-tsunami occupations. In addition, the continued influx of outside assistance may influence people to respond that they are willing to try a new occupation if they think there could be training, gear, or other assistance available for additional types of livelihoods. Although this is less of a concern in the follow up data than during the baseline because there was more opportunity to participate in alternative livelihood projects, many households continue to participate in more than one type of livelihood and this could affect responses to these questions. In addition, those fishermen that like fishing were more likely to be out fishing when the survey was administered for the follow up which could also have affected the results of these answers. However, because the responses are comparable to the baseline information overall, it is not likely that these methodological aspects significantly affected results of this survey. Low values of satisfaction with fishing can also be a sign of willingness of fishers to practice alternative livelihoods in the future which should be taken into consideration for future livelihood projects in Suk Sumran. In addition, the results presented here suggest preferred alternative sources of income that might satisfy those fishermen willing to leave the fishery.

Responses to this survey indicate that both residents of the SCL Program villages and fishermen view fishing as an unsafe occupation. However, the severity of theses views seems to be lessening with an increase of time since the tsunami and may continue to do so. Therefore, continued monitoring of attitudes in general toward fishing would provide further information about how residents' perception of fishing continues to change overtime after the tsunami.

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Follow Up to Baseline – #4
Investment Orientations

INTRODUCTION

The SCL Program implemented various types of livelihood interventions in order to facilitate recovery of residents of the Program villages. One type of intervention is village banks and distribution of micro-loans for individuals to have access to money that they can invest most appropriately for their needs. Asking respondents how they would invest a sudden windfall of money, can provide information for Program managers about the types of investment priorities for residents in the Program villages. In order to assess investment orientations, villagers were 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 110,000B in a lottery, what would you do with this money?*

Respondents were asked these questions as free-form questions. Answers were then grouped into the following categories and multiple responses were recorded.

INVESTMENT ORIENTATION

Table 1 illustrates the percent distribution of all responses to how they would invest in 9,000B. This value was chosen because preliminary interviews (during baseline data collection) indicated that 9,000B was an approximation of average monthly income in the Program villages.

Table 1. Percent Distribution of Investment Orientation (9,000B)[7]

Village	Productive Goods	Save for Future	Save for Children	Pay Debt	Material Goods	Don't want to answer	N
1	**33.7**	23.1	24.3	11.8	7.1	-	169
2	**38.7**	18.5	29.4	7.6	5.9	-	119
3	**55.8**	22.1	7.1	10.6	4.4	-	113
4	**54.3**	15.2	15.2	12.8	2.4	-	164
7	**34.1**	20.1	11.2	25.1	8.4	1.1	179
Overall	**42.5**	19.8	17.3	14.4	5.8	0.3	744

There were 744 responses to this question which were recorded and categorized as presented in Table 1. The most common response was to invest the money in productive goods. Productive goods are defined (for the purposes of this categorization) as anything that is needed or can be used for some type of livelihood and/or food generation activity. Over forty percent (43%) of respondents reported that they would invest in productive goods. One fifth (20%) of the sampled residents stated that they would save the money for future use. The next most common answer was to save the money for children (18%), and then pay off existing debt (14%). Just over five percent (6%) of the sample reported that they would use the money to purchase material goods. Less than one percent (0.3%) of the respondents did not wish to answer.

Although the most common response in each village is to invest in productive goods, intervillage differences are statistically significant (Kruskall-Wallis one-way analysis of variance coefficient=477.0, df = 5, $p<0.001$). One notable difference is that over half of the sample in Villages 3 and 4 (56% and 54%, respectively) reported that they would invest in productive goods and only around one third, in Villages 1, 2 and 7 (34%, 39% and 34%, respectively). Villages 1, 2 and 7 each experienced direct damage from the tsunami (e.g. houses and boats were swept

[7] Respondents were instructed to report multiple answers, if appropriate (not ranked by importance).

away). These results suggest that respondents in these villages want more productive goods, but it cannot be determined from this information whether this is because they are still recovering or if they wish to expand with additional productive goods. However, supporting the idea that at least some residents would use the money for some type of occupational recovery, during semi-structured interviews, one interviewee in Village 7 stated that he was still saving money in order to replace machinery that was lost during the tsunami.

Another difference to note is about half of the respondents in Villages 1 (57%) and 2 (48%) responded that they would save 9,000B, either for the future or for their children. In contrast, only about thirty percent of respondents in Villages 3 (30%), 4 (30%) and 7 (31%) reported that they would save for the future or for their children. This difference is less likely to be due to the effects of the tsunami because Villages 1, 2, and 7 had more significant structural damage than Villages 3 and 4. An additional difference is that one quarter (25%) of respondents in Village 7 also reported they would use the money to pay off debt, which is a much higher percentage than the other villages. This may be a result of more opportunities for residents in Village 7 to take on debt for recovery or that respondents in Village 7 or more concerned about paying back debt than individuals in other villages.

Table 2 shows the percent distribution of respondents' choices for investment if given 110,000B. This value was chosen as an approximate average one year's income in the Program villages, also determined during baseline data collection.

Table 2. Percent Distribution of Investment Orientation (110,000B)[8]

Village	Productive Goods	Save for Future	Save for Children	Pay Debt	Material Goods	Don't want to answer	N
1	**33.1**	25.4	21.3	11.8	8.3	-	169
2	**41.2**	10.1	25.2	11.8	11.8	-	119
3	**50.4**	22.1	12.4	8.8	5.3	0.9	113
4	**40.9**	21.3	19.5	13.4	4.9	-	164
7	**33.5**	20.1	18.4	22.3	5.6	-	179
Overall	**38.8**	20.3	19.5	14.2	7	0.1	744

There were 744 responses to this question with almost forty percent (39%) of the respondents reporting that they would invest in productive goods. One fifth (20%) of the sample responded that they would save for the future and another one fifth (20%) would save the money for their children. Almost fifteen percent (14%) would use the money to pay off existing debt and less than ten percent (7%) would buy material goods. Similar to responses for 9,000B, less than one percent (0.1%) did not wish to answer the question.

Intervillage responses between villages are statistically significant (Kruskall-Wallis one-way analysis of variance coefficient=395.4, df = 5, $p<0.001$) although the most common response in each of the villages is to invest in productive goods. Responses between villages regarding savings are not as distinctly different for investment choices for 110,000B. Saving, either for the future or for children, was a less common response than with 9,000B with between 35% (Villages 2 and 3) and 47% (Village 1) of each village reporting that they would save the sum of money. Similar to responses for 9,000B, more responses in Village 7 were to pay off debt (22%) compared to the other villages where percentages ranged from 9% (Village 3) to 13% (Village 4).

[8] Respondents were instructed to report multiple answers, if appropriate (not ranked by importance).

Figure 1. Percent Distribution of Overall Investment Choices

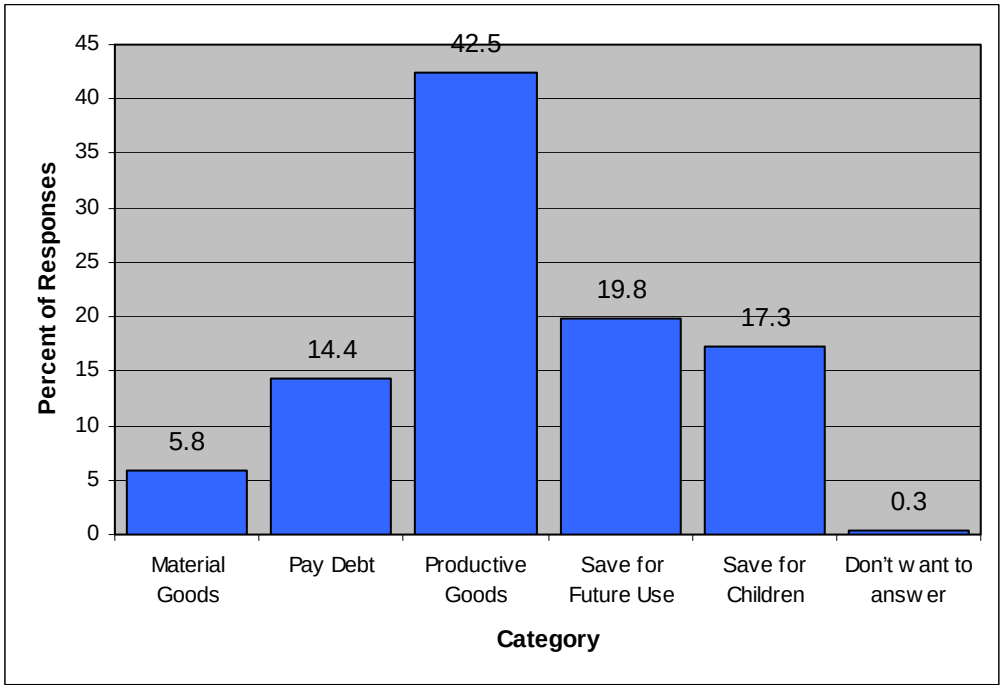

Figure 1 shows investment choices for both questions (9,000B and 110,000B) for 1488 responses. These results show that the most common response overall is to invest in productive goods (43%). One fifth of respondents would invest money in each, saving for the future (20%) or saving for their children (18%) which shows that after investing in productive goods, savings are also a high priority. Paying off debt is less of a priority for respondents with just less than fifteen percent (14%) of responses and only six percent (6%) would spend the money on material goods. Differences between villages are statistically significant for responses to both questions (Kruskall-Wallis one-way analysis of variance coefficient=56.4, df = 4, $p<0.001$) and reflect differences discussed above for responses to each question.

FACTORS ASSOCIATED WITH VARIABILITY IN INVESTMENT ORIENTATION

The following table (Table 4) illustrates bivariate correlations between types of investment orientation and demographic variables that have been associated with each other in previous studies including age, education and involvement in fishing (Pollnac 1989). Religion, gender, fatalistic views and exposure to media are other factors that could affect investment orientation and are therefore, included as exploratory variables. Finally, experience with the tsunami is expected to affect an individual's outlook on the future which could impact investment orientation. Variables pertaining to tsunami impacts are personal injury, member of household killed, and member of household injured during the tsunami.

This analysis used natural dichotomies (e.g. gender, religion (Muslim or non-Muslim, income from fishing, etc.) or calculated dichotomies. Dichotomies were formed around the median value (age (38), years of education (6), listening to radio news (0.5) and reading newspaper (7)). Due to non-normal variance in responses and outliers, values are the Spearman's Correlation Coefficient. Responses to investment choices for 9,000B and 110,000B were analyzed as one variable and multiple responses were recorded with each answer weighted evenly.

