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Democratic Republic of Timor-Leste Building Disaster/Climate Resilience in Timor-Leste

May 22, 2015

GSURR

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There are two sets of outputs from the AAA: (a) Assessment of hazards and risks from floods, landslides and strong winds in 49 sucos (the lowest administrative level) along the Dili-Ainaro road corridor (b) Materials to support National Disaster Management Directorate (NDMD) in designing and implementing CBDRM projects. The following two reports are attached: (a) Final synthesis report of the hazard assessment and the (b) CBDRM Manual. Remaining documents have been uploaded as additional documents.

Natural Hazard Risk Assessment: Synthesis Report

Building Climate and Disaster Resilience in Communities along Dili-Ainaro and Linked Road Corridors Project

Component 1: Natural Hazard Risk Assessment

Synthesis Report



May 2015

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ACP-EU Natural Disaster Risk Reduction Program
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1. Introduction

Timor-Leste is vulnerable to natural hazards including floods, strong winds, landslides, earthquakes, and tsunamis. These hazards are common causing significant damages to the country. There is a need to evaluate these natural hazards and associated risks. Forty-nine sucos of the four districts (Ainaro, Aileu, Ermera, and Manufahi) of Timor-Leste, which intersect Dili-Ainaro-linked road corridor, were selected for the study.

- 49 sucos across Ainaro, Aileu, Ermera and Manufahi districts
- Population: 136,209 persons (projected 2014 of Census 2010)
- Area: 1,356 sq km
- Number of Households: about 19,000 (estimated 2014)
- Number of Buildings: 47,846 (RMSI, 2014)

Objectives of the Study

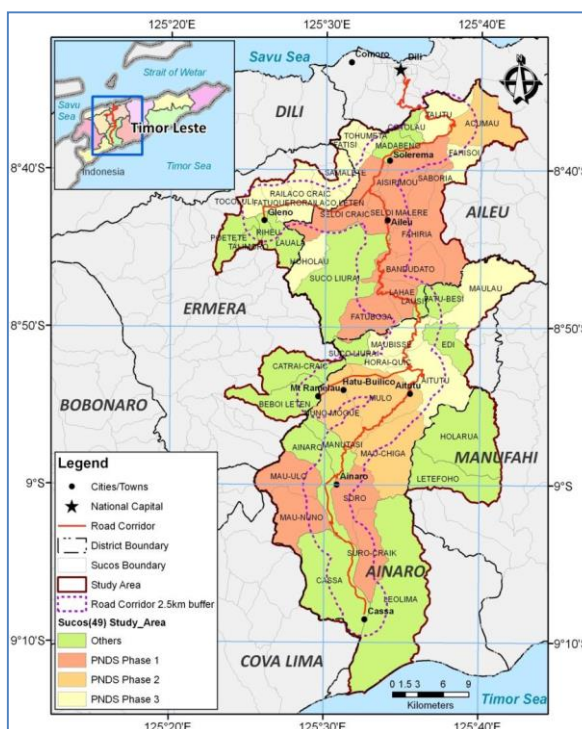
- To assess the hazards and the risks to assets and people along Dili-Ainaro and Linked Road Corridor and develop technical capacity of the concerned stakeholders to use quantified data for better understanding of risks.
- To carry out assessments of hazards, vulnerability, and risks of the selected study area focusing on landslides, floods, and strong wind hazards, strengthen institutional capacity and disseminate knowledge.

Stakeholders

The country focal points of this project - National Disaster Management Directorate (NDMD) and other key stakeholders were consulted and were part of the training and capacity building activities of the project. Following are the key stakeholders consulted:

- District Administrations of Aileu, Ermera, Manufahi, and Ainaro.

- The World Bank; UNDP and various departments like NDMD; Public Works; Agriculture and Fisheries; Finance; Transport and Communication; Environment, Commerce and Industry.
- Directorate General of Rural Governance.
- Ministry of Agriculture and Fisheries and University National of Timor-Leste.



Sucos under study

Challenges Faced

- Absence of appropriate geo-spatial data in National Directorate of Statistics (Census) for building footprints and their details.
- Lack of adequate historical flow and hydro-meteorological data.
- Non-standard data resolution across sucos
- Absence of Timor-Leste's official key infrastructure information such as location and structural details of the buildings.
- Non-availability of Data related to agriculture at suco level and landownership posed difficulty in assessing the livelihood vulnerability of the people.

2. Flood Hazard Analysis

The study area faces mainly two types of floods - riverine flood and flash floods. The main causative factors of flooding in Timor-Leste include heavy rains; rapid excessive runoff from the slopes to streams; and high mountainous ranges having steep slopes and low soil permeability.

The flood hazard analysis was carried out in the 49 selected Sucos to understand the frequencies, extent and depth of flooding. In addition to flow data, morphological variables including the catchment area, river network, river cross sections at various locations, water levels at various river streams, land-use land-cover classes, etc. were considered for the flood analysis.

