

Community Preparedness and Resilience in a Coastal Community on Mannar Island, Sri Lanka

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Project Summary

Background: Community preparedness and community resilience have become important themes in the present era, with frequent natural disasters affecting the globe and especially countries in Asia and the Pacific. Sri Lanka has experienced numerous disasters, and the Disaster Management Centre (DMC) has taken various steps to mitigate such events. Many organizations are involved in preparedness activities at provincial, district, and village levels, but there are gaps in the status of preparedness in certain districts and communities. This study focused Mannar Island in northern Sri Lanka, which lies along a lowland coastal belt where many people live and depend on fishing as their main livelihood. The area is prone to flash floods, storm surges/tidal waves, tsunamis, and sea level rise. This study assessed the factors that contribute to the vulnerability of the coastal community and the impact of training and capacity building on community disaster preparedness.

Methods: The study interviewed 500 households and held six focus group discussions on social, economic, and physical vulnerability, disaster preparedness capacity, and related training. The data were analyzed and computed using Excel and SPSS. Vulnerability conditions were examined by topic through descriptive statistics. Preparedness and capacity variables were analyzed through multilinear regression. The model was significant ($p < .000$).

Findings: Many factors contribute to the coastal community's vulnerability to natural hazards. Most people have only primary school education, and few have had any trade or vocational training. Most women stay at home and could easily be injured or killed by coastal hazards. Men are engaged mostly in fishing or day labor. Houses are made mainly of cajan using traditional, non-engineering structures. The drainage network is improperly designed and not maintained. The communities own few assets. Capacity and training in the community are low.

Conclusions: One community member said, "In 20 to 30 years' time, we will have to study Mannar Island in history only" without immediate policy changes to increase disaster preparedness and resilience. Recommendations include training communities in Community-Based Disaster Risk Management (CBDRM), activating local disaster management committees and ensuring more diverse membership and regular meetings, establishing a clear mechanism for knowledge dissemination and a proper evacuation and contingency plan, restricting sand mining, rehabilitating and maintaining drainage systems, preventing erosion, and reinforcing bunds to prevent sea water incursion.

1 Introduction

Natural hazards in Sri Lanka have increased the vulnerability of the population. The occurrence and frequency of these hazards are unpredictable, and the hazards appear in different forms, especially with global climate change. Coastal erosion and accretion are complex processes that need to be investigated from the angles of sediment motion under

wind, wave, and tidal current action. Climate change makes the issue of sea level rise complex and produces a range of environmental problems. As the sea level rises, the water depth increases and the wave base becomes deeper. Waves reaching the coast have more energy and therefore can erode and transport greater quantities of sediment. Thus, the coast starts to adjust to the new sea level to maintain a dynamic equilibrium.

Tens of millions of people live in coastal communities in India, Sri Lanka, Indonesia, and Thailand. Most of these people depend on coastal fisheries, coastal and marine habitats, agriculture, aquaculture, and forestry for their livelihoods and food security. The fishery sector in Sri Lanka provides direct employment for about 250,000 people, and about 1 million people depend on fishing. Since the tsunami of December 2004, there have been many initiatives by the government and other stakeholders to increase disaster preparedness and build a resilient community, especially along the coastal belt, but there are gaps. Floods, landslides, cyclones, and lightning have damaged lives, property, and the environment and have become annual events in Sri Lanka.

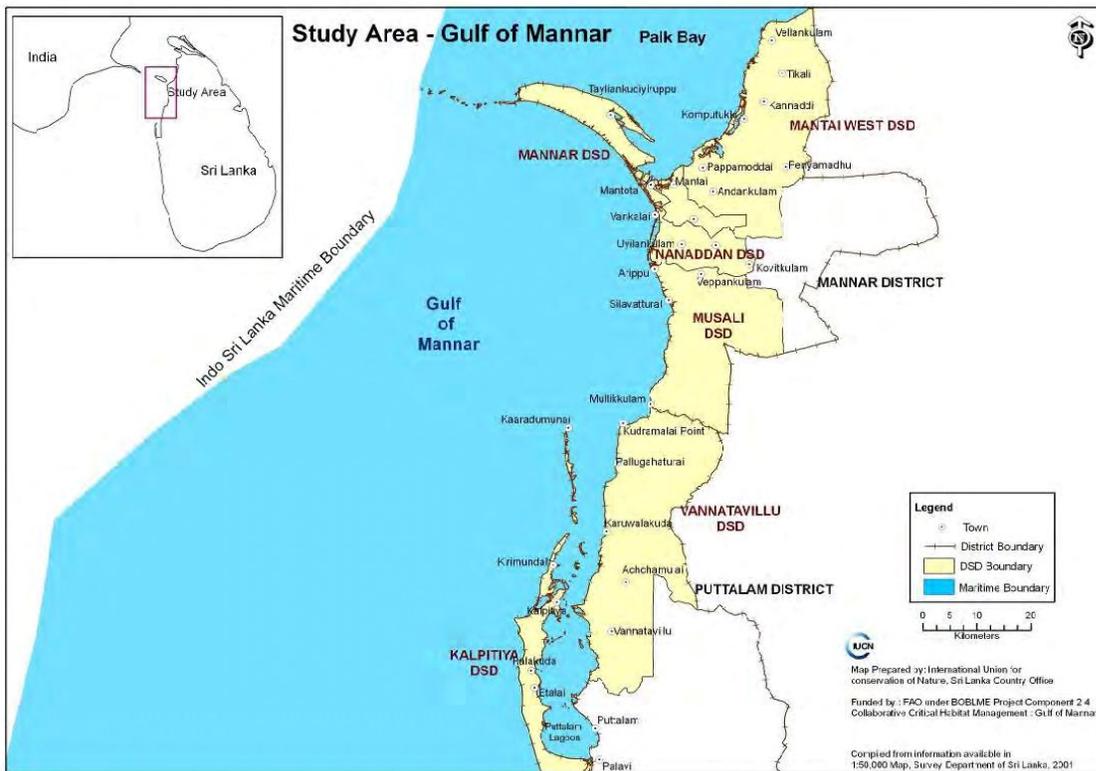
The District of Mannar, especially Mannar Island, is particularly exposed to natural hazards. It lies along a lowland coastal belt where many people are living and depending on fishing as their main livelihood. The coastal belt is vulnerable to natural hazards such as flash floods, cyclones, storm surges, sea level rise, and tsunamis. The island has only one land route, and this is the only evacuation route except by air. Therefore, it is crucial that the community in the coastal belt knows about possible hazards, their pattern, and their consequences and is prepared to respond to their occurrence.