Table 4. Correlations between selected variables and investment choices**

Variable	Material Goods	Pay Debt	Productive Goods	Save for Future	Save for Children
Age	-0.08*	0.00	0.08*	-0.01	-0.03
Years of Education	0.05	0.03	-0.11*	-0.04	0.14*
Fishing	0.08*	0.04	0.07	-0.07*	-0.10*
Religion	-0.09	-0.19*	0.09*	0.04	0.08*
Gender	-0.04	0.02	0.09*	-0.06	-0.05
Fatalistic	-0.04	-0.13*	0.14*	0.03	-0.08*
Radio News	0.08*	-0.02	-0.12*	0.04	0.08*
Reads Newspaper	-0.01	-0.10	-0.01	0.03	0.08*
Personal Injury	-0.05	0.19*	-0.08*	0.00	-0.05
Household Member Killed	-0.01	0.07*	-0.08*	0.07*	-0.02
Household Member Injured	-0.10*	0.24*	-0.08*	0.00	-0.06

* Correlation is significant at p>0.01 (two-tailed)
**N is calculated by response, not individual, and ranges from 1476-1488.

Bivariate correlation coefficients are presented in Table 4. These correlations indicate that those individuals who would invest in material goods also tend to be younger, from households that fish, listen to news on the radio more often and are less likely to have had a household member injured during the tsunami. Individuals reporting that they would pay off debt with a windfall of money were more likely to be Buddhist, not fatalistic, and closely affected by the tsunami (i.e. were themselves injured or had a member of their household killed or injured during the incident). Older, Muslim, fatalistic males with less education who listened to radio news less often were more likely to report that they would invest in productive goods. Individuals reporting that they would invest in productive goods were also more likely to receive personal injury, lose a household member or have an injured household member due to the tsunami. Respondents that report they would save the money for the future were less likely to live in households that gain income from fishing and more likely to have experienced a death in their household due to the tsunami. Individuals that have more education, and are Muslim tend to report that they would save money for their children. Those individuals reporting that they would save money for their children also tended not to be fatalistic, were more likely to be from households that did not gain income from fishing, listened to radio news and read newspapers more often.

Of specific interest to the SCL Program are relationships between investment orientations and experience with the tsunami. The correlations above indicate that all three variables pertaining to the tsunami are positively correlated with reporting intentions to pay off debt and negatively correlated with responses to invest in productive goods. This association suggests that those who were directly affected by the tsunami over two years prior to this survey prioritized paying off their debt over other investment choices. These results could be an indication that those individuals that were closely affected by the tsunami accrued debt following the tsunami and now want to pay it off. Supporting the notion that more capital is needed for investment in productive materials, microfinance loans through village banks implemented by the SCL Program, prioritized loans for households that were more severely affected by the tsunami in some cases. Also, many aid projects prioritized households that were directly affected by the tsunami when donating productive materials (e.g. boats) or allowing participation in recovery livelihood projects. Therefore, those households that were more severely affected by the tsunami were more likely to receive assistance for recovery so that they would not have to invest in productive materials at the time of the follow up survey. In addition, individuals that did not experience the effects of the tsunami examined here and chose to invest in productive goods may do so because they invested in productive goods soon after the tsunami, possibly with borrowed money, and now do not have a need to invest further in productive goods.

CHANGES SINCE INITIAL SOCIO-ECONOMIC SURVEY

Results from the baseline and follow up surveys are presented in Table 5 below. The results show overall investment choices for all responses to each question (9,000B and 110,000B) and are not statistically significantly different between the initial and follow up assessments.

Table 5. Percent Distribution of Overall Investment Choices (2005 and 2007)

Village	Productive Goods	Save for Future	Save for Children	Pay Debt	Material Goods	Donate	For Education	Don't want to answer	N
2005	**64.9**	11.7	12.4	1.0	7.2	1.8	1.1	0.2	1124
2007	**42.5**	19.8	17.3	14.4	5.8	-	-	0.3	1488
Change	23.9	44.6	-7.1	-13.3	1.3	N/A	N/A	0.1	

The most common response at both time periods was to invest in productive goods. However, over two thirds (65%) of the sample from the baseline survey responded this way and only two fifths (43%) of the sample during the follow up would use the money for productive goods. In addition, responses during the follow up survey are more evenly distributed with one fifth (20%) of the sample report they would save the money for the future, over fifteen percent (17%) would chose to save for children and just under fifteen percent (14%) would pay off debt. The second most common answer during the baseline survey was to save for children with just over one tenth of the responses (12%) followed by save for the future also with just over one tenth (12%) of responses. Respondents were more likely to report that they would save, for the future and for children, during the follow up (37% of respondents) survey than during the baseline (24%).

CONCLUSIONS AND RECOMMENDATIONS

These results suggest that investing in productive goods remains a priority for residents in SCL Program villages even over two years after the 2004 tsunami. However, there is no way to determine if that these investments would be used for recovery from damage during the tsunami or if the individuals already feel that they have recovered and would invest in productive goods anyway.

Results indicate that saving - either for the future or for children - is a higher priority for respondents during the follow up assessment than during the baseline survey. This finding is important because it suggests that residents are sufficiently recovered from the tsunami to prioritize preparing for the future or, if they were not severely affected by the tsunami, their investment priorities are still forward-looking. This finding is important because it has been suggested in previous studies that people in areas affected by a hazard, may feel that it is futile to prepare for the future (Bankoff et al 2004; Dyer 2002; Heijmans 2004).

Statistically significant correlations show that individuals who experienced personal injury or the injury or death of a household member, tend to report different investment orientations than those that were not affected by the tsunami in these ways. However, it cannot be determined whether differences are due to differing situations because of the recovery effort (i.e., receiving loans and/or donations) or because of actual investment orientations. This question could be further explored through additional surveys to monitor change overtime.

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Follow Up to Baseline – #5
Perceptions of Coastal Resources and Factors Related to their Management

INTRODUCTION

During a recovery effort, there is an opportunity to improve upon past management of coastal resources by implementing policies and practices that encourage sustainable resource use (Tobin and Montz 1997). In turn, sustainable and diverse resource use can enhance community resilience. Developing better management requires a good understanding of residents' attitudes toward, and understanding of, coastal resource processes and their management (Pollnac and Crawford 2000). In addition, in a recovery scenario, associated beliefs - such as fatalism and perceptions of the future – affect rebuilding efforts and the capability to enhance resilience during recovery (Bankoff et al. 2004). At the conclusion of the SCL Program, it is useful to assess whether and how these beliefs have changed in response to various types of exposure and education regarding human impacts on coastal resources, over the course of the recovery period.

In order to assess attitudes toward coastal resources and their management in the SCL Program villages, we asked survey residents to rank the following two statements on a Likert scale to which respondents were asked to agree or disagree with the statement and to what degree (from 'Strongly Disagree' to 'Strongly Agree'):

1. *Human activities do not influence the number of fish in the ocean.*
2. *There is no point in planning for the future, what happens, happens and we cannot do anything about it.*

The following four statements were read to respondents as self-anchoring style questions. Each situation was explained as the lowest rung on the ladder representing the worst scenario (1) and the highest rung on the ladder representing the best scenario (10). Respondents were asked to rank the actual situation in their area on this scale (1-10) for the present day, prior to the tsunami, and three years in the future.

Resource health
Overall: *The 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.*
Fishery: *The first step represents a situation in which there are not enough fish for fishermen to catch and the habitats for fish are polluted or damaged so that fish are not attracted from surrounding areas. The highest step represents a healthy fishery with enough fish for all fishermen to catch what they need and fish habitat is intact and able to attract fish from surrounding areas.*
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.
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.

ATTITUDES TOWARD HUMAN INFLUENCE ON COASTAL RESOURCES AND FATALISM

Table 1 illustrates the distribution of attitudes toward human influence on the number of fish in the ocean. Responses were consolidated from seven responses to three in order to further

summarize the data (i.e. responses 'Strongly Disagree', 'Disagree' and 'Slightly Agree' were aggregated to 'Disagree').[9]

Table 1. Percent Distribution of attitudes toward human influence of number of fish in ocean

Village	Disagree	Neither	Agree	N
1	37.1	-	**62.9**	62
2	**69.3**	4.0	26.7	75
3	**62.3**	2.6	35.1	77
4	**45.9**	16.2	37.8	74
7	24.2	4.4	**71.4**	91
Overall	47.2	5.5	47.2	379

Overall, responses were divided with an equal percentage, almost half (47% each), of respondents agreeing and disagreeing with the statement that humans do not influence the number of fish in the ocean. Only six percent (6%) of respondents neither agreed, nor disagreed with the statement. These values indicate that, for residents of all villages, attitudes are evenly split as to whether humans influence the number of fish in the ocean. However, there are statistically significant differences in responses between villages (Kruskal-Wallis coefficient = 46.8, df = 4, $p<0.001$). This suggests that within each village, attitudes are more homogenous than in the overall SCL Program area. Over sixty percent of respondents in Villages 1 and 7 agree that humans to not influence the number of fish in the ocean (63% and 71%, respectively), and these villages are also heavily reliant on fishing for food and income. Alternatively, respondents in Villages 2, 3, and 4, those villages that rely less on fishing, disagreed more often that humans do not affect the number of fish in the ocean; therefore, they realize that humans do, in fact, influence fish stocks (69%, 62% and 46%, respectively).

Fatalism is closely associated with the conceptual understanding of human influence on natural resources. If people are fatalistic, they are less likely to think about possible consequences of resource use and management for the future. Those individuals who could be classified as fatalistic would agree that there is no use in planning for the future and that they cannot affect change because 'what happens, happens [and they] cannot do anything about it'. Table 2 shows responses of 378 individuals from the five SCL Program villages regarding fatalism.

Table 2. Percent Distribution of Fatalistic Attitudes

Village	Disagree	Neither	Agree	N
1	34.4	9.8	**55.7**	61
2	**56.0**	6.7	37.3	75
3	35.1	10.4	**54.5**	77
4	**75.7**	9.5	14.9	74
7	36.3	6.6	**57.1**	91
Overall	**47.4**	8.5	44.2	378

Overall, slightly more people reported that they disagreed with the fatalistic statement (47%), but only three percent fewer respondents agreed that there is no use in planning for the future (44%). Again, responses were aggregated to three categories and intervillage differences were statistically significant (Kruskal-Wallis coefficient = 42.8, df = 4, $p<0.001$). Surveyed individuals within each village, however, are split more equally between fatalistic and non-fatalistic responses than to the statement regarding human influence on fish. Respondents in Village 4, and to a lesser extent, Village 2, are less likely to agree with the fatalistic statement (76% and 56%,

[9] The most common (modal) responses of each village are either 'Disagree' or 'Agree'.

respectively). Between one-half and two-thirds of surveyed individuals from Villages 1, 3, and 7 agreed that there is no point in planning for the future (56%, 55% and 57%, respectively).

ASSESSMENT OF COASTAL RESOURCES HEALTH AND MANAGEMENT[10]

Table 3 illustrates the distribution of responses on a self-anchored scale of coastal resource health from 371 respondents in the five SCL Program villages.

Table 3. Percent Distribution of self-anchoring assessment of coastal resource health

Rank \ Village	1	2	3	4	7	Overall
3	19.4	9.3	7.8	10.3	13.5	11.9
4	21.0	**33.3**	20.8	20.6	20.2	23.2
5	**37.1**	25.3	**24.7**	27.9	**38.2**	**30.7**
6	12.9	17.3	23.4	**29.4**	10.1	18.3
7	6.5	2.7	11.7	5.9	10.1	7.5
N	62	75	77	68	89	371

Overall, the most common response was '5' (31%) which indicates that respondents assessed the health of coastal resources evenly between a 'filthy and polluted beach [with] dead and dying mangroves' and a 'beautiful beach [with] healthy mangroves'. Responses were statistically significantly different between villages (Kruskal-Wallis coefficient = 15.3, df = 4, $p<0.01$) with the lowest most common rank in Village 2 ('2') and Village 4 with the highest most common rank of '6' (33% and 29%, respectively).