History of Flooding

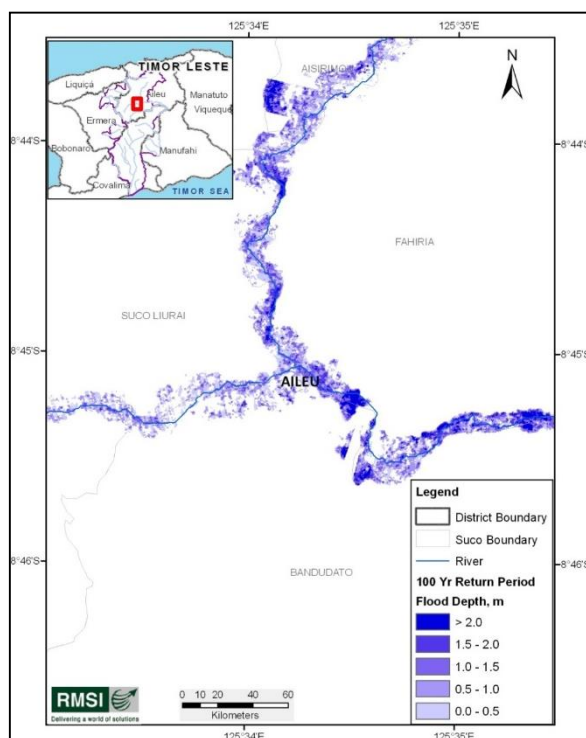
Major flood events in Timor-Leste were reported in 2001, 2003, and 2007, which affected several thousand people in the country.

Top 10 Natural Disasters Reported			
Affected People			
Disaster	Date	Affected (no. of people)	
Storm	2006	8,730	<div style="width: 100%;"></div>
Flood	2001	2,508	<div style="width: 28%;"></div>
Flood	2007	947	<div style="width: 11%;"></div>
Flood	2003	600	<div style="width: 7%;"></div>
Flood	2003	450	<div style="width: 5%;"></div>
Epidemic	2005	336	<div style="width: 4%;"></div>
Flood	2007	0	<div style="width: 0%;"></div>
Drought	2007	0	<div style="width: 0%;"></div>
Killed People			
Disaster	Date	Killed (no. of people)	
Epidemic	2005	22	<div style="width: 100%;"></div>
Flood	2003	3	<div style="width: 14%;"></div>
Flood	2001	1	<div style="width: 5%;"></div>
Flood	2007	1	<div style="width: 5%;"></div>
Flood	2003	0	<div style="width: 0%;"></div>
Storm	2006	0	<div style="width: 0%;"></div>
Flood	2007	0	<div style="width: 0%;"></div>
Drought	2007	0	<div style="width: 0%;"></div>

Source: EM-DAT

Flood Hazard Mapping

Flood hazard mapping has been presented in terms of flood depth and flood extent. Based on the return-period flows, a maximum flood depth of 3.9 meters was estimated for a 100-year return period event for suco Talitu of district Aileu. For example, the maximum flood inundation area covered by such an event was estimated at 10.5% of the total for suco Liurai of district Ainaro.



100-Year Return Period for Suco Liurai in Aileu District

Findings

- **Letefoho, Riheu, Poetete, Leolima, and Ainaro** are the most flood affected Sucos while Acumau and Fahisoi are least affected Sucos.
- Average Annual Loss of USD 166,430 for **Riheu Suco** and of USD 45,180 for **Letefoho Suco** among all Sucos have been estimated.
- In terms of residential sector, Letefoho Suco registers average annual loss of USD 29,942 due to flooding.

3. Strong Wind Hazard Analysis

The strong wind hazard analysis was done to evaluate the frequency and severity of various strong wind events at different recurrence intervals or return periods ranging from more frequent to rare events based on historical events.

History of Strong Wind Hazard

Strong wind is one of the most destructive hazards in the studied area. Strong wind events normally occur during **March-April** and **September-October**. The country experienced about 19 strong wind events (2002-2011) affecting 2015 individuals and damaging 1,863 houses.

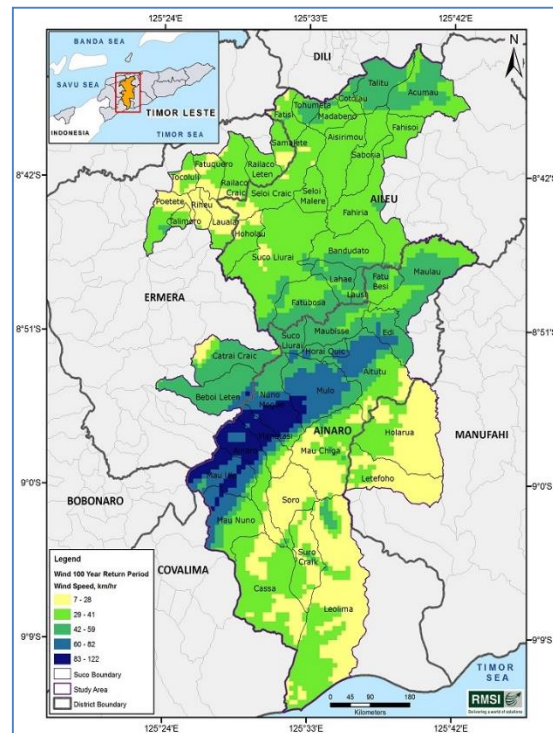
Simulation Results: Strong Wind Hazard Analysis

Simulation results of strong wind hazard for 100-year return period (RP) shows that Ainaro district is likely to have 15 sq. km of area affected by high wind speeds of 100 km/h. While considering 25, 50, and 100- year return periods, the analysis indicates that the north-western part of Ainaro district is prone to strong winds (>75 km/hr).

The moderate wind speed of 42-59 km/hr is expected to affect the northern and central parts of the Aileu district. For a 2-year return period (a low severity event), the wind speed is likely to vary between 5 km/hr to 32 km/hr, while for 100 year return period (a high severity event) the potential wind speed is likely to vary between 7 km/hr to 122 km/hr.

The higher wind speeds could be attributed to local topography and mountain ranges present in these districts. The wind speed increases over the mountainous region due to positive pressure gradient, i.e., the pressure decreases with increase in altitude. Hence, when wind blows from areas of high pressure to areas of low pressure, its speed increases. Results clearly indicate that the high-resolution WRF model with spatial grids of

500 m x 500 m could efficiently resolve the impacts of local topography and orography on wind fields.