Civil society and international non-governmental organizations (INGOs) actively engaged in disaster management have expressed the urgency of community awareness and preparedness for disasters in the area. Because of the long-standing war, no major studies had been done in recent years on community preparedness on the coastal belt. Participants in an initial stakeholder meeting said it was urgent to evaluate and get feedback from the community on the status of community preparedness for disaster. In addition, the stakeholders who are directly engaged in relief programs for the coastal community were keen to assess their effectiveness.

Study Area

Mannar Island, formerly called Manar Island, is part of Mannar District. It is linked to the mainland of Sri Lanka by a causeway (figure 1). The island is dry and barren and mainly covered with vegetation and sand. It has an area of about 250 square kilometers. Adam's Bridge is a chain of limestone shoals between Pamban Island, also known as Rameswaram Island, off the southeastern coast of Tamil Nadu, India, and Mannar Island, off the northwestern coast of Sri Lanka. Geological evidence suggests that this bridge is a former land connection between India and Sri Lanka. Between 1914 and 1964, there was a train and ferry link from India via Dhanushkodi and Talaimannar to Colombo, but this was not resumed after the disastrous damages caused by a cyclone in 1964.

Figure 1. Map of Mannar Island



Source: IUCN. (2011). Biodiversity and Socio-economic Information of Selected Areas of Sri Lankan Side of the Gulf of Mannar.

The main settlements are Mannar and Erukkulampiddi on the eastern coast and Pesalai on the northern coast, all connected by the A14 road, which leads across the bridge to mainland Sri Lanka. Table 1 shows that Mannar Island has the largest population of the Grama Niladari Divisions. Out of 7,813 families in Mannar District, around 5,322 are living on Mannar Island. The island has the highest population density, reaching 210 per km². A high-magnitude disaster could easily wash away the total population. Community resilience is therefore crucial to reduce the impact of natural disasters to minimize loss of lives, property, livelihoods, and the environment.

Table 1. Administrative units and population density

Divisional Secretariat	Main town	Grama Niladari (GN) Divisions ¹	Total	Area (km ²)	Population density (km ²)
Madhu	Madhu	17	7,646	512.82	15
Mannar	Mannar	49	47,576	226.88	210
Manthai West	Adampan	36	14,335	658.9	22

Musali	Chilawathurai	20	8,212	474.22	17
Nanaddan	Nanaddan	31	17,661	129.25	137
Total		154	95,340	2,002.07	48

Source: Department of Census and Statistics, Sri Lanka. (2011). Enumeration of Vital Events 2011: Northern Province. Retrieved from

http://www.statistics.gov.lk/PopHouSat/VitalStatistics/EVE2011_FinalReport.pdf

¹ A Grama Niladhari ("village officer") division is a subunit of a divisional secretariat.



Coastal belt village of Erukkampiddi

Mannar is a lowland area, and most of the land is below sea level. The island has been affected by flash floods from the northeast monsoon from November to January.

The drainage system in Mannar is outdated, and almost all the streets are flooded during the rainy season. In addition to tidal waves, sea water flows into the villages.



Sea water intrusion into drainage system

Mannar Island in the Gulf of Mannar is an ecosystem with high biodiversity and is therefore rich in fishery resources. Fishing is a major contributor to the economy of the district, involving 38% of the population. Mannar is an important supplier of fresh and dried fish. Coastal preparedness is closely correlated with the livelihoods of fishing families. Mannar District comprises six Fisheries Inspector Divisions (FID), covering 38 fishing villages (table 2). These 38 villages have 50 landing sites.

Table 2. Fisheries Inspector Divisions in Mannar District

Divisional Secretariat Division	Fisheries Inspector Divisions	No. of fishing villages	No. of fishing families
Mannar	Pesalai	6	2,275
	Erukkalampiddi	6	806
	Mannar	6	2,241
Nanadan	Nanadan	3	1,027
Musali	Silavathurai	10	583
Manthai West	Vidataltivu	7	881
TOTAL		38	7,813

Source: IUCN. (2011). Biodiversity and Socio-economic Information of Selected Areas of Sri Lanka Side of the Gulf of Mannar.



House of a coastal belt family

Figure 2 shows that almost half of the landing sites located in the coastal belt are on Mannar Island.



Source: IUCN. (2011). Biodiversity and Socio-economic Information of Selected Areas of Sri Lanka Side of the Gulf of Mannar.

The three-decades-long war in Sri Lanka had a major impact on the fisheries sector, displacing fisher families for security reasons. The situation was compounded by

restricted fishing hours, limitation of fishing grounds, and restrictions on the capacity of outboard engines. The war precluded any systematic field-based scientific study in this part of the country, where such research had been scanty even before the war. There were also few activities such as capacity building, infrastructure development, or allocation of government resources.



A neglected sea bund and lighthouse

The objectives of this study were to determine the factors that contribute to vulnerability of a coastal community and assess the impact of training and capacity building on community preparedness.