Table 4 illustrates the responses regarding compliance with coastal resource regulations on a self-anchoring scale.

Table 4. Percent Distribution of self-anchoring assessment of compliance with coastal resource regulations

Rank \ Village	1	2	3	4	7	Overall
1	6.5	6.7	-	18.6	13.2	9.1
2	8.1	2.7	3.9	14.3	1.1	5.6
3	9.7	6.7	-	7.1	4.4	5.3
4	9.7	4.0	-	8.6	6.6	5.6
5	**35.5**	**24.0**	17.1	**34.3**	**38.5**	**29.9**
6	16.1	13.3	**25.0**	10.0	22.0	17.6
7	9.7	22.7	21.1	1.4	9.9	13.1
8	4.8	14.7	22.4	5.7	4.4	10.4
N	62	75	76	70	91	374

For this statement, the modal value is also '5' or neutral between 'a lawless sea where everyone does what they want' and a scenario where 'everyone takes care of the environment and obeys the law'. In contrast to the previous question of coastal resource health, the distribution of responses is more evenly distributed, but concentrated above '5' (44% overall). There were statistically significant intervillage differences on the responses to this statement (Kruskal-Wallis coefficient = 82.7, df = 4, $p<0.001$). However, the most common rank in all villages is '5' except for Village 3 where the most common response is '6'. Semi-structured interview responses provide some further information about why the responses to this question vary more widely than responses to other self-anchoring statements. When interviewees were asked if the rules regarding coastal resources had improved management of these resources, responses varied widely, indicating that residents are not aware of regulations regarding coastal resources.

[10] Only overall ranks of more than 5% of the sample were included in the tables in this section although possible responses ranged from 1-10.

However, several interviewees responded that there were no regulations for small-scale fishermen, only restrictions on commercial fishing boats entering nearshore fishing areas. This is not, however, true for fishermen in Suk Sumran as there are restrictions on gear types used for small scale fishermen. Several other respondents replied that the laws regarding fishing and coastal resources are written regulations but not followed in practice.

Table 5 illustrates the responses to community control over coastal resources based on a self-anchoring scale from 1-10. The modal value for these responses is again '5' with over one quarter (28%) of the respondents choosing this rank between 'where people have no control over access to…coastal resources' and 'where people have the right to control the use of coastal resources'.

Table 5. Percent Distribution of self-anchoring assessment of community control over coastal resources

Village / Rank	1	2	3	4	7	Overall
1	6.5	9.3	2.6	**34.8**	13.2	13.1
2	4.8	5.3	7.9	4.3	2.2	4.8
3	9.7	13.3	5.3	1.4	3.3	6.4
4	11.3	4.0	5.3	11.6	8.8	8.0
5	**38.7**	18.7	13.2	26.1	**44.0**	**28.4**
6	14.5	**22.7**	**32.9**	14.5	17.6	20.6
7	9.7	**22.7**	22.4	5.8	9.9	14.2
N	62	75	76	69	91	373

There were statistically significant differences in responses based on village of residence (Kruskal-Wallis coefficient = 38.2, df = 4, $p<0.001$). Village 4 respondents most often ranked control over resources a '1' (35%) while the most common rank in the other four villages was '5', '6', or '7' which indicates a much greater sense of control in the other villages. In semi-structured interviews, respondents in Village 4 noted that there was conflict within the village members as well as between the village authorities and fishermen in Village 4 regarding coastal resources which could explain the lower ranking in this village relative to the others. Overall, however, the responses fall centrally between the extremes presented in the ladder statement regarding the issue of community control over coastal resources.

The following table represents the responses from 374 respondents to rank the health of the fishery in Suk Sumran on a scale of 1-10 (Table 6). The modal value for these responses is '5', again with just over one quarter (29%) of respondents choosing this rank between 'not enough fish…to catch and…damaged habitats' and 'a healthy fishery with enough fish…and [healthy] habitat for fish'.

Table 6. Percent Distribution of self-anchoring assessment of health of the fishery

Village / Rank	1	2	3	4	7	Overall
3	14.5	12.0	9.3	2.8	8.8	9.4
4	21.0	25.3	17.3	25.4	23.1	22.5
5	**32.3**	**28.0**	**30.7**	25.4	**27.5**	**28.6**
6	22.6	24.0	21.3	**32.4**	24.2	24.9
7	4.8	5.3	16.0	9.9	4.4	8.0
N	62	75	75	71	91	374

Analysis of intervillage variation reveals that there are no statistically significant differences in responses, indicating that residents of Suk Sumran largely agree on this response, irrespective of their village of residence. Most answers to this statement indicate that residents feel that the health of the fishery is about average (76% of responses were ranks '4', '5', or '6'). The similarity

of responses to this statement reflects the fact that residents of all villages in the SCL Program rely on the same area for their coastal resources. The most common rank for each of the above regarding coastal resource health and management indicate that overall, the respondents rank these aspects of Suk Sumran about average (rank '5').

PERCEPTIONS OF CHANGE IN COASTAL RESOURCES AND MANAGEMENT SINCE TSUNAMI[11]

The following four tables (Tables 9-12) show the change in rank from respondents between the assessment of the subject at the time of the survey and their perceived assessment of the same subject prior to the tsunami. The rank for the current state was subtracted from the rank prior to the tsunami so that positive responses correspond with perceived increase in condition from before the tsunami until the time of the survey and negative responses indicate that conditions are perceived to have decreased since prior to the tsunami.

Table 7 shows the change in rank between the health of coastal resources prior to the tsunami and the time of the follow up survey. The most common change in response overall was '-1' with just under one quarter (22%) of respondents ranking the present period one step lower than that from just prior to the tsunami.

Table 7. Percent Distribution of perceived change in coastal resource health since before the tsunami

Village / Difference	1	2	3	4	7	Overall
-6	-	12.0	5.2	4.5	3.4	5.1
-5	4.8	12.0	7.8	3.0	13.6	8.7
-4	11.3	9.3	20.8	9.0	6.8	11.4
-3	12.9	4.0	3.9	16.4	12.5	9.8
-2	19.4	12.0	7.8	13.4	12.5	12.7
-1	**24.2**	8.0	**24.7**	**37.3**	19.3	**22.2**
No Change	11.3	**24.0**	15.6	3.0	**20.5**	15.4
1	14.5	13.3	13.0	3.0	8.0	10.3
N	62	75	77	67	88	369

This indicates a slight decrease in perceived coastal resource health from prior to the tsunami (2004) until the follow up survey (2007). There are no statistically significant differences between results from each village. The most common response for Villages 1, 3, and 4 was '-1' and the most common response for Villages 2 and 7 was 'No Change' which supports the notion that residents of the SCL Villages assess changes in coastal resource health similarly.

Table 8 illustrates the difference in rank on a self-anchoring scale of compliance with regulations concerning coastal resources between prior to the tsunami and the time of the follow up survey. The overall most common response was 'No Change' with over half (53%) of the respondents valuing compliance equally during both time periods.

Table 8. Percent Distribution of perceived change in compliance with coastal resource regulations since before the tsunami

Village / Difference	1	2	3	4	7	Overall
-1	22.6	16.0	15.8	15.7	22.2	18.5
No Change	**32.3**	**56.0**	**51.3**	**61.4**	**57.8**	**52.5**
1	19.4	12.0	19.7	12.9	12.2	15.0
N	62	75	76	70	90	373

[11] Only overall change in rank of more than 5% of the sample were included in the tables in this section although possible responses ranged from -10 to +10.

The results of this change in rank were not statistically significantly different between respondents from different villages and the modal answer was 'No Change' for each of the villages in addition to the overall sample. Again, this indicates that there was little change in perceived compliance among residents of Suk Sumran and that the residents from all SCL Program villages responded similarly to this question.

The following table shows the difference in rank on a scale of 1 to 10 between the perceived community control over coastal resources prior to the tsunami and again at the time of the follow up survey (Table 9). The most common difference in rank is again 'No Change' with just under half (45%) of respondents ranking community control the same in both time periods.

Table 9. Percent Distribution of perceived change in community control of coastal resources since before the tsunami

Village / Difference	1	2	3	4	7	Overall
-2	8.1	6.7	1.3	2.9	6.7	5.1
-1	21.0	10.7	19.7	11.6	25.6	20.4
No Change	**25.5**	**44.0**	**44.7**	**53.6**	**44.4**	**44.6**
1	21.0	21.3	22.4	18.8	7.8	17.7
N	62	75	76	69	90	372

The Kruskal-Wallis test of variance indicates that there was a statistically significant difference in responses between villages (Kruskal-Wallis coefficient = 21.7, df = 4, $p<0.001$). Although the most common response in each of the SCL Program villages was 'No Change', the distribution of responses in Village 1 was more disparate than those of responses from other villages. Over one fifth (21%) of the respondents stated that there was either a slight decrease, or a slight increase in community control over resources since before the tsunami ('-1' and '+1'). In this village, just over one quarter (26%) of respondents stated that there was no perceived change during that time which between 44% (Villages 2 and 7) and 54% (Village 4) ranked community control the same during these two time periods. Again, these responses support the notion that the residents of all SCL Program villages responded similarly and that there is not much perceived change in their control over coastal resources since prior to the tsunami.

Table 10 represents the responses of perceived changes in the health of the fishery from before the tsunami (2004) till the time that the follow up survey was administered (2007). Overall, the modal response was '-1' with one-fifth (20%) of the respondents perceiving a slight decrease in fishery health, which indicates that the responses to this question are more varied than that of the previous questions.

Table 10. Percent Distribution of perceived change in fishery health since before the tsunami

Village / Difference	1	2	3	4	7	Overall
-5	-	13.3	13.3	1.4	-	5.6
-4	6.5	14.7	13.3	2.8	6.7	8.8
-3	19.4	13.3	14.7	8.5	15.6	14.2
-2	25.8	10.7	12.0	18.3	15.6	13.1
-1	**27.4**	17.3	10.7	**28.2**	**18.9**	**20.1**
No Change	12.9	6.7	12.0	18.3	15.6	13.1
1	4.8	**18.7**	**16.0**	7.0	14.4	12.6
N	62	75	75	71	90	373

The responses show intervillage statistically significant differences (Kruskal-Wallis coefficient = 14.6, df = 4, p<0.01) with the most common perceived change in Villages 2 and 3 being an improvement of 1 rank (19% and 16% respectively) and the modal difference in Villages 1, 4 and 7 is a decrease in fishery health of 1 rank (27%, 28% and 19%, respectively). Overall, however, the responses to the perceived change in the health of the fishery from before the tsunami until the follow up survey also reflect little change positive or negatively or no change.