100-Year RP Strong Wind Hazard Map

Findings

- Wind speed increases from low severity event (2-Year RP) to high severity event (100-Year RP)
- For lower return periods (2 to 25 years) low wind speed extents are limited to southern part of the study area
- For higher return periods (>25 years) high wind speed extents cover west-central part of the study area located in Ainaro district
- Most affected district for 100-year RP - Ainaro
- Most Affected Sucos for 100 Year RP – Ainaro, Manutasi, Mau-Ulo, and Nuno-Mogue.
- Areas under high wind speed zones in Ainaro district could be due to local topography and mountain ranges located in the surroundings.

4. Landslide Hazard Analysis

An extensive analysis was done to evaluate the landslide susceptibility of the study area. The RMSI team carried out field investigations to understand the parameters, which are responsible for landslides in the study area.

History of Landslide Hazard

Historical information on landslide occurrences is one of the most important considerations in landslide hazard assessment as it gives insight into the frequency of occurrence, their spatial distribution and their types, and the damage that they have caused.

Following are the sources for the history of landslide events in the study area:

- NDMD and Desinventar (10 landslides)
- RMSI Field Survey (30 landslides)
- High Resolution satellite and Google Earth Images (773 landslides)
- Melbourne Energy Institute

A Landslide event on January 12, 2012, in suco Mulo, Ainaro district, caused damage to 70 houses, affected 20 people. Similarly, another Landslide on the same day in suco Faturasa, Aileu district caused damage to 15 houses, affected 15 people.

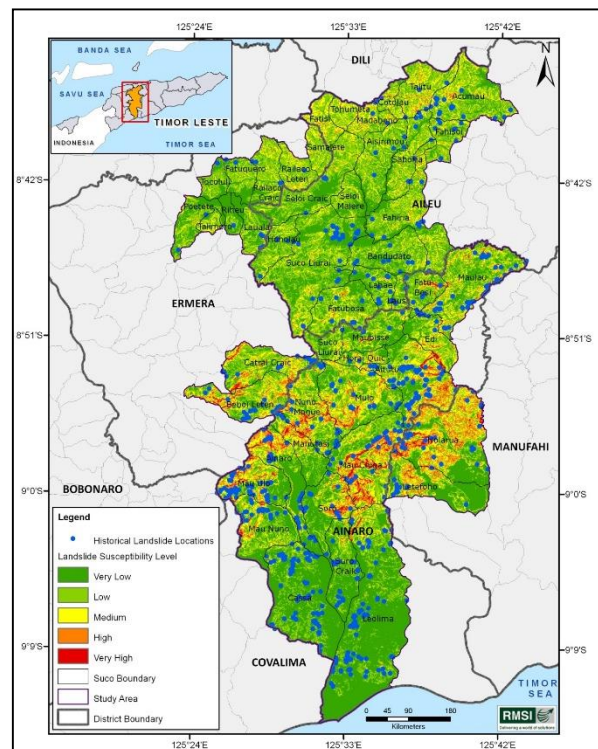
Key Factors of Landslide Hazard

Factors influencing landslide in the study area were selected based on available literature, expert opinion, and historical landslide data. Based on the outcome, six factors have been considered for landslide susceptibility mapping, viz. Slope angle, Geology/ Lithology, Soil, and Land use-land cover, Rainfall, and Seismicity.

Landslide Susceptibility Analysis

The analysis shows that approximately 76% of the total area of study area is susceptible to some level of landslide. Of this, 4%, 10%, 23%, and 38% areas lie in the very high, high,

moderate, and low landslide susceptibility zones, respectively. Ainaro, Aitutu, Beboi Leten, Catrai Craic Cotolau, Edi, and Fatisi Sucos are the most susceptible to landslide.



Historical landslide locations superimposed over the landslide susceptible map

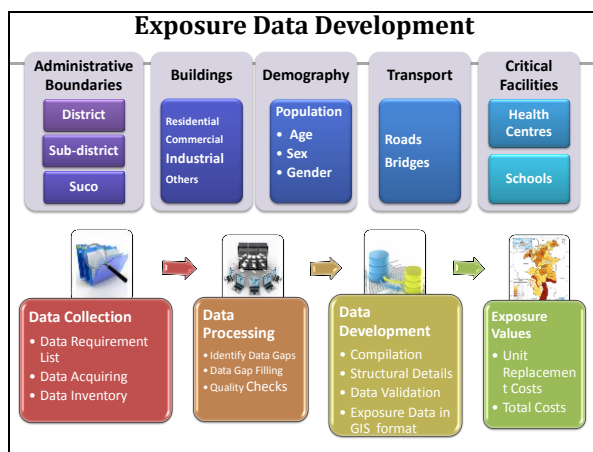
The analysis suggests that the areas where thick deposits of clayey soil and weathered rocks are present on gentle slopes, when combined with prolonged high rainfall, generally become unstable because of increase in pore water pressure.

Findings

- Historically, by 813 landslide incidents of various degrees occurred in the area.
- 14 percent of the area falls in high to very high landslide susceptibility zones.
- Impact wise Letefoho Suco of Manufahi district, and Ainaro, Aitutu, Mulo, Nuno-Mogue, Leolima Sucos of Ainaro district are most susceptible to landslide hazard.
- Lowest landslide susceptibility is observed in Fahiria Suco of Aileu District.