2 Project Outputs and Outcomes

Tangible

- a. Initial research proposal

- b. Survey questionnaire (English and Tamil)
- c. 493 completed questionnaires
- d. Database in MS Excel and SPSS software
- e. Focus group discussion (FGD) guideline and formats
- f. Photographs of workshops, training, and field visits
- g. Mid-review and final reports to RDPR
- h. MSc Final Repo to the Postgraduate Institute of Science, Peradeniya University
- i. Secondary data: Articles, books, statistical data, maps, figures

Less tangible

- a. Initial training of enumerators (SRCS and DMC volunteers) on the research background and survey methodology
- b. Training of SLRC and DMC volunteers on data management and entry
- c. Training of new enumerators (SLRCS volunteers) on the research background and survey methodology
- d. Training of new enumerators (SLRCS volunteers) on data management and entry
- e. Training of SLRCS volunteers on focus group discussions
- f. Six focus group discussions in vulnerable areas
- g. Dissemination workshop for 15 government officers and 10 key stakeholders
- h. Dissemination presentation to the American and Qatar Red Cross and Red Crescent delegation on their visit to Sri Lanka

3 How Did You Go about Achieving Your Outputs/Outcomes?

Table 3 shows the villages selected for the study, based on the living condition in terms of vulnerability as well as information collected from the DMC, Mannar.

Table 3. Selected villages on Mannar Island

No.	Village name	No. of questionnaires
1.	Pesalai Ward 4	37
2.	Panamkattu Kottu West	32
3.	Konthapittye	24
4.	Pallimunai-Nallavanvadi	15
5.	Vankalaipaddu	16
6.	Erukkalampiddi Wards 7 and 9	41
7.	Periyakaddai	17
8.	Kaddipalivasal	22
9.	Santhipuram	13

10.	South Bar	29
11.	5th mail post	12
12.	Konnaiyan Kudiyiruppu	10
13.	Talaimannar Village	34
14.	Pallimunai	34
15.	Nalavanvaadi	17
16.	Jeevapuram	18
17.	Thottacaddu	20
18.	Selvanagar	22
19.	Emil Nagar	29
20.	Thalvupadu	12
21.	Talaimannar Pier	13
22.	Uppukulam	14
23.	Siruthopu	14
24.	Vankalaipadu	5
	Total	500

A couple of villages were selected away from the coastal area because these villages are often affected by flash floods and tidal waves.

Problem Statement/Research Question

How resilient is the coastal community on Mannar Island to natural hazards?

The study considered the general formula for disaster risk to analyze the key components of hazard, exposure, vulnerability, and capacity, as follows:

$$\text{Disaster Risk (DR)} = \frac{\text{Probability of Hazard} \times \text{Degree of Vulnerability}}{\text{Capacity to Cope}}$$

Questionnaire Development

A closed-ended questionnaire was used to collect data and information. The required and relevant data and information was collected through primary data collection. Because the survey method was more suited for gathering descriptive information, structured surveys were conducted to collect information by approaching respondents directly.

The information for the content of the questionnaire was drawn from various sources. These included a literature review and information from various stakeholders. The

questionnaire (appendix 1) consists of 30 questions divided into five categories (general, social, economic, physical, and capacity/training) to assess community's preparedness. It was designed to capture information needed to analyze the hypothesis and in return reflect on the key objectives.

The methodology used to identify the variables was a descriptive analysis model. Concepts were converted to variables by using indicators. Measurement was central to the data collection, and therefore both the ordinal or ranking scale and the interval scale were used for measuring the variables.

The questionnaire was designed in English and circulated to stakeholders such as the DMCC and SLRCS Mannar for feedback. It was also circulated to a few academic staff for their comments. The final English version was translated into Tamil (the local language). The draft was presented to the enumerators and pretested. The final questionnaire was then programmed for data base entry into Excel. The length of each interview was about 40 minutes.

A focus group discussion guideline was developed to conduct six focus group discussions involving 10 people each to obtain different points of view on the topics.

Survey Monitoring and Administration

A partnership agreement was signed with the SLRCS Mannar to monitor and conduct the field survey. Twenty enumerators from SLRCS and the DMC were trained on the questionnaire, oriented on the research and background information, and given a practice session. The team was then deployed to the villages to collect the required data.

Sample Size

Five hundred households were selected from 24 villages on Mannar Island. Simple random sampling was done for reasons of convenience and time limitations. The sampling was done according to the sampling frame and to have a fairly good percentage (around 10%) to represent the fishing population of the coastal belt villages. The fishing population of Mannar Island is about 26,610, with about 5,322 fishing households (with an average of five per household). The sample size of 500 households was a simple random sample, mostly from the landing points of the coastal area. The sample represents around 10% of the fishing population of Mannar Island.

Data Analysis

Data were analyzed using SPSS software (IBM SPSS Statistics 20). The descriptive analyses reported here are based on weighted data. Descriptive statistics were calculated for all sectors: General, social, physical, economic, and capacity/training. For each question, the status of the household was described based on the results. Each component was then analyzed according to conditions of vulnerability. To analyze the model, two variables were

considered as per research objective 2. The dependent variable of preparedness (Y) was computed from the scores from general data. The independent variable of capacity and training was computed from the scores from capacity and training.

To examine the relationship between capacity building and preparedness for coastal hazards, a standard multiple regression analysis and correlation was performed using statistical tests (ANOVA). Prior to interpreting the results of multiple regression analysis, several assumptions were evaluated. First, inspection of the normal probability plot of standardized residuals, as well as the scatter plot of standardized residuals against standardized predicted values, indicated that the assumptions of normality, linearity, and homoscedasticity of residuals were met. A conservative alpha level of .001 was used to determine statistical significance. Respondents who did not know the answers or responses that were not entered by human error on the part of the enumerators were considered as missing values and excluded from the analysis. The vulnerability condition was examined under each main topic through descriptive statistics. The preparedness and capacity variables were analyzed through multilinear regression, and the model was significant ($p < .000$).