Considering the perceived responses to the change in coastal resource health and management from before the tsunami to the time of the follow up survey suggests that residents perceive little change. However, it is notable that the impact of the tsunami affected fishery and coastal resource health in the early aftermath when there was significant debris in waterways used to reach fishing grounds, there was a severe lack of boats and gear, and management and community control over these areas was almost non-existent. Considering the interim period (the aftermath of the tsunami), these responses suggest that the fishery, coastal resource health and management recovered from the tsunami to an almost equivalent state.

PERCEPTIONS OF THE FUTURE FOR COASTAL RESOURCES AND MANAGEMENT

The following four tables (Tables 13-16) show the change in rank from respondents between the assessment of the subject at the time of the survey and their projected assessment of the same subject three years in the future. The rank for the future was subtracted from the rank for the current state at the time of the follow up survey. Positive responses correspond with projected increase in condition in the next three years and negative responses indicate that the respondent thinks that conditions will worsen in the next three years.

Table 11 illustrates the change in rank projected by respondents in coastal resource health in the next three years. The modal response overall was '+1' with almost thirty percent (29%) of the respondents projecting a slight increase in the health of coastal resources in the next three years.

Table 11. Percent Distribution of projected change in coastal resource health in the next three years

Village / Difference	1	2	3	4	7	Overall
-1	8.1	17.6	9.1	10.4	18.0	13.0
No Change	**32.3**	9.5	15.6	38.8	**32.6**	25.5
1	22.6	**23.0**	**32.5**	**43.3**	25.8	**29.3**
2	27.4	**23.0**	19.5	3.0	15.7	17.6
N	62	74	77	67	89	369

The responses show statistically significant intervillage differences (Kruskal-Wallis coefficient = 15.0, df = 4, p<0.01) with the distribution of responses varying between villages. The responses in Village 4 largely centered around 'No Change' (39%) or '+1' (43%) while Village 1 and 2 respondents were more evenly distributed from '-1' through '+2'. These responses suggest that residents of the SCL Program villages are mildly optimistic about the future of the coastal resources in their community.

The following table represents the difference in self-anchored assessment of compliance with regulations regarding coastal resources between the time of the follow up assessment and the projected state in the next three years (Table 12). The most common response overall as well as for each of the villages, was 'No Change' (55% overall) and there was no statistically significant difference between villages.

Table 12. Percent Distribution of projected change in compliance with coastal resource regulations in the next three years

Village / Difference	1	2	3	4	7	Overall
-1	4.8	8.0	10.5	10.0	6.6	8.0
No Change	**46.8**	**52.0**	**43.4**	**72.9**	**60.4**	**55.3**
1	22.6	24.0	26.3	15.7	20.9	21.9
2	16.1	5.3	10.5	1.4	5.5	7.5
N	62	75	76	70	91	374

This data also coincides with the results of the perceived change between prior to the tsunami and then again three years later. In addition, the most common rank for the current state (at the time of the survey) for compliance was '5' which is a medium level. Considered together, this suggests that perceived compliance is stable and projected to continue to be so at a medium level and fairly consistent across villages.

Table 13 illustrates the percent projected change in community control of coastal resources in the next three years. The modal value is again 'No Change' (54% overall) with the most common response in each village 'No Change' as well.

Table 13. Percent Distribution of projected change in community control over coastal resources in the next three years

Village / Difference	1	2	3	4	7	Overall
-1	6.5	13.3	7.9	13.0	6.6	9.4
No Change	**48.4**	**48.0**	**40.8**	**73.9**	**60.4**	**54.4**
1	22.6	10.7	15.8	7.2	19.8	15.3
2	11.3	6.7	10.5	-	8.8	7.5
N	62	75	76	69	91	373

In addition, the responses do not show intervillage statistically significant differences. These responses again suggest that residents project community control to remain consistent in the upcoming three years.

The table below shows that responses for projected change in fishery health again, are centered on 'No Change' with almost thirty (30%) percent of the overall sample (Table 14). Responses across villages do not show statistically significant differences, however, respondents from Villages 2 and 3 projected a slight decrease in fishery health ('-1') over the next three years.

Table 14. Percent Distribution of projected change in fishery health in the next three years

Village / Difference	1	2	3	4	7	Overall
-2	4.8	16.0	12.3	8.5	7.8	10.0
-1	24.2	**29.3**	**17.8**	21.1	21.1	22.6
No Change	**35.5**	14.7	15.1	**54.9**	**27.8**	**29.1**
1	21.0	16.0	16.4	4.2	25.6	17.0
2	9.7	10.7	11.0	2.8	2.2	6.2
3	4.8	5.3	16.4	2.8	2.2	6.2
N	62	75	73	71	90	371

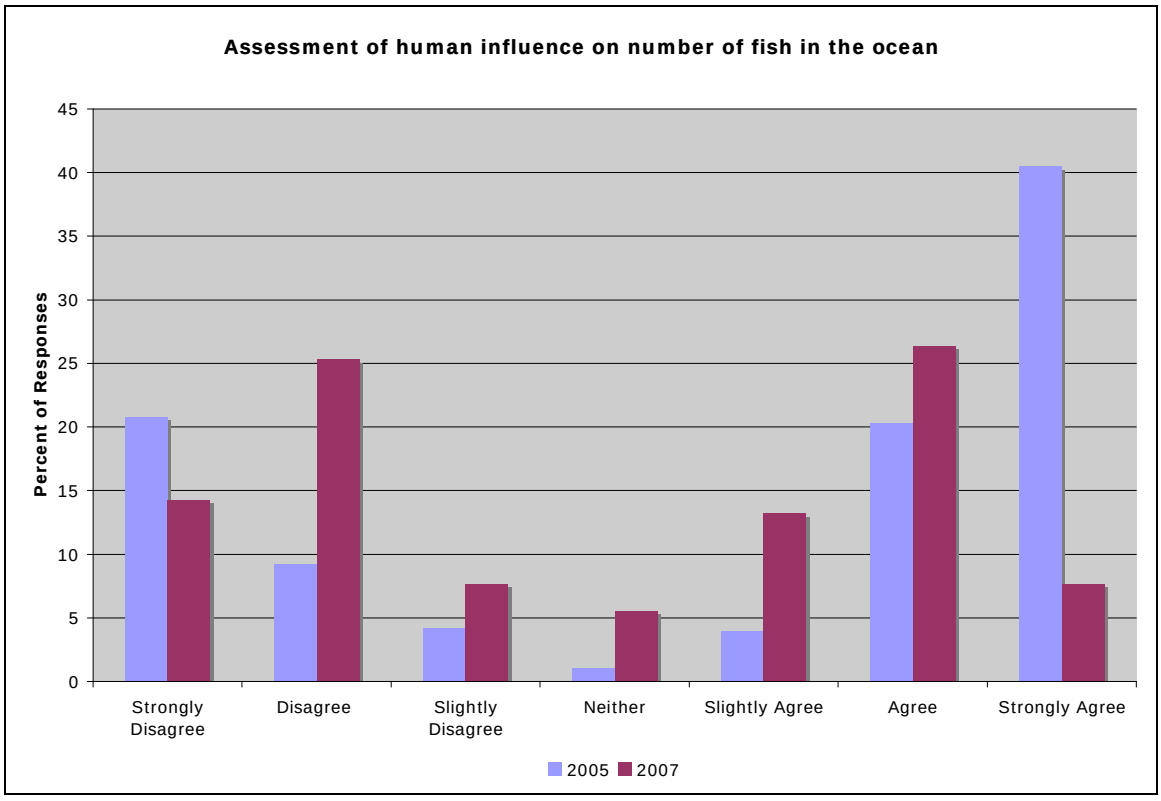
The modal response from the rest of the villages (1, 4 and 7) was 'No Change'. This data suggests that respondents most often projected little or no change in the next three years in the health of the fishery in Suk Sumran.

Overall, respondents projected little if any change of coastal resources, their management, community control and compliance with regulations, in the next three years. Since the initial rankings of these aspects of the SCL Program area were most commonly an average value ('5'), this data can be interpreted in two ways. Projected responses that are most often 'No Change' can mean that respondents are reasonably satisfied with the aspects of community coastal resource management discussed above and they project continued satisfaction with these aspects. These responses can also indicate a sense of apathy regarding coastal resources and their management in Suk Sumran because respondents rank them average and do not project future change. However, either way, this data indicates that there is some level of satisfaction with the future of coastal resources because respondents most often do not project a decrease in any of the aspects surrounding their management in the next three years.

CHANGES SINCE INITIAL SOCIO-ECONOMIC SURVEY

Figure 1 illustrates responses from the baseline and follow up surveys to the statement that humans do not affect the number of fish in the ocean. Therefore, agreement with this statement suggests that the respondent does not believe that humans affect the number of fish in the ocean and disagreement indicates that the respondent believes that humans do impact fish stocks. An increase in the percentage of respondents that disagree with this statement suggests that more residents of the SCL Program villages understand that humans can affect coastal resource health.

Figure 1. Percent distribution of attitudes toward human influences on fish (baseline and follow up)



The results presented in Figure 1 indicate that a larger percentage of respondents disagreed with the statement in the follow up survey than in the baseline survey (34% of baseline and 47% of follow up) and therefore, recognize the potential for human impact on fish. In addition, an analysis

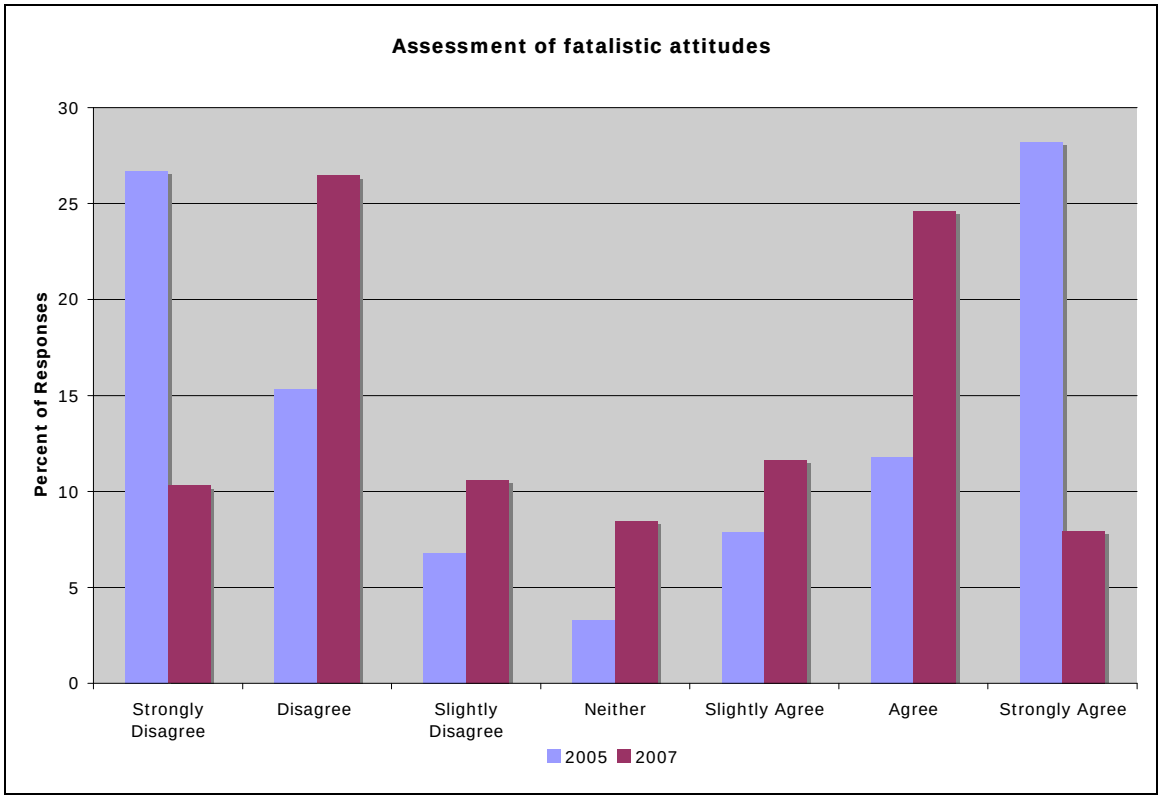
of variance reveals statistically significant differences between the baseline and follow up responses to this statement (Kruskal-Wallis = 48.4, df = 1, p<0.001; Table 15).