5. Exposure Data Development and Analysis

Being a critical component of risk assessment, which is subjected to potential losses, exposure data such as population, built environment, systems that support infrastructure and livelihood functions, or other elements present in the hazard zone have been developed. Modeling vulnerability of a system to natural hazards involves establishing a relationship between the potential damageability of critical exposure elements and different levels of local hazard intensity for the hazard of interest.



Analysis of Exposure Elements

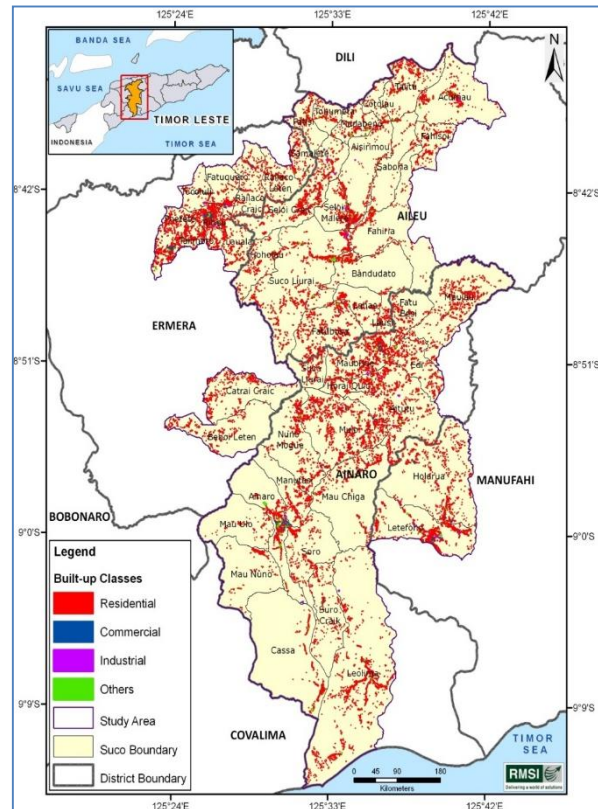
Demographic Analysis

- Total Population of 49 sucos: 136,209 persons (projected 2014 figure)
- Fahisoi (52%), Horai-Quic (51%) and Aisirimou (51%) sucos have more percentage of female population
- Fahiria Suco of Aileu district has the lowest percentage of female population (about 44%)
- Poetete Suco (Ermera district) has the highest population (7% of total population), while Mau-Ulu Suco (Ainaro) has the least population (0.4% of total population).

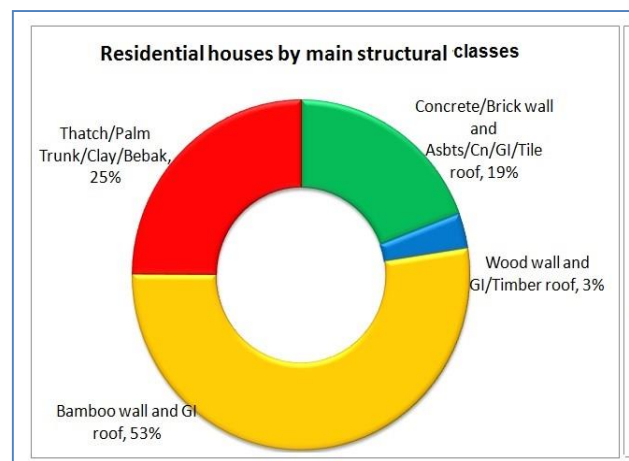
Buildings exposure analysis

The footprints of residential, commercial, public, and industrial buildings were captured

and primarily classified on occupancy types and structural types. The number of building footprints captured (47,846) for the study area using high-resolution satellite images was greater when compared to dwelling units provided by Census 2010.



Building Exposure Data: Occupancy Types



Building Exposure Data: Structural Types

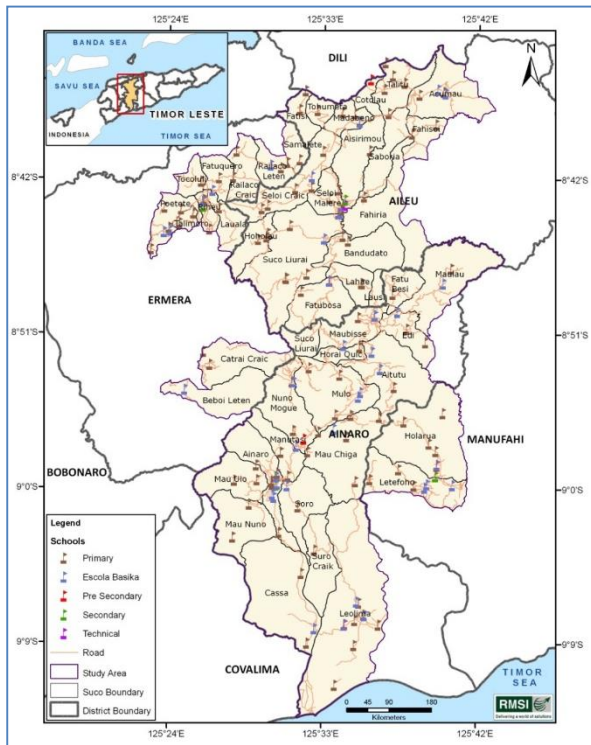
- Highest number of residential houses: Leolima Suco of Ainaro district.
- Lowest number of residential houses: Cotolau Suco of Aileu district

- Highest percentage of residential houses: Aileu district (84% of total.)
- Highest percentage of industrial and commercial buildings: Manufahi district (about 4% and 16% of total, respectively)

Critical Facilities Exposure Analysis

Educational Institutes

The building footprints of educational institutions which were captured indicate that 13 primary schools fall beyond 1-km distance from the motorable road network. Total number of educational institutions is 170 in the study area.