4 What Did You Learn?

The study found no significant progress in several important aspects that contribute to preparedness and resilience. The major findings of the focus group discussions are summarized below.

Main Hazards

- Flash floods
- Sea water intrusion
- Sea level rise/heavy, high winds
- Coastal erosion
- Sand mining
- Tree cutting
- Stagnation of rainwater during the rainy season (October–January) with no means of drainage
- Sea level rise during the rainy season with both sea water and rain water flowing into villages (“In the past 10 years, the beach or the coast has moved around 3 m toward the land” said a focus group discussion member in Erukkalampiddi.)

Social Issues

- Most of the coastal community has only primary level or less education.
- Hardly anyone has had vocational/trade training.
- The family size is around five members.

- Women play a key role in the family and are the most vulnerable group, as most of the time they are at home.

Economic Issues

- Most of the community depends on fishing.
- Few own their livelihood assets (e.g., boats, engines, fishing gear/nets); others work as day laborers in masonry, carpentry, etc. Most are paid on a day-pay basis, and lack of steady income leads to poverty.
- Few of those who own assets have insurance for them.
- Some women are involved in income generation activities such as poultry raising, drying fish, small trading, or making palm products.
- At times, marketing and getting a good price has been challenging.
- Outsiders' interference in the sea area affects people's income/catch.

Physical Issues

- Most of the houses are traditional structures (non-engineering), which are not designed for coastal hazards.
- In a few villages, there are houses made out of cadjan and roofing sheets as well.
- In general, houses are weak and can be easily affected by strong wind, flood, tidal waves, etc. Most of the time this happens between October and January ("At times we catch fish inside our houses," said a focus group discussion participant).
- Most of the villages don't have proper drainage systems.
- In certain villages there is drainage, but it is not properly designed.
- The drainage systems are poorly maintained.
- Most of the respondents said they had approached and informed the authorities regarding the drainage, but no action was taken.
- In certain villages, construction of concrete roads have worsened the situation of water flowing into houses with no way to drain off.

Capacity and Training

- Most of the communities said the DMC had formed committees. The committees appointed by the DMC are still there, but they are not functioning.
- Some committee members received training in disaster management and early warnings/alerts, but the knowledge was not been disseminated to the whole community in most of the villages.
- There was confusion about the early warning and alert systems. Some said they don't get alerts in time, whereas others said they do. The DMC has given a speaker phone, but it is not properly used for this purpose.
- No one has first aid kits, but a few have medications.
- Few said they had their important documents in a safe and accessible place. Others said they don't even think about basic important documents.
- Only a few have emergency cash.

- In one village, the Women's Rural Development Society (WRDS) has a fund (around Rs. 45,000) for emergency purposes.

Many factors contribute to the vulnerability of the coastal community. The social dimensions of poor preparedness and resilience include the low educational level of the community (most people have only primary school education and few have had any trade or vocational training outside fishing) and status of women (most women stay at home and could easily be wiped out by coastal hazards).

The economic dimensions of employment and income also affect the vulnerability of the community. Most of the women are housewives, and men are mostly engaged in fishing or day labor. A significant percentage earns an income less than Rs. 5,000.

The physical dimension of vulnerability includes house construction unable to withstand coastal hazards. Although a large percentage of residents owns their houses, the houses are mostly made of cadjan using traditional and non-engineering structures. The drainage network is improperly designed and not maintained. This increases vulnerability, because as Mannar Island is on low land, it is crucial to have a proper drainage system. The community owns few assets.

The overall percentage rating of 22 factors under capacity and training is low, indicating the need for a lot of effort to increase capacity building programs. In addition, the model is significant ($p < .000$) and contributes to a correlation between the variables of preparedness and capacity/training.

5 Immediate Impact

This research was eye opening to the key stakeholders and community in the target area. The DMC and SLRCS Mannar said there had not been such a study in this area because of the long-standing war, poor access, and lack of interest of government officials. Therefore, this research adds value for the whole community and partners and stakeholders working directly and indirectly in disaster management and community resilience building. The DMC was keen to support the research, as it had no mechanism in place to evaluate its own performance. The Assistant Director expressed the view that it was important to evaluate the current situation and recommend a way forward to improve current practices.

During training, the volunteers of the SLRCS and DMC (e.g., youth and graduates), were shocked to see the statistical data on the population and the DMC models of hazards that could affect Mannar Island. During the field survey and focus group discussions, the community understood the importance of building their capacity for disaster preparedness, taking precautions to protect the environment, and collectively raising their voices to increase their resilience to disaster. At least a few key active community-based organizations now know about the threats of disasters, current community preparedness for these disasters, and how to address gaps in preparedness.

The study findings and recommendations were disseminated to key stakeholders including the DMC, government departments, SLRCS Mannar, INGOs, and community leaders in a workshop at the Division Secretariat Office in Mannar. They were also disseminated to the Global Disaster Preparedness Centre, R2R, the American Red Cross and Red Crescent, and Qatar Red Crescent.

Not only are outputs from this study useful for the local authorities, but they also provide valuable knowledge and information to other local and national stakeholders with a similar target of strengthening appropriate measures to increase the level of preparedness and resilience of the community.

6 Future Impact

DMC officials, the SLRCS, and implementing partners expressed their interest in focusing on preparedness through not only short-term interventions but also long-term activities that will prevent and mitigate environmental hazards. It was proposed to key stakeholders, especially SLRCS Mannar, to design programs to address the findings of this research and invest in community preparedness and resilience programs that support not only the “hard” components of relief but the “soft” components of civil society. In addition, the government officials emphasized that there should be non-negotiable policy changes for the sake of the community and protection of the environment.

The feedback from the dissemination of the study results to government officials and implementing partners and the session with the U.S. and Qatar Red Cross and Red Crescent Delegations indicated a desire to prioritize the recommendations to turn them into proposals for community resilience programs or incorporate them into policy frameworks.