Table 15. Differences in assessment of Likert questions (baseline and follow up)

	Kruskal-Wallis Coefficient	df	P-value
Human influence on fish in the ocean	48.44	1	0.001
Fatalism	0.22	1	0.643

The responses to the statement regarding fatalism do not show statistically significant differences between baseline and follow up survey samples (Table 15). Figure 2 shows the comparison between the responses from the two time periods to the statement that humans cannot control their destiny. Therefore, agreement with this statement indicates a fatalistic individual while disagreement suggests that the respondent feels they can control over their own lives and associated happenings.

Figure 2. Percent distribution of fatalistic attitudes (baseline and follow up)

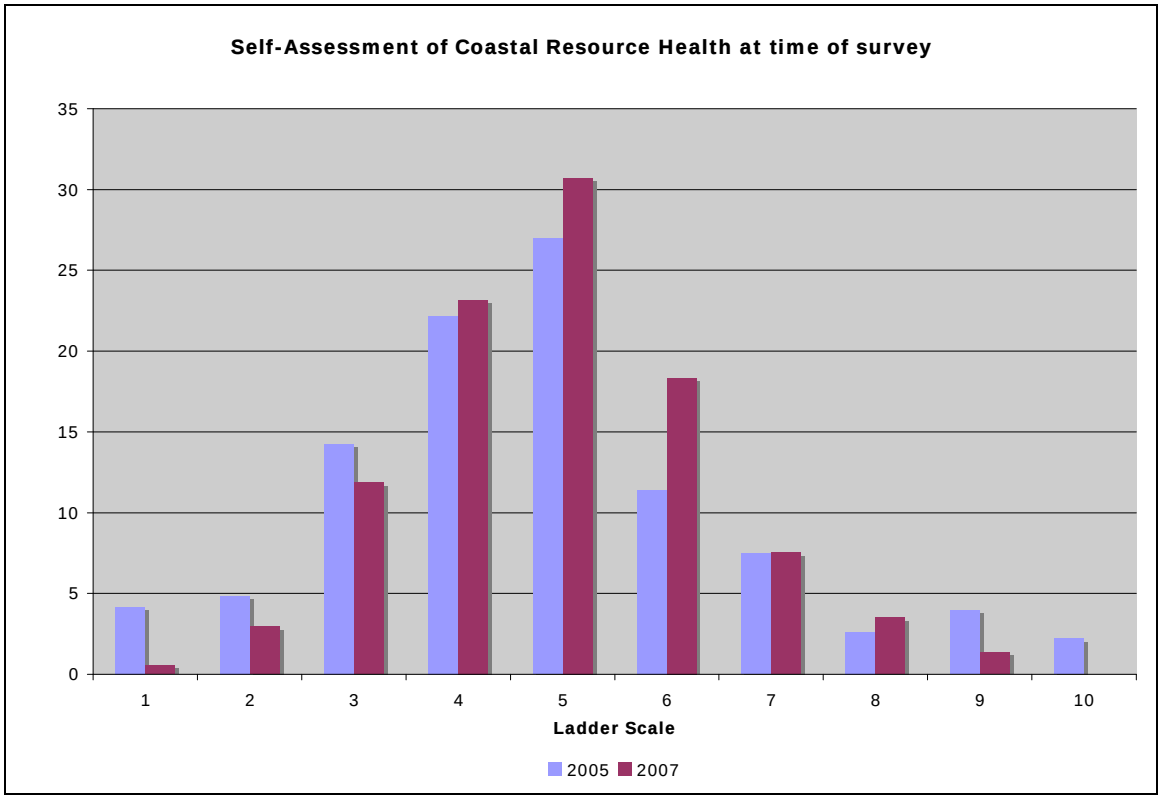


In both surveys, respondents chose strong responses (Agree, Disagree and Strongly Agree/Disagree) more often than weak responses (Slightly Disagree/Agree and Neutral) which indicates that respondents in the SCL Program villages feel strongly about fatalism but they are nearly equally split during both the baseline and follow up surveys.

The following figure illustrates respondents' assessment coastal resource health at the time of the survey for both baseline (2005) and follow up (2007) responses (Figure 3). The figure shows an

increase in percentage of responses in the follow up survey for ranks ‘4’, ‘5’ and ‘6’ over the baseline survey.

Figure 3. Assessment of coastal resource health at time of survey (baseline and follow up)



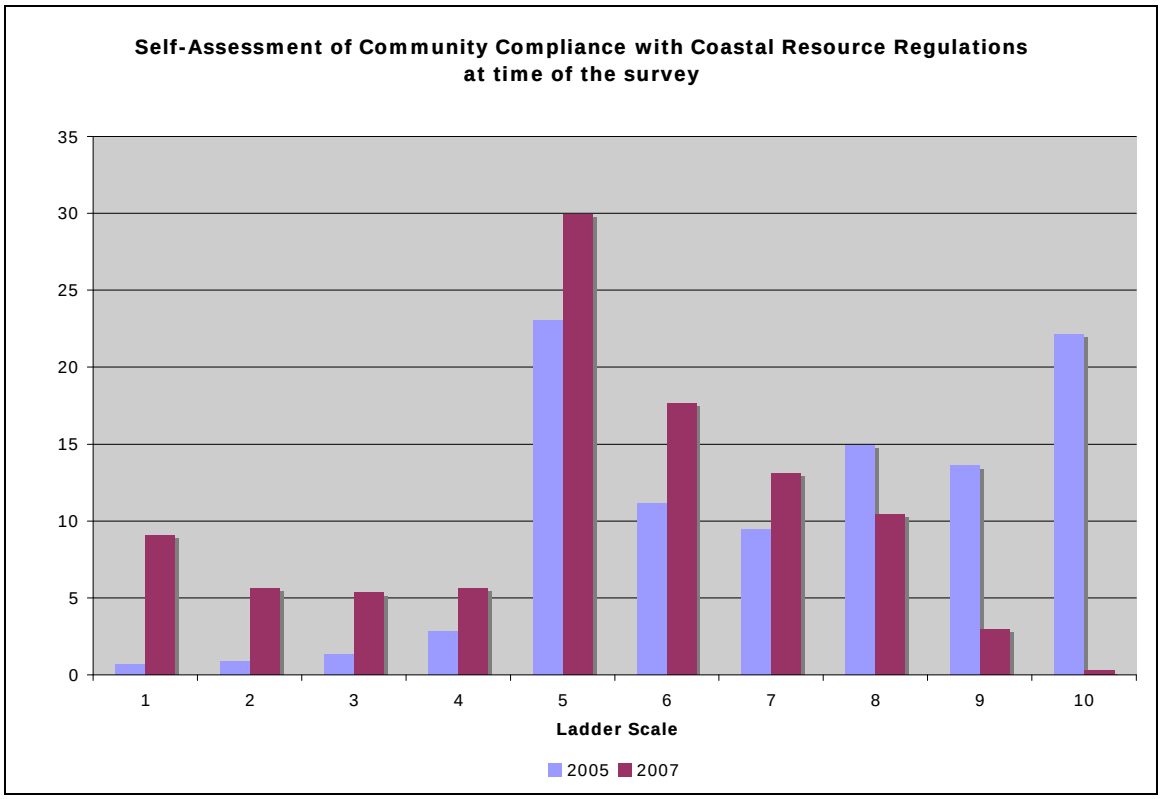
Although there is no statistically significant difference between time periods regarding the assessment of coastal resource health, there is a higher percentage of responses over 5 from the follow up survey than from the baseline (31% of follow up and 28% of baseline; Table 16). This suggests that residents in the SCL Program villages perceive the health of their coastal resources to be slightly higher now than six months after the tsunami.

Table 16. Differences in assessment of aspects of coastal resources (baseline and follow up)

	Kruskal-Wallis Coefficient	df	P-value
Health of coastal resources	3.34	1	0.068
Compliance with coastal resource regulations	148.73	1	0.001

In contrast, there are strong statistically significant differences between baseline and follow up survey responses regarding compliance with coastal resource regulations in the SCL Program villages (Kruskal-Wallis = 148.7, df = 1, $p<0.001$). Figure 4 illustrates responses regarding community compliance with coastal resource regulations from the baseline and follow up survey samples. This figure shows that significantly fewer respondents during the follow up survey ranked community compliance over ‘5’, than in the baseline assessment (71% of baseline and 41% of follow up).

Figure 4. Assessment of community compliance with coastal resource regulations (baseline and follow up)



Two developments in the SCL Program villages between the two survey time periods could have an effect on the perspective regarding community compliance with coastal resource regulations. The first possibility is that at the time of the baseline survey, six months after the tsunami, many fishermen were not yet back out fishing and respondents could have believed that if they reported high community compliance with regulations, more relief assistance would be directed toward the fishermen in the area. In addition, during the recovery effort, various parts of recovery projects included education regarding coastal resource regulations. It is possible that respondents were not aware of the regulations in place during the initial survey and, therefore, speculated that most fishermen were abiding by regulations regarding coastal resources during the baseline survey. After residents were further informed about the regulations that exist in Suk Sumran, their assessment of community compliance was lower. However, even given these tangential issues that may have effected responses the move in responses suggest that actual perception of community compliance may have decreased since the baseline assessment.

CONCLUSIONS

It is interesting to note that those villages that rely more heavily on fishing are also less likely to recognize human influence on the fishery. Fishermen are more closely associated with the fishery and its resources, and it may be expected that they would be more likely to recognize human effects on fish. This result should be of concern for future fishery resource management programs and regulations because if fishermen don't recognize their ability to affect fish stock health, they may not accept restrictions on gear, take size, etc. However, when responses to this statement from the follow up are compared with the baseline survey, a significantly larger percentage of respondents in the follow up assessment recognized that humans can impact the number of fish in the ocean. As part of the recovery effort, various types of education activities emphasized the potential effects of human impacts on coastal resources in order to encourage more stewardship

of coastal resources and their management. These results suggest that there is increased awareness regarding potential impacts of humans on coastal resources.