Building Exposure Data: Educational Institutes

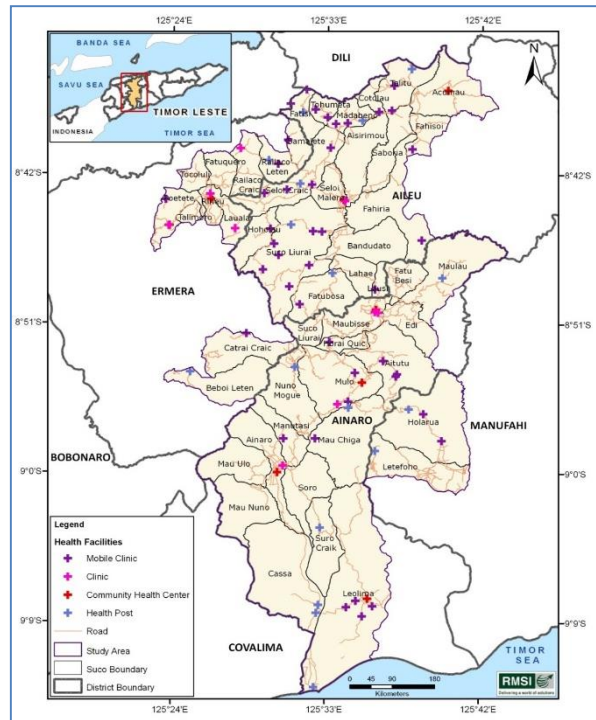
Health Facilities

There are 77 major health centers located in the study area and comprise of community health centers, clinics, health posts, and mobile clinics.

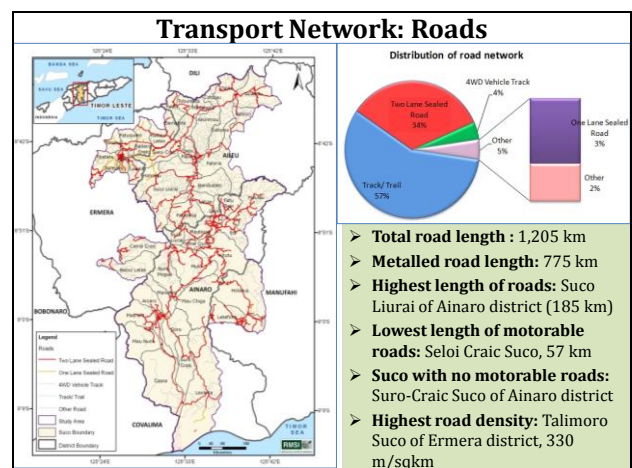
Transportation Network

During disasters, the transportation network plays an important role in rescue and recovery operations in suco/ district. The roads and

bridges were considered for exposure analysis. The road data, collected from Government of Timor-Leste (2014 vintage), which constitute important attributes like types of roads, length, administrative area and replacement costs, were used for exposure analysis.



Building Exposure Data: Health Facilities

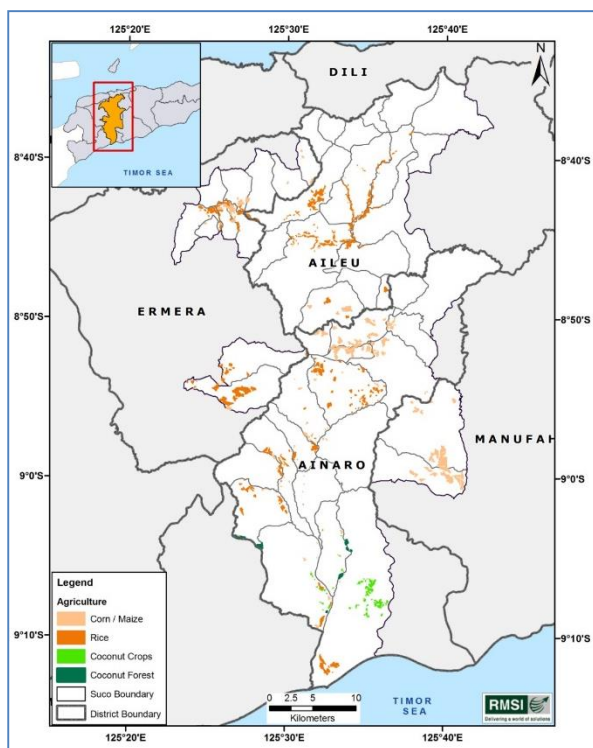


In the study area, most of the bridges are situated on the Dili-Ainaro highway corridor. Locations of bridges at suco level were captured from available bridge location data of 2012 from ALGIS division of Ministry of Agriculture and Fisheries and maps received from the transport department and were updated using high-resolution Pleiades

satellite images and field survey data collected during the present study.

Agricultural Crop Exposure

The spatial distribution of key cash crops, their types, and associated replacement costs were captured to create the crop exposure database. The major cash crops are categorized into four classes such as coconut crop, coconut forest, cultivated land, and rice. Rice cultivation occupies the maximum agricultural land for production (about 51%) in the study area, followed by Maize/ Corn (about 41%) whereas coconut crops and coconut forests account for only 6% and 1% of the crop areas, respectively.