7 Conclusions

The research findings showed that the coastal community in Mannar Island is inadequately prepared for coastal hazards. Many factors—general, physical, social, economic, and capacity and training related, have contributed to the vulnerability and low resilience of this community. It is important for the future to consider the recommendations below for project proposals, infrastructure design, policy discussions, and advocacy forums, making sure that decisions are made in a participatory manner for sustainability and community ownership. As one community member said, “In 20 to 30 years’ time, we will have to study Mannar Island in history only” if policy changes to do not receive immediate attention.

Recommendations at Community Level

- Increase awareness and knowledge of possible hazards and their impact.
- Build community capacity, focusing on Community-Based Disaster Risk Management (CBDRM).

- Ensure community participation in decision making for community ownership.
- Strengthen the ability of the village committees to be proactive in preparing for disasters.

Recommendations at Policy Level

- Implement resettlement programs with proper assessments.
- Maintain the existing drainage system (such as the Dutch canal) and design a drainage network with community consultation.
- Maintain the buffer zone of the coastal area.
- Stop/control permits for sand mining.
- Maintain existing water plants on the coast and plan new plants to increase fishery resources, protect erosion, and reduce the sea water flow.
- Control the population/urban settlement on the island and focus development equally on the mainland.
- Stop inappropriate land filling (existing lakes, conservation land areas).
- Increase planting of appropriate trees and stop/prevent tree cutting.
- Take measures to protect the coastal area by constructing a sea bund, heavy black stone bunds, sea water breakers, etc.

Recommendations at DMC Level

- Ensure that the committees formed by the DMC include more diverse membership, with gender balance, participation of traditional knowledge elders, etc.
- Provide continuous/ongoing training is related to disaster risk reduction (DRR).
- Strengthen the relationship and communication between the DMC and village committees through regular monthly meetings, regular visits, capacity building, etc.
- Develop a clear mechanism for dissemination of knowledge and to the community at all levels.
- Assess the capacity of designated assembly points (church, mosque, schools, etc.).
- Disseminate a proper evacuation and contingency plan to move the population from Mannar Island to safe locations to all people concerned.

8 Implications for the future

The research survey methodology and questionnaire could be used for future surveys. The training and workshop built local capacity that could be utilized for future surveys, needs assessments, and focus group discussions. The community awareness created through the focus group discussions is an asset for future programs. The model created to measure the status of preparedness and capacity/training could be used in other locations with slight modification. The primary data collected will be useful as secondary data for stakeholders, government officials, researchers, and program implementers. The SLRCS has an important role to play in developing proposals and programs based on the findings of this research. Already the Government Agent (GA) of Mannar would like to take the recommendations forward with the SLRCS Mannar.

9 Budget Progress Narrative

The financial summary provides an overall picture of the actual expenditure against the original budget. The balance remaining is US\$189.61. Below is a detailed breakdown of expenditures.

Financial Summary

Line item	Original cost/LKR	US\$	Total	Balance
Travel and subsistence	42,000	326	41,791	20
Equipment, materials, and supplies	56,500	438	43,779	12,72
Workshops and meetings	144,000	1,116	135,405	8,59
Communication costs	15,000			
Product dissemination costs	257,500	116	12,065	2,935
Total (LKR)	257,500	1,996	233,040	24,46
Total (US\$)	1,996.12		1806.51	18

Most of the line item costs were for the intended purposes. Travel and subsistence expenditures were high. To keep them under the original budget, travel costs related to product dissemination were charged as product dissemination costs. Almost every month, all bills were settled with the PGIS Bursar and either reimbursed or settled against cash advanced. A minor change could occur because of exchange rate gain and loss. The PGIS Bursar was very efficient, and no transaction or operation was questioned. I propose to provide the balance left from the budget to the SLRCS Mannar for administrative costs, as the study used the resources of the SLRCS Mannar for workshops, meetings, and training.

10 Publications

The findings will be submitted to journals and national and international forums. This information will be provided in the near future once the manuscript is completed.

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Appendix 1. Survey Questionnaire

Community Preparedness and Resilience of the Coastal Community of Mannar Island Disaster Management

General

Screener/Interviewer Name: _____
 GN Division: _____ **VILLAGE NAME:** _____
 Interview Start _____ **AM/PM**
 Time: _____

Hello, I am from the Volunteer Unit of the Disaster Management Centre and Red Cross, Mannar. I am interviewing people in Mannar Coastal Belt to find out what they have heard or done about coastal hazards (flash floods, storm surges/tidal waves, sea-level rise, tsunami) preparedness. This information may help to improve the responses to disaster in Mannar Island. I need to ask just a few questions to get some details and information.

1. Please think about the 3 worst coastal hazards you have ever experienced?
a. b. c.
.....

2. How much did it affect you? Using a scale of 1 to 5 where 1 means “no effect” and 5 means “a lot of effect”, you may use any number in between?
a. 1.....2.....3.....4.....5.....
b. 1.....2.....3.....4.....5.....
c. 1.....2.....3.....4.....5.....