Fatalism, especially with respect to planning for the future, may have implications for management of both natural resources and financial capital. Therefore, microfiance loans distributed by village banks as part of the SCL Program may be impacted by fatalistic attitudes of residents. It is interesting to note that responses from Village 4 were the least fatalistic of all the SCL Program villages; however, the village bank in this village is not the most successful in terms of repayment rates. It should be noted that there are many other influences that affect loan repayment rates for the village banks. Attitudes about fatalism have not changes significantly between baseline and follow up assessments based upon a comparison of the responses from each. Respondents are nearly split between fatalistic and non-fatalistic at both time periods and tend toward strong feeling either for or against fatalism.

Overall, respondents assess aspects of coastal resources addressed in this survey at a medium level. The health of coastal resources was assessed at a medium level during the follow up survey. Time comparisons between the baseline and follow up surveys indicate a slightly higher (although not statistically significantly different) assessment of the health of coastal resources in the SCL Program area. The relatively large variance in assessment of compliance with coastal resources, along with semi-structured interview responses indicates that all residents are not fully aware of regulations regarding coastal resources. Perceptions of community compliance with coastal resource regulations significantly decreased between the baseline and follow up assessments, however, some of this change in perception could be due to increased awareness of coastal resource regulations. Assessments of community control over resources were concentrated around the central rank between total and no community control over resources. However, the results highlighted significant differences between villages. Fishery resource health was also ranked medium between the best and worst scenarios presented in the survey.

Respondents perceived little or no change in coastal resource health, compliance with regulations, community control and fishery health between prior to the tsunami and the time of the follow up survey (2007). However, considering these aspects of coastal resources and their management were considerably affected by the 2004 tsunami, this assessment suggests that most respondents perceived significant recovery in these aspects of coastal resources health and management. Similarly, respondents' projections for coastal resource health and management suggest little or no change in next three years.

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Follow Up to Baseline – #6
Subjective and material well-being

INTRODUCTION
Assessing subjective well-being and material style of life are important to monitor during recovery efforts in order to measure both perception and actual change in the households and community affected by the SCL Program (Tobin and Montz 1997). Perceptions of well-being can also affect willingness to participate in recovery activities and desire to better one's household and/or community (Bankoff et al. 2004).

In order to assess perceptions of well-being of respondents in the SCL Program villages, the following five statements were read to respondents as self-anchoring style questions. Each situation was explained as the lowest rung on the ladder representing the worst scenario (1) and the highest rung on the ladder representing the best scenario (10). Respondents were asked to rank the actual situation in their area on this scale (1-10) for the present day, prior to the tsunami, and three years in the future.

> ***Well-being***
> ***Household:*** *The first step indicates that YOUR household is very poor without enough food to eat and a poor house that does not provide enough protection from severe weather. YOUR overall standard of living is very low. The highest step indicates that YOUR household is a wealthy family with more than enough food and a well-build house. YOUR overall standard of living is very high.*
> ***Community:*** *The first step indicates very poor families in the community, 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 in the community with more than enough food, and beautifully furnished well-built houses.*
>
> ***Livelihood Security***
> ***Household:*** *The first step indicates that YOUR household is in need of more income and/or food in order to sustain yourselves. The highest step indicates that YOUR household conduct is fully engaged in livelihood and food gathering activities and these provide enough for the household to sustain and prosper.*
> ***Community:*** *The first step indicates households that practice livelihoods that are not secure in terms of resource use or economic fluctuations so that they will not be able to provide for their household if one type of livelihood cannot be practiced for some reason. The highest step indicates households that practice various types of livelihoods that use natural resources in sustainable ways so that if there is some interruption in one form of livelihood, the household will continue to provide for themselves.*
>
> ***Community Unity and Cohesion:*** *The first step represents a situation where there is no community spirit and unity in villages. Residents do what benefits their own household without considering others. The highest step represents a situation where the community is well-organized and unified. Residents are friendly to one another and help each other when possible.*

The respondents were asked to assess these aspects of well-being prior to the tsunami in December 2004. Their responses for the time before the tsunami were subtracted from those at the time of the follow up survey to produce the perceived change in well-being since prior to the tsunami in the PCL Program villages. Respondents were also asked to project the same aspects of well-being for three years in the future. Responses for the current situation (at the time of the follow up survey) were subtracted from projected assessments of these aspects of well being three years in the future.

A common way of assessing actual changes in well-being is documenting material style of life of respondents and change in material of style of life overtime (Pollnac and Crawford 2000). In this

assessment, surveyors noted the type of material used for the floor, walls, windows and roof. Each type of material was assigned a value on a scale from least valuable/reliable to most valuable/reliable. These values were summarized into a single value that describes the relative level of security and protection of respondents' houses. The second factor assessed in this survey to describe material style of life was facilities and appliances. This factor is a sum of a series household amenities found in each surveyed household. The list of facilities/appliances to be accounted in each house was based on previous studies as well as participant observation (Pollnac and Crawfard 2000). Due to the nature of this research as a comparison of baseline and follow up survey results, material style of life indicators are compared for the two time periods.

SELF-ANCHORING ASSESSMENT OF COMMUNITY AND HOUSEHOLD WELL-BEING

The following table summarizes responses from 379 individuals regarding the five aspects of community and household well-being stated above (Table 1). The respondents assessed these aspects of well-being for the current situation at the time of the follow up survey.

Table 1. Percent Distribution of assessment of aspects of well-being

Category \ Rank	1	2	3	4	5	6	7	8	9	10	N
Household Well-being	-	0.5	8.2	15.8	**41.7**	16.6	9.0	5.5	2.1	0.5	379
Community Well-being	0.3	0.5	5.0	11.6	**37.7**	19.5	10.0	9.8	5.3	0.3	379
Household Livelihood Security	-	1.3	8.4	26.1	**39.3**	12.7	7.7	3.7	0.8	-	379
Community Livelihood Security	0.8	2.9	6.6	18.7	**31.7**	20.6	14.0	3.7	1.1	-	379
Community Unity and Cohesion	2.1	5.8	9.2	19.3	**29.3**	18.8	9.2	5.8	0.3	0.3	379

The modal value for household and community well-being, household and community livelihood security and community unity and cohesion was '5' overall for all responses. These responses generally follow a normal distribution with a great majority of responses surrounding rank '5'. A rank of '5' is indicates a medium assessment of these aspects and some satisfaction with respect to household and community well-being and also some room for improvement on all aspects.

Table 2 shows that four of the five aspects of well-being vary statistically significantly between responses from different villages in the SCL Program. Household well-being does show statistically significant differences between villages which indicates that respondents assess their household well-being similarly across all villages (again, surrounding rank '5' which is a medium level of satisfaction).

Table 2. Intervillage differences in assessment of aspects well-being

	Kruskal-Wallis Coefficient	df	P-value
Household Well-being	8.03	4	0.090
Community Well-being*	42.70	4	0.001
Household Livelihood Security*	15.66	4	0.001
Community Livelihood Security*	52.99	4	0.001
Community Unity and Cohesion*	35.13	4	0.001

Community well-being responses were statistically significantly different across villages (Kruskal-Wallis = 42.7, df = 4, $p<0.001$). The modal value for each village was '5'. However, in Village 1, over half of the respondents ranked community well-being '5' (53%) while just under one third of respondents ranked community well-being '5' in Village 4 (31%) and over twenty percent of the sample from this village also ranking community well-being '4' (22%) and '6' (26%). This indicates that there is more variability in the responses in village 4 than village 1 but responses are still centered on '5'. Household livelihood security also varies statistically significantly across villages although the coefficient is lowest of the aspects of well-being that are statistically significant (Kruskal-Wallis = 15.7, df = 4, $p<0.001$). Again, the modal value for each village is '5' with over

forty percent of Villages 1 and 7 respondents ranking household livelihood security '5' (47% and 46%, respectively). In contrast, the responses in Villages 2, 3 and 4 are more disparate. In Village 2, 39% of respondents ranked household livelihood security '5' and almost one quarter ranked it '7' or '8' (23% for both '7' and '8'). Over one quarter of the respondents in Village 4 also ranked household security either '7' or higher (27% for ranks '7', '8' and '9').

Respondents assessed community livelihood security statistically differently across villages with the largest coefficient value of the five aspect of well-being assessed here (Kruskal-Wallis = 53, df = 4, $p<0.001$). The modal values for Villages 4 and 7 were '5' (43% and 40%, respectively). However, the modal value for Village 1 was '4' (34%) and Villages 2 and 3 (35% and 26%, respectively). Village 1 is located further from the center of the community than the other villages which could influence respondents attitudes toward livelihood security in their village because there are less options available for income and food generation because residents are more isolated from the commercial center. Villagers in Villages 2 and 3 have relatively more livelihood options than those in Village 1 and 7 because there is a lot of farmland located in the villages in addition to the availability of other livelihoods such as fishing, farming and trading that are present in all of the villages. Respondents' assessment of community unity and cohesion was also statistically significantly different across villages (Kruskal-Wallis = 35.1, df = 4, $p<0.001$). Modal values for this aspect of well-being are '5' for Villages 1, 2 and 7 (55%, 29% and 52%, respectively). Village 3 respondents most often assessed community unity and cohesion at '6' (25%) and an equal percentage of the sample of respondents from Village 4 ranked this aspect of well-being '5' and '6' (37% each). Responses from Village 2 were the most disparate with more than 10% of respondents ranking community unity and cohesion at each rank from '3' through '8'. In contrast, almost three fourths of respondents in Village 4 ranked community unity and cohesion either '5' or '6' (together 73% of the sample). These responses suggest that there is a difference of opinion regarding community unity.

In semi-structured interviews, responses from Village 2 reflect this as residents that live in the area adjacent to the coast mentioned that they do not get the same opportunity to participate in alternative livelihood projects as those residents living in the inland part of the Village. There seems to be a division between residents of these two areas which could affect their assessment of community unity and cohesion as assessed in the follow up survey.

PERCEPTIONS OF CHANGES IN WELL-BEING SINCE TSUNAMI

The following table summarizes responses from 379 individuals regarding perceived change in the five aspects of community and household well-being since before the tsunami (Table 3).

Table 3. Percent Distribution of perceived change in well-being since before the tsunami[12]

Difference (present – before tsunami) / Category	-5	-4	-3	-2	-1	No Change	1	2	3	4	5	N
Household Well-being	1.1	1.3	7.1	12.1	28.2	**34.3**	10.0	4.0	1.1	0.5	-	379
Community Well-being	0.3	1.3	4.8	10.6	**23.5**	23.2	16.6	10.6	3.7	4.5	0.5	379
Household Livelihood Security	0.8	1.9	7.7	21.9	21.4	**30.3**	12.1	3.2	0.3	0.5	-	379
Community Livelihood Security	0.5	1.6	6.7	13.5	**23.0**	20.8	14.5	13.7	4.0	0.8	0.5	379
Community Unity and Cohesion	1.3	6.1	11.4	**22.2**	19.3	17.5	14.3	5.6	0.3	0.5	-	378

The modal value for perceived change in household well-being and household livelihood security was 'No Change' overall for all responses. Considering that these aspects of well-being were affected by the tsunami in almost all households, the modal response of 'No Change' since before the tsunami suggests that some sense of security in both household well-being and household livelihoods has been rebuilt since just after the tsunami. Modal values for community well-being and community livelihood security perceived change since before the tsunami, are

[12] Overall differences were omitted if less than 1 percent (for all categories).

both ‘-1’ overall. This modal value suggests that respondents perceive that their households have recovered more fully than the community as a whole because their assessment of perceived change is that community well-being and livelihood security is not quite what it was prior to the tsunami. However, the change is only less one rank and considering that community affairs were severely disrupted in the immediate aftermath of the tsunami, the perceived change does not necessarily indicate a decrease in community well-being and livelihood security. Semi-structured interview responses commonly stated that aspects of community well-being were taking longer than households to return but that communities were still rebuilding during the time of the follow up survey and residents projected community well-being and livelihood security would continue to increase.