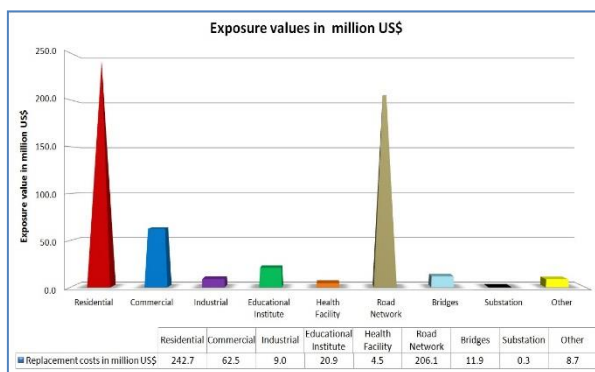
Spatial distribution of crop types

Beboi Leten suco of Ermera district has the highest agricultural land for rice cultivation followed by Mulo suco of Ainaro district. For corn/maize cultivation, Holarua and Letefoho suco of Manufahi district have the highest agricultural area. Leolima suco of Ainaro district has the highest amount of coconut plantation in the study area.

Estimation of Exposure Values

Field survey data, consultations with stakeholders, and literature survey were used in the estimation of different structural types, average built up areas and unit costs of building structures.

The total estimated value of exposure in all categories in the study area is more than 570 million USD. Out of this, residential exposure accounts for about 42.5% of the total value, transport exposure (roads and bridges) for about 38.2%, commercial exposure for about 10.9%, educational exposure for about 3.7%, industrial exposure for about 1.6%, health exposure for about 0.8%, and crop exposure about 0.7%, respectively.



Estimated values for exposures

For exposure related to education sector, Ainaro suco of Ainaro district has the highest exposure value. Letefoho suco of Manufahi district and Liurai suco of Ainaro district are the next important sucos with higher educational exposure values. Maubisse suco of Ainaro district has the highest exposure value related to health sector followed by Selo Malere and Ainaro sucos of Aileu and Ainaro districts, respectively. Similarly, for the studied crops exposure, Holarua suco of Manufahi district has the highest exposure value, followed by Letefoho suco of Manufahi district and Maubisse suco of Ainaro district.

6. Social Vulnerability Assessment

Social vulnerability is considered as not only a function of exposure to natural hazards, but also the sensitivity and resilience of the society to prepare, respond, and recover from the natural disasters. Livelihood and economic status influence sensitivity while skills, awareness, social security, etc. improve resilience of the community. A combination of demographic and economic variables was considered for social vulnerability assessment.

Social Vulnerability Index (SoVI)

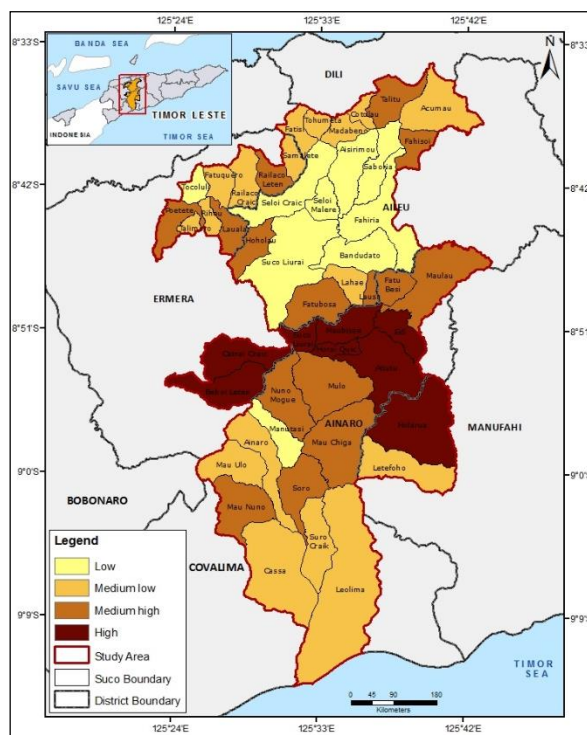
Social Vulnerability Index was developed to identify people, households, groups, and communities with different levels of susceptibility to disasters and drive their ability to respond to various types of hazards that Sucos face. It is an index-based approach selecting socio-economic indicators that have strong influence on the community's well being, sensitivity, and resilience and categorizing the study area into varying groups – high, medium, and low. Indicators at the lowest administrative unit, i.e., suco level were considered and the indices were assigned ranks based on the level of influence.

Suco-specific Vulnerability to Natural Hazards

The sucos were analyzed based on reported hazards for the period 2010-2013 (affected population) along with the economic status of local communities. For comparison of sucos, poverty index was developed considering key economic activities and converting them into monetary terms. Analysis indicates that strong wind is the dominant hazard in the region.

During the field investigation, it was observed that weak building structures and poorly maintained buildings (vulnerable to strong winds) and houses located on unstable slopes (vulnerable to landslides) were the main

residential structures damaged. In addition to the factors contributing to social vulnerability, access to road infrastructure seems to be critical in determining vulnerability.



SoVI across the 49 Sucos

Findings

- Poor access to critical facilities (schools and hospitals) and markets deter the economic growth of the sucos and thus increase social vulnerability.
- Lack of roads restrains quick response as well as retards the development activities of the region. Sucos categorized as very high SoVI have either poor roads or steep topography restraining community access to markets and other critical facilities.
- The social vulnerability is high specifically in sucos in the mountainous areas with poor access to health services, markets, roads, and financial services.
- There is a high dependency on rainfed agriculture as other sources of income are limited and irrigated areas are scant.

7. Hazard Risk Modeling

Natural hazard events such as floods, strong winds, and landslides of different severity can cause significant casualties, property damage, and business interruption to communities; ultimately impacting the people, the economy, the environment, and the long-term development of a region. Hazard risk modeling offers valuable information to assist local governments and communities to determine their risks and make more informed risk management decisions.