3. Please think about the information you have got about preparing for coastal hazard. Have you heard information about preparing for coastal hazards from:

	YES	NO
a. Friends or relatives	1	2
b. Employees	1	2
c. Employers	1	2
d. Children	1	2
e. TV	1	2
f. Radio	1	2
g. The Red Cross	1	2
h. Disaster Management Centre	1	2
i. INGOs/local NGOs	1	2
j. Other (specify)	1	2

	YES	NO
k. Friends or relatives	1	2
l. Employees	1	2
m. Employers	1	2
n. Children	1	2
o. TV	1	2
p. Radio	1	2
q. The Red Cross	1	2
r. Disaster Management Centre	1	2
s. INGOs/local NGOs	1	2
t. Other (specify)	1	2

4. How was the information communicated to you?

a. Did you read it in the newspaper?.....	1	2
b. Did you read it in other private media?.....	1	2
c. Did you see it on the television?	1	2
d. Did you hear it on the radio?	1	2
e. Was it communicated to you in face-to-face	1	2
f. Was it communicated to you some other way?	1	2
SPECIFY_____		

5. What kinds of information have you got? Have you got information about <...>?

What kinds of information have you got? Have you gotten information about <...>?	GOT INFORMATION ABOUT <...>?	
	Y	N
a. How to be ready for coastal hazards?	1	2
b. How to be safe during coastal hazards?	1	2
c. Making disaster plans?	1	2
d. Training and practicing on skills that can protect life or reduce damage from coastal hazards?	1	2
e. Organizing equipment and supplies that would be useful in coastal hazards?	1	2
f. Making the things inside your home safer during a coastal hazard?	1	2
g. Making your building structure safer during coastal hazards?	1	2
h. Buying coastal hazard insurance?	1	2

5A. How much of the information that you got about preparing for coastal hazards did you **believe**? Would you say 1, none of it, 5, all of it, or any number in between?

1.....2.....3.....4.....5.....
None All of it

5B. How much of the information did you **understand**? Would you say 1, none of it, 5 all of it, or any number in between?

1.....2.....3.....4.....5.....
None All of it

5C. How much of the information did you **think** about? Would you say 1, none of it, 5 all of it, or any number in between?

1.....2.....3.....4.....5.....
None All of it

5D. How much of the information did you **discuss** with other people? Would you say 1, none of it, 5 all of it, or any number in between?

1.....2.....3.....4.....5.....
None All of it

6. Do you know anyone, not including yourself, who has <...>?

Do you know anyone, not including yourself, who has <...>?	Y	N
a. Learned how to be ready for coastal hazards?	1	2
b. Learned how to be safe during coastal hazards?	1	2
c. Made disaster plans?	1	2
d. Gotten training and practice in skills that can protect life or reduce damage from coastal hazards?	1	2
e. Organized equipment and supplies that would be useful in coastal hazard?	1	2
f. Made the things inside the home safer during coastal hazard?	1	2
g. Made a building structure safer during coastal hazards?	1	2

h. Bought coastal hazard insurance?	1	2
-------------------------------------	---	---

Social Factors

7. First, what is your current marital status? Are you: never married, married, living together as married, divorced, separated, or widowed?

- NEVER MARRIED.....1
- MARRIED.....2
- LIVING TOGETHER AS MARRIED.....3
- DIVORCED.....4
- SEPARATED.....5
- WIDOWED.....6

8. How many adults 18 years of age or older are living in your household, and what is their relationship to you?

Record as given_____

READ TABLE DOWN

- | | |
|------------------------------------|---------------------------|
| SPOUSE.....01 | GRAND CHILD.....08 |
| CHILD.....02 | UNCLE/AUNT.....09 |
| STEP-CHILD.....03 | NEPHEW/NICE.....10 |
| PARENT.....04 | COUSIN.....11 |
| PARENT-IN-LAW.....05 | OTHER |
| RELADED.....12 | |
| GRANDPARENTS.....06 | |
| GRAND PARENTS-IN-LAW.....07 | |

8A. In which month was your <INSERT RELATIONSHIP> born?

- | | | |
|------------------------|----------------------|------------------------|
| January.....01 | May.....05 | September.....0 |
| February.....02 | June.....06 | October.....1 |
| March.....03 | July.....07 | November..... |
| April.....04 | August.....08 | December..... |

COMPLETE Q8 FIRST, AND THEN ASK Q8A. ADULT ROSTER

Q8	Q8A
RELATIONSHIP TO CORRESPONDENT (ENTER CODE # FROM LIST)	ENTER BIRTH MONTH (ENTER CODE # FROM LIST)
01.	
02.	
03.	
04.	
05.	
06.	
07.	
08.	

9. How many children 17 years of age or younger live with you in your household?

Record as given _____

If Q9=0, GO TO Q10, OTHERWISE CONTINUE

9A. Of the <INSERT ANSWER FROM Q9> children 17 years of age or younger living in your household, what is their relationship to you?

- CHILD.....02**
- STEP -CHILD.....03**
- GRAND CHILD.....08**
- NEPHEW/NIECE.....10**
- COUSIN.....11**
- OTHER RELATED.....12**

9A CHILD ROSTER

Q9A. RELATIONSHIP TO RESPONDENT (ENTER CODE# FROM
01.
02.
03.
04.

05.
06.
07.

10. What was your age on your last birthday?.....

10A. In which month were you born?

(ENTER CODE# FROM LIST).....

- | | | |
|------------------------|----------------------|-------------------------|
| January.....01 | May.....05 | September.....09 |
| February.....02 | June.....06 | October.....10 |
| March.....03 | July.....07 | November.....11 |
| April.....04 | August.....08 | December.....12 |

11. RECORD GENDER BY OBSERVATION:

MALE.....1

FEMALE.....2

12. What is the highest grade in school you completed and received credit for?

- PRIMARY SCHOOL.....01
- Ordinary Level (O/L).....02
- Advanced Level (O/L).....03
- University.....04
- Teacher training.....05
- Diploma courses.....06
- Other studies.....07

13. Have you had any trade, technical, or vocational training?

YES.....1

14. Were you born in Mannar District or in another district?

Mannar District.....1

OTHER SPECIFY.....2

15. Please tell me which one of these racial/ethnic group best describes you?

TAMIL.....1

MUSLIM.....2

SINHALESE.....3

Economic Factors

16. What is your current employment status? Are you working full-time, working part-time, unemployed, retired, keeping house, a student, disabled, or something else?

- WORKING FULL-TIME.....1
- WORKING PART-TIME.....2
- UNEMPLOYED/LOOKING FOR WORK.....3
- RETIRED.....4
- KEEPING HOUSE.....5
- STUDENT.....6
- DISABLED.....7
- OTHER (SPECIFY).....8

17. Thinking of all the people in **your household**, how many people **including yourself** received income from **any source**, such as wages or salary, pensions, welfare, in January 2014?