Community unity and cohesion was the lowest perceived change of the five aspects of well-being assessed in the follow up survey. The modal value was ‘-2’ for 378 responses across all SCL Program villages, however, over 10% of respondents perceived a change of ‘-3’ through ‘+1’ which indicates that responses were distributed over a larger range than other aspects. Semi-structured interview responses also reflected differing views regarding community unity and cohesion with some respondents claiming that village and local officials did not fairly distribute recovery assistance and access to rehabilitation projects. Other respondents, however, were satisfied with community cohesion during the follow up survey.

Table 4 shows that two of the five aspects of perceived change in well-being since before the tsunami vary statistically significantly between responses from different villages in the SCL Program. As with assessments at the time of the survey, household well-being does not show statistically significant differences in responses across villages. In addition, community livelihood security and community unity and cohesion also do not show intervillage statistically significant different responses. This suggests that there are more similar views among the SCL Program community as a whole in terms of recovery since the tsunami in these aspects of well-being.

Table 4. Intervillage differences in assessment of well-being since before tsunami

	Kruskal-Wallis Coefficient	df	P-value
Household Well-being	10.15	4	0.040
Community Well-being*	19.05	4	0.001
Household Livelihood Security*	15.78	4	0.001
Community Livelihood Security	11.66	4	0.020
Community Unity and Cohesion	12.13	4	0.016

Perceived change in community well-being since before the tsunami is statistically significant between villages (Kruskal-Wallis = 19.1, df = 4, $p<0.001$). Although the overall modal value is ‘-1’, Village 1 respondents answered ‘-1’ and ‘No Change’ the most often (29% each) and the modal value for each of the other villages was not ‘-1’ and responses varied widely within each village. Respondents in Villages 2 and 7 most often perceived ‘No Change’ (20% and 32%, respectively) and in Village 4, an equal percentage of respondents perceived ‘No Change’ and ‘+1’ (23% each). In Village 3, the modal response was ‘+1’ with 29% of responses and one quarter of respondents in this village also perceiving a ‘-1’ change (25%). The perceived changes since the tsunami vary more widely than those assessing the current state of well-being during the follow up survey. This is to be expected because memory of pre-tsunami well-being is not as accurate as current estimates. Overall, just over two years after the tsunami, assessments regarding well being are largely centered on ‘No Change’ since before the tsunami which indicates that the well-being of households and community is perceived to have recovered or almost recovered during the rehabilitation effort.

PROJECTIONS OF THE FUTURE OF WELL-BEING

Table 5 summarizes responses from 379 individuals about projected change in five aspects of community and household well-being since before the tsunami.

Table 5. Percent Distribution of project change in well-being three years in the future[13]

Category \ Difference (future – present)	-5	-4	-3	-2	-1	No Change	1	2	3	4	5	N
Household Well-being	-	-	1.1	3.4	9.0	**44.1**	23.0	10.0	4.0	3.4	1.6	379
Community Well-being	0.5	2.1	2.6	7.1	15.8	**35.1**	22.4	8.4	2.9	1.6	1.1	379
Household Livelihood Security	-	-	0.5	3.7	10.1	**37.6**	29.1	9.5	5.0	1.3	2.1	378
Community Livelihood Security	0.3	-	-	4.0	12.1	**36.4**	28.0	11.1	5.5	2.4	0.3	379
Community Unity and Cohesion	-	-	1.6	3.2	17.4	**42.0**	19.5	6.6	6.3	2.4	0.3	379

The modal values for projected change in all five aspects of household and community well-being was 'No Change' overall for all responses. This suggests that respondents might feel stagnant about the recovery effort, however, for each aspect, the next highest percentage of responses is '+1' with at least one fifth of respondents projecting an increase of one rank in the next three years (20% for community unity to 29% for household livelihood security). Therefore, most respondents predict no change of a small increase in well-being for households and the SCL Program community in the next three years.

The following table shows that none of the five aspects of projected change in aspects of household and community well-being in the next three years vary statistically significantly in responses across surveyed villages (Table 6).

Table 6. Intervillage differences in projection of well-being three years in the future

	Kruskal-Wallis Coefficient	df	P-value
Household Well-being	2.79	4	0.59
Community Well-being	3.06	4	0.55
Household Livelihood Security	6.24	4	0.18
Community Livelihood Security	9.11	4	0.06
Community Unity and Cohesion	11.5	4	0.02

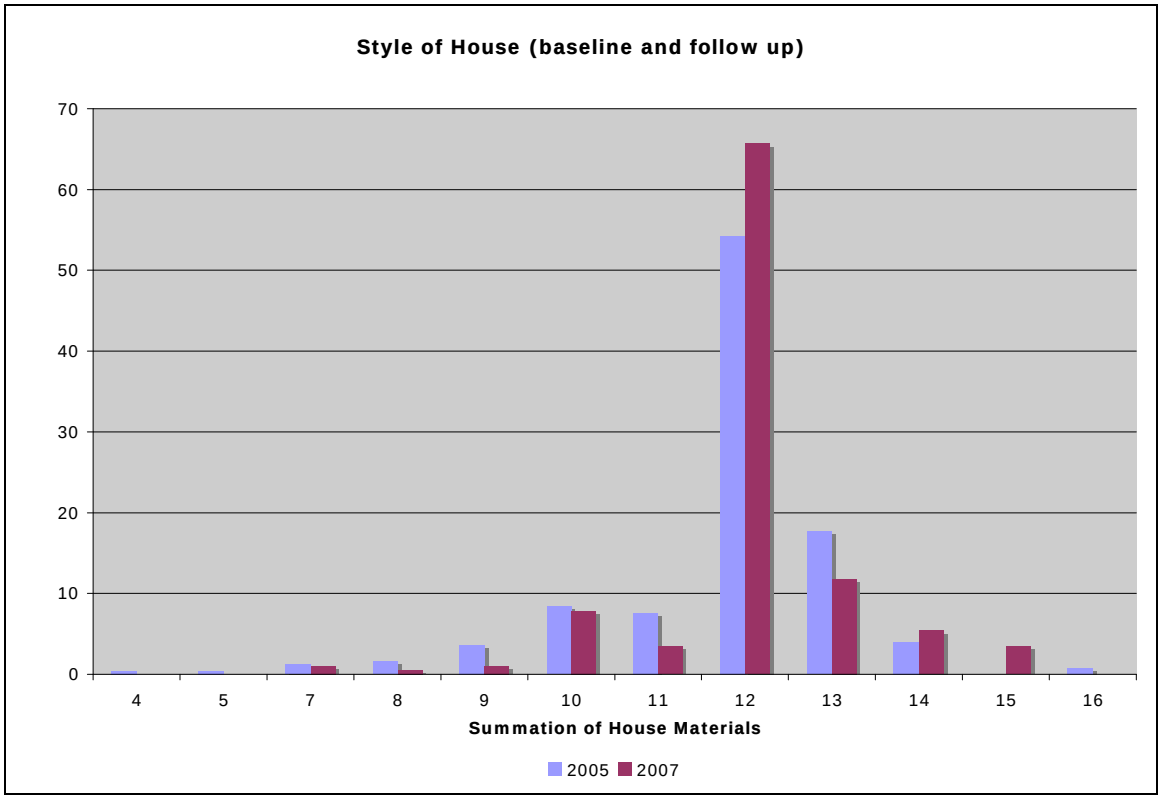
The projections for three years are concentrated around the projection of 'No Change' and '+1' for the future of household and community well-being and livelihood security and community unity and cohesion.

CHANGES SINCE INITIAL SOCIO-ECONOMIC SURVEY

Figure 1 shows the percent distribution of material style of life for both baseline (2005) and follow up (2007) survey results. It should be noted that the houses that were build by the Thai Royal Air Force, known as 'tsunami houses' were assigned a value of '12' (the sum of values of material types used for these houses). These houses were built prior to the baseline survey and were replacements for those residents that lost their houses in the tsunami.

[13] Overall differences were omitted if less than 1 percent (for all categories).

Figure 1. Percent distribution of material style of house (baseline and follow up)



Comparing results from the baseline and follow up surveys, there is a larger portion of households whose style of house rank 12-16 during the follow up survey than the baseline (86% of follow up and 77% of baseline). This data suggests that overall, the survey respondents style of house improved between baseline and follow up surveys, however, there was no statistical significant differences between the two samples (Table 7).

Table 7. Differences in style of house and household facilities/appliances (baseline and follow up)

	Kruskal-Wallis Coefficient	df	P-value
Style of House	4.32	1	0.040
Household Facilities and Appliances*	13.97	1	0.001

There is, however, a statistically significant difference between baseline and follow up survey samples in household facilities and appliances (Kruskal-Wallis = 14.0, df = 1, $p<0.001$). Again, the follow up sample shows a higher percentage of households that have more household amenities than the baseline sample (for scores over 7, 46% of baseline and 55% of follow up; Figure 2). There are also no households with values under 4 in the follow up survey and no households in the baseline survey with a value of 15 in the baseline sample. These results indicate that households were better equipped and more households had more amenities in the follow up survey than in the baseline survey. Facilities and appliances is also a better indicator of change in this study because the 'tsunami houses' were provided to people who had lost their houses but appliances and facilities were not.