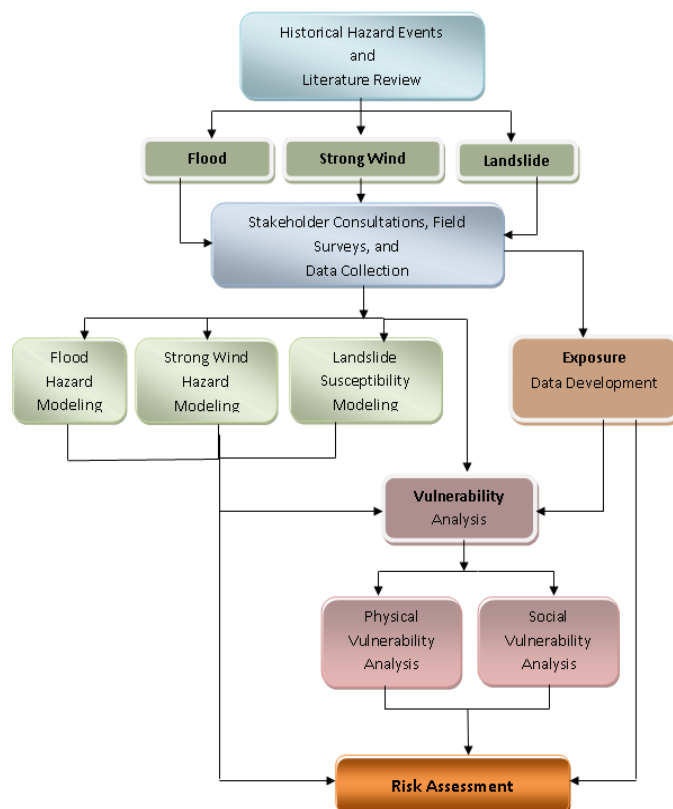
Hazard Risk Modeling Framework

Hazard risk modeling for the risk assessment of the 49 selected sucos in the four districts has taken into consideration the hazard risk equation.

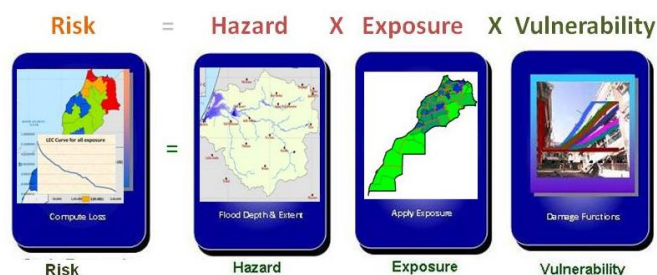
Risk is the uncertainty of future losses. The amount of losses are rather somewhat uncertain as the causative hazard events (e.g. flood, landslide, strong wind, etc.); their locations, dates and times of occurrence; and the degree or amount of damage to assets caused by these events is uncertain. It has thus become imperative to assess what losses accrue due to damage by these natural hazard events.

State-of-the-art methodology for hazard risk modeling and assessment were adopted and followed in the present study. While describing each hazard risk profile, the exposure elements being common to all the three hazards were described before the hazard risk profile of each hazard.

Following is the framework of hazard risk modeling developed and followed in the present study:



Hazard Risk Modeling Framework



Hazard Risk Equation

8. Risk Assessment Results

Since risks are uncertain, they must be stated probabilistically which is expressed in terms of a Loss Exceedance Curve (LEC).

Risk Matrices by Hazard

Probable Maximum Loss (PML):

provides an estimate of losses that are likely to occur, considering existing mitigation features, due to a single hazard scenario event with one or several return-periods.

Loss Exceedance Curve (LEC): plots the consequences (losses) against the probability for different scenario events with different return periods.

Average Annualized Loss (AAL): is the estimated long-term value of losses to assets in any single year within the study area.

Risk metrics (LEC, PML, and AAL and Loss Cost) were used to estimate of the losses and damages attributable to each hazard in the Sucos at risk. Loss is the decrease in asset value due to damage, typically quantified as the replacement or repair cost. Loss estimation is one of the most important tasks in risk analysis.

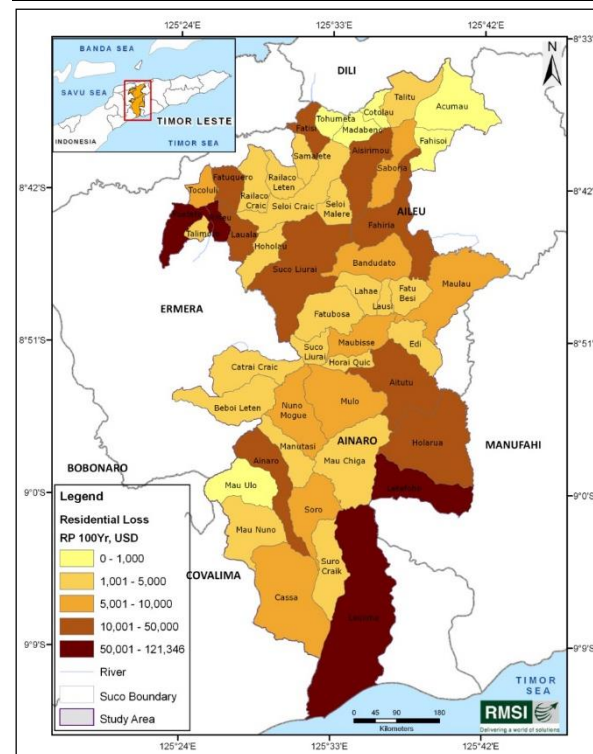
Based on the hazard, exposure, and vulnerability assessment, the risks in terms of economic losses for different sectors under various scenarios were calculated.