- UNDER RS. 5,000.....1
- BETWEEN 5,000 AND 10,000.....2
- ABOVE RS. 10,000.....3

18. Including yourself, how many people 18 years of age or older were dependent on that total household income?

RECORD#: _____

18A. How many children 17 years of age or younger were dependent on that total household income?

RECORD#: _____

PHYSICAL FACTORS

19. Do you own your current residence or do you rent?

- OWN.....1
- RENT.....2
- OTHER SPECIFY.....3

20. Do you live in simple house/single-family unit, double-story house, cajan house, or tent or other?

- SIMPLE HOUSE/SINGLE-FAMILY UNIT.....1
- DOUBLE-STORY HOUSE.....2
- CAJAN HOUSE.....3
- TENT.....4
- OTHER (SPECIFY).....5

21. Is your residence designed to withstand against the coastal hazards?

- YES.....1
- NO.....2

22. Is your residence located within the buffer zone?

- YES.....1
- NO.....2

23. Does your village have proper drainage system?

- YES.....1
- NO.....2

**IF “1-YES”, ASK 23a;
IF “2-NO”, SKIP TO Q24.**

23a. How would you rate the maintenance of the drainage system?

Would you say “1, no maintenance,” “5, good maintenance,” or you may use any number in between?

- 1.....2.....3.....4.....5.....
- None All of it

24. What type of assets do you have that is connected to your livelihood?

- Fishing net/gears.....1
- Out boat engine.....2
- Boat.....3
- Other (specify):4

24a. Do you have insurance for the assets?

- Fishing net/gears.....YES.....1 NO.....2
- Out boat engine.....YES.....1 NO.....2
- Boat.....YES.....1 NO.....2

25. Do you own your own van/lorry, motor cycle or bicycle?

- YES.....1
- NO.....2

26. If YES to Q21, what do you own?

- Van/lorry.....1
- Motorcycle.....2
- Bicycle.....3
- Other (specify):4

Capacity and Training

27. Now I want to know if you have participated in any training programs, capacity building programs and preparedness sessions.

27A. Have you/do you have <...> (on hand)?

CIRCLE RESPONSE IN COLUMN A.

IF Q27A="1-YES", ASK Q27B.

IF Q27A="2-NO", SKIP TO NEXT ITEM

27B. Was/is that for coastal hazards or for other reasons?

Q27 (READ GOING ACROSS)		A		B		
		HAVE YOU/DO YOU HAVE <...>		REASONS FOR TAKING ACTION		
		Yes	No	COASTAL HAZARDS	OTHER REASONS	BOTH
1.	Have you... Made family disaster plans? Was that for coastal hazards or for other reasons?	1	2	1	2	3
2.	Have you... Participated in neighborhood disaster planning? Was that for coastal hazards or for other reasons?	1	2	1	2	3
3.	Have you... Learned first aid? Was that for coastal hazards or for other reasons?	1	2	1	2	3
4.	Have you.... Learned how to shut off utilities, such as gas/electricity? Was that for coastal hazards or for other reasons?	1	2	1	2	3
5.	Have you..... Received basic disaster response training, like evacuation drills? Was that for coastal hazards or for other reasons?	1	2	1	2	3
6.	Have you... Participated in disaster preparedness activities in the village? Was that for coastal hazards or for other reasons?	1	2	1	2	3

7.	Do you have... A first aid kit and medical supplies? Is that for coastal hazard or for other reasons?	1	2	1	2	3
8.	Do you have... A working flashlight with replacement batteries? Is that for coastal hazards or for other reasons?	1	2	1	2	3
9.	Do you have... Copies of important papers/documents, such as birth certificate, marriage certificate, national identity card copies, medical card, etc.? Is that for coastal hazards or for other reasons?	1	2	1	2	3
10.	Do you have.... A working radio with replacement batteries or solar radio? Is that for coastal hazards or for other reasons?	1	2	1	2	3
11.	Do you have... Extra cash and change on hand for emergencies? IF "YES", ASK 11a.; IF "NO", SKIP TO Q12 Is that for coastal hazard or for other reasons?	1	2	1	2	3
11a.	About how much cash do you have set aside? ENTER APPROXIMATE RUPPEE AMOUNT	Rs. _____				
12.	Do you have... Extra prescription medications? Is that for coastal hazards or for other reasons?	1	2	1	2	3
13.	Have you.... Stored canned, dried, or other non-perishable food? IF "1-YES", ASK 13a; IF "2-NO", SKIP TO Q14. Was that for coastal hazards or for other reasons?	1	2	1	2	3
13a.	How much do you store? PAUSE FOR RESPONSE Would you say that is less than 3 days of food per person, about 3 days of food per persons, or more than 3 days of food per person?	LT 3DAYS.....1 ABOUT 3 DAYS.....2 GT 3 DAYS.....3				
14.	Do you have... Tools to rescue trapped people, such as crowbars and axes? Is that for coastal hazards or for other reasons?	1	2	1	2	3
15.	Do you have... Bleach or some other method that can be used to purify water? Is that for coastal hazards or for other reasons?	1	2	1	2	3
16.	Do you have... A flashlight in an accessible location? Is that for coastal hazard or for other reasons?	1	2	1	2	3

17.	Have you... Added latches to cupboard or storage cabinets? Is that for coastal hazard or for	1	2	1	2	3
18.	Have you... Secured tall furniture and appliances like bookshelves and refrigerators to walls? Is that for coastal hazard or for other reasons?	1	2	1	2	3
19.	Have you... Strapped or buckled down heavy appliances, like televisions and computer monitors? Is that for coastal hazard or for other reasons?	1	2	1	2	3
20.	Have you... Arranged breakable and heavy items in cabinets and shelves to reduce damage? Is that for coastal hazard or for other reasons?	1	2	1	2	3
21.	Have you... Stored hazardous materials safely? Is that for coastal hazard or for other reasons?	1	2	1	2	3
22.	Have you... Stored water? IF "YES", ASK 22a.; IF "NO", SKIP TO NEXT Was that for coastal hazard or for other reasons?	1	2	1	2	3
22a.	How much do you store? Less than 3 gallons per person, about 3 gallons per person, or more than 3 gallons per person?	LT 3 GAL.....1 ABOUT 3 GAL.....2 GT 3 GAL.....3				

Next I want to ask you some questions about warnings and alerts that you might receive in the event of a disaster.