Figure 2. Percent distribution of household facilities and appliances

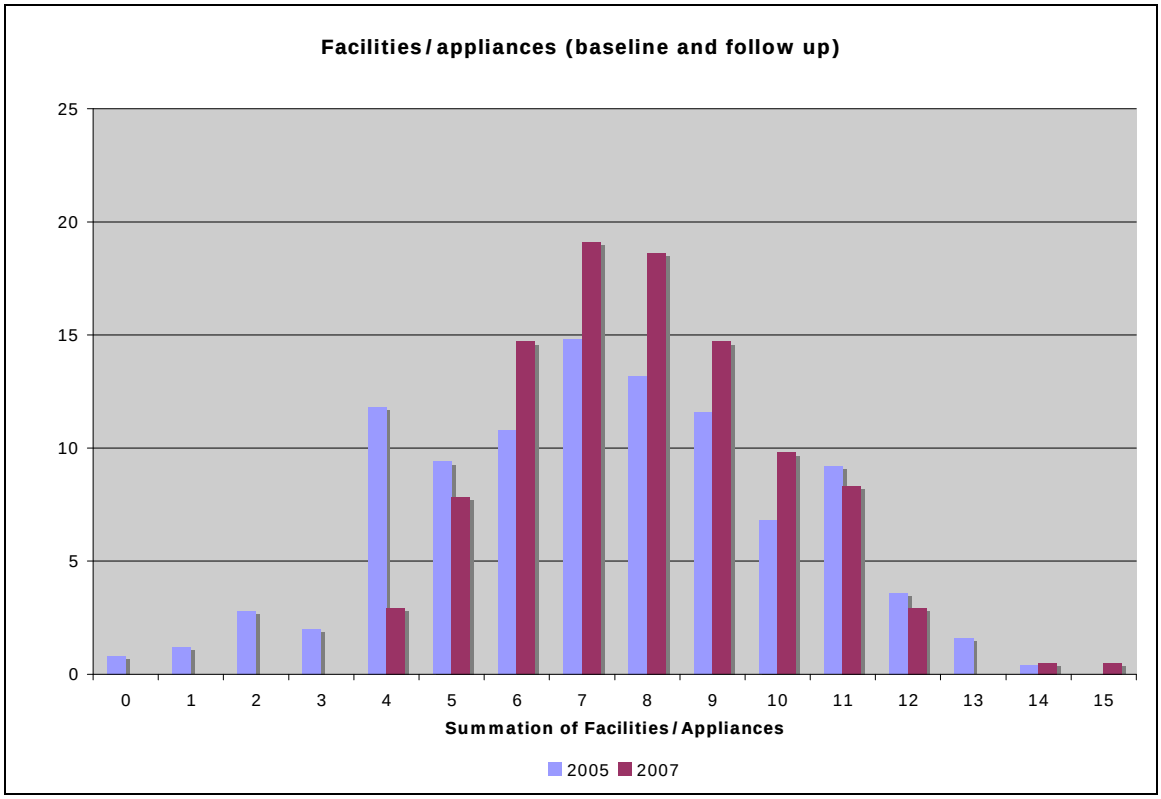
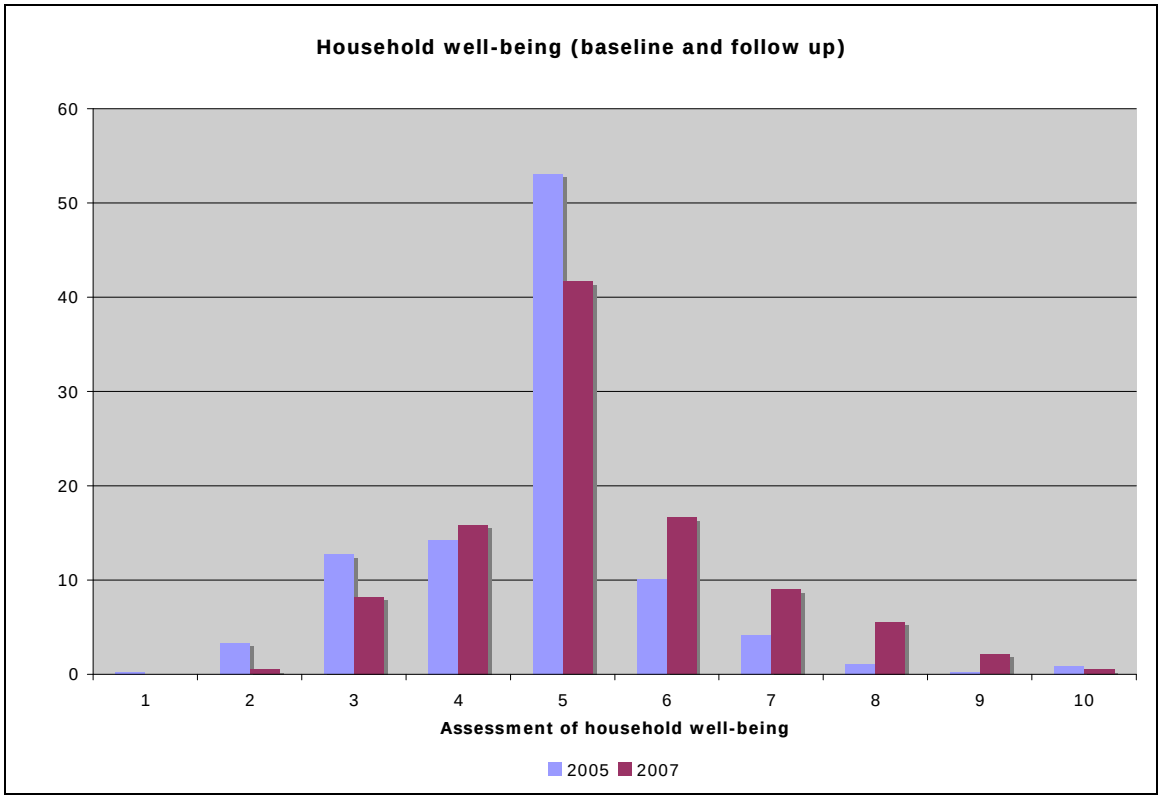


Figure 3 shows the responses from both the baseline and follow up respondents on a self-anchored scale for the state of household well-being at the time of the survey.

Figure 3. Percent distribution of self-anchored assessment of household well-being



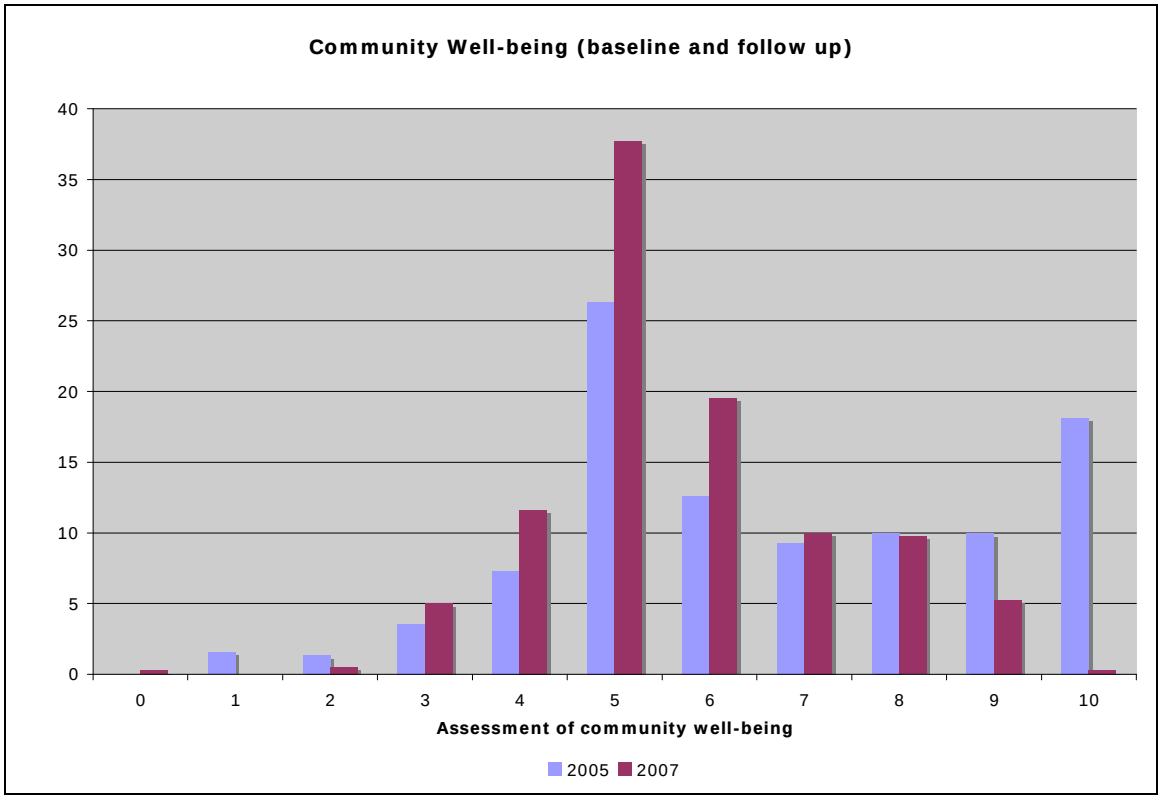
The percentage of individuals that rated household well-being over '5' during the follow up survey was double the percent of respondents from the baseline survey (16% of baseline and 34% of follow up). In addition Table 8 illustrates that there were statistically significant differences in the assessment of household well-being between the baseline and follow up survey responses (Kruskal-Wallis = 26.24, df = 1, $p<0.001$).

Table 8. Differences in assessment of well-being (baseline and follow up)

	Kruskal-Wallis Coefficient	df	P-value
Household Well-being*	26.24	1	0.001
Community Well-being*	42.27	1	0.001

There are also significant differences between the baseline and follow up responses regarding assessment of community well-being at the time of the survey (Kruskal-Wallis = 42.27, df = 1, $p<0.001$). The percent of responses above '5' regarding community well-being for the follow up survey was lower for the follow up survey than the baseline assessment (60% of baseline and 45% of follow up; Figure 4).

Figure 4. Percent distribution of self-anchored assessment of community well-being



However, almost one fifth of the baseline sample assessed community well-being at '10' (18%) which does not follow the normal trend of responses surrounding the middle values. One possible explanation for this discrepancy is that during the time of the baseline survey, there were many projects for recovery assistance in the SCL Program area. Some respondents may have thought that if they assessed their community highly in terms of well-being, more recovery assistance would target their community. This is conjecture based upon information from participant observation, gathered during the follow up assessment about the baseline survey.

CONCLUSIONS

Assessments of current aspects of community and household well-being at the time of the follow up survey are mostly in the middle range for all aspects. These responses tend to be more closely aligned within villages and show intervillage differences in responses than perceived or projected changes in aspects of well-being. Overall, just over two years after the tsunami, assessments regarding well being are largely centered on 'No Change' since before the tsunami which indicates that the well-being of households and community is perceived to have recovered or almost recovered during the rehabilitation effort. The projected changes in well-being indicate s cautiously positive outlook for the future of household and community well-being in the next three years. Responses for all aspects of projected well-being and across villages (see discussion above) vary less than those for perceived change or assessment of the situation at the time of the survey. This may indicate that the future outlook of the residents in the SCL Program villages share a similar vision of the future of household and community well-being, irrespective of their village of residence. This also suggests that residents may be willing to work toward common goals for the future with respect to improving household and community well-being.

Comparing baseline and follow up assessment sample household style of houses and facilities and appliances indicates that the material style of life of households in the SCL Program villages improved between the two time periods. This result is also an indication of material increase in

well-being in addition to perceived values of well-being. Assessment of household well-being significantly increased between the baseline and follow up surveys. Responses to community well-being assessment could be skewed and therefore, are difficult to compare across time periods.

Subjective well-being results indicate that respondents in the SCL Program villages assess their households and communities at a middle level with respect to well-being, livelihood security and community unity and cohesion. Perceptions of change since before the tsunami are approximately the same or slightly lower than at the time of follow up survey. Projected future aspects of well-being for households and the community are that there will be no change or slight improvement in the next three years.

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