28. Think about how you might receive official warnings, alerts, and notifications about a disaster, including notifications about when and how to evacuate your home. I am going to read a list. Please tell me from whom you would prefer to receive this information. Would you say:

CHOOSE ONE

- Government Agent’s Office.....1
- Disaster Management Center.....2
- Red Cross.....3
- Local community leaders.....4
- Some other person or agency.....5
- Other (specify)_____

29. What would be the best way for you to receive these warnings?
Would you say: CHOOSE ONE

- On television.....1
- On the radio.....,2
- By speakerphone.....3
- Freeway amber alerts.....,4
- Text message.....5
- Other (specify).....,6

30. What would you do if you received a warning about a disaster affecting the area where you live?

PROBE: What are some things you might do in response?

END: Thank you very much for your cooperation.

STOP TIME: _____:_____AM/PM

Appendix 2. Expense Report

Community Preparedness and Resilient Research														
PGIS														
Detail Budget & Expenses														
I US\$=LKR 129														
Ac/Code	Line Description	Quantity	Unit	Unit Cost/LK	Total Cost/LKR	US \$	Expenses April/May	Expenses June	Expenses July/SLRC	Expenses of Aug	Expenses of Sep	November/Dec	Total Expenditure	Balance
001	Travel and subsistence													
	Pre field/test visit to the coastal belt	1	vehicle	7,000.00	7,000.00		6,400.00	-		411.00			6,811.00	189.00
	Survey travel of volunteers	10	days	3,000.00	30,000.00		1,595.00	2,300.00	10,050.00	2,972.00	12,140.00	1,062.00	30,119.00	(119.00)
	External travel Out of Mannar	1	lump	5,000.00	5,000.00		2,119.00	1,632.00			1,110.00		4,861.00	139.00
					-								-	-
	Sub-total				42,000.00	326	10,114.00	3,932.00	10,050.00	3,383.00	13,250.00	1,062.00	41,791.00	209.00
002	Equipment, materials, and supplies													
	Note book & pen (two sessions)	20	person	250.00	5,000.00		792.00	950.00				3,398.00	5,140.00	(140.00)
	Questionnaire translation into Tamil	1	person	10,000.00	10,000.00		7,000.00						7,000.00	3,000.00
	Printout/photocopies of questionnaires	510	Nos	50.00	25,500.00		7,835.00	1,900.00	8,000.00	365.00	1,580.00	2,110.00	21,790.00	3,710.00
	Mid/Final Review	2	Nos	5,000.00	10,000.00							9,849.00	9,849.00	151.00
	Mid/Final Review Reports	2	Nos	3,000.00	6,000.00								-	6,000.00
	Sub-total				56,500.00	438	15,627.00	2,850.00	8,000.00	365.00	1,580.00	15,357.00	43,779.00	12,721.00
003	Workshops and meetings													
	Questionnaire training	2	session	3,000.00	6,000.00		2,820.00	1,695.00		830.00			5,345.00	655.00
	Focal Group Discussion	6	session	3,000.00	18,000.00						10,870.00		10,870.00	7,130.00
	Payment to Volunteers	140	person	350.00	49,000.00		13,650.00		23,450.00		7,350.00	3,750.00	48,200.00	800.00
	Payment to Volunteers for data entry	500	Nos	100.00	50,000.00		15,000.00		35,000.00				50,000.00	-
	Meal Allowance	140	Nos	150.00	21,000.00		690.00	2,260.00	10,050.00			7,990.00	20,990.00	10.00
	Sub-total				144,000.00	1,116	32,160.00	3,955.00	68,500.00	830.00	18,220.00	11,740.00	135,405.00	8,595.00
004	Communication costs													
	Phone calls/internet use	1	lump	-	-		-						-	-
	Sub-total				-	-	-	-	-	-	-	-	-	-
005	Product dissemination costs													
	Final dissemination in Mannar	1	lump	15,000.00	15,000.00							12,065.00	12,065.00	2,935.00
	Final dissemination in Kandy	1	lump	-	-								-	-
	Sub-total				15,000.00	116	-	-	-	-	-	12,065.00	12,065.00	2,935.00
	Total/LKR				257,500.00	1,996	57,901.00	10,737.00	86,550.00	4,578.00	33,050.00	40,224.00	233,040.00	24,460.00
	US\$				1,996.12		448.84	83.23	670.93	35.49	256.20	311.81	1,806.51	189.61

Appendix 3. Photos



Sri Lanka Red Cross Society and its operations in Mannar Island



Orientation session for SLRC volunteers for the field survey



Training session



Practicing using the questionnaire



Coastal belt of Talaimannar Pier



SLRCS volunteers with a family in Talaimannar



Livelihood: Dried fish



Volunteers with a family in Palimunai South



SLRCS and DMC volunteers with a women's forum in Thalvu



Houses on the lagoon



Houses located in the plain sea terrace of the same level



Drainage connecting Mannar Town water and the sea



Drainage water exit point as well as rainwater/seawater entry point





**Dissemination session for Federation of Red Cross and Red Crescent
(Global Disaster Preparedness Center)**





Research for preparedness and resilience