Risks Due to Flood Hazard

Probable Maximum Losses (PML) for general occupancy (residential, industrial, and commercial) classes due to floods were calculated. Losses are presented for six key return-periods (2, 5, 10, 25, 50, and 100 years). The table shows that probable maximum losses are to the order of USD 661,158 for residential buildings for a 100-year return period event. However, corresponding numbers for industrial and commercial buildings are not that significant.

Flood Risk/ Loss					
PML for different Year Return Period Flood					
Return Period Years	Losses (USD)				
	Residential	Commercial	Industrial		
2	187,505	49,482	7,964		
5	281,964	74,752	11,909		
10	360,741	94,843	15,416		
25	460,208	121,732	19,082		
50	553,070	146,490	22,652		
100	661,158	174,933	26,591		

AAL for Flood Hazards					
AAL					
Residential		Commercial		Industrial	
USD	Exposure Affected	USD	Exposure Affected	USD	Exposure Affected
1,27,439	0.05%	33,658	0.05%	5,379	0.06%



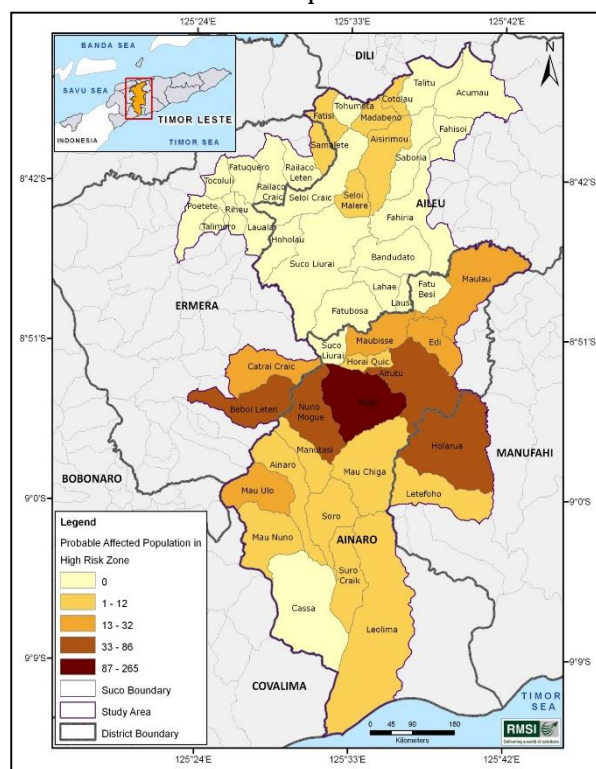
PML for 100 Year Return Period Flood for Residential Buildings

Risks Due to Landslide Hazard

For landslide risk assessment, the hazard component is most difficult to assess due to the absence of a clear magnitude-frequency relation at a particular location. During the analysis, the hazard map was directly overlaid with a building footprint map and all buildings that fell within the high hazard zone were considered to be at high risk.

Landslide Risk/ Loss			
Probable affected exposure from landslide hazard			
Occupancy	Probable Affected Exposure (Million USD)	Probable Affected Exposure %	
Residential	22.84	10%	
Commercial	5.37	7%	
Industrial	0.66	7%	
Schools	1.74	8%	
Hospitals	0.48	11%	
Power Stations	0.00075	2%	
Power Substations	0.074	25%	
Roads	43.41	21%	
Landslide Vulnerability			
Vulnerability			
	Persons	Buildings	Roads
Debris slides, flows and rock fall, > 25° slope	0.9	1	1
Rotational slides and slumps, < 25° slope	0.05	0.25	0.3
Small debris slides, flows, slumps and rock falls	0.05	0.25	0.3

After this, the building footprint was analyzed with the landslide susceptibility map and Australian Geological Survey Organization AGSO vulnerability classes were applied to calculate the affected exposure.



High-risk landslide zones

Risks Due to Strong Wind Hazard

The risks due to strong wind hazard and associated losses were calculated based on hazard, exposure, and vulnerability for different return periods ranging from more frequent to rare events. The risk were calculated in terms of economic losses

different sectors could incur under key return period scenarios.

Strong Wind Risk/ Loss					
PML for the Strong Wind Hazard					
Return Period Years	Losses (USD)				
	Residential	Commercial	Industrial		
2	414,195	38,794	5,228		
5	810,054	72,888	9,433		
10	958,714	82,331	10,282		
25	1,007,578	83,867	10,427		
50	1,061,457	85,324	10,561		
100	1,141,987	89,114	10,779		
AAL for Strong Wind Hazard					
AAL					
Residential		Commercial		Industrial	
USD	Exposure Affected	USD	Exposure Affected	USD	Exposure Affected
304,973	0.13%	27,289	0.04%	3,550	0.04%

Comparative Risk Assessment at Suco Level

To better understand the situation of hazard risks at suco level, the team carried out an exercise to compare the probable maximum loss (PML) for each hazard category. In addition, the team also looked at the Social Vulnerability Index (SoVI) and displayed them together with the risks associated with these hazards. This will be very useful in understanding the coping capacity of the community in terms of hazard risks and disaster management planning and preparedness. The table below presents the comparative overview of risk assessment at suco level. All PML shown in the table below are for 100 year return period and the loss value are in US\$. Higher SOVI number represents higher social vulnerability and vice a versa. Also, range (loss in US\$) of low, medium, and high risk category are defined in the lower part of table below.

Suco Name	District Name	PML- Flood	Flood Risk Category	PML- Landslide	Landslide Risk Category	PML- Wind	Wind Risk Category	SoVI	SoVI Category
Ainaro	Ainaro	62760	High	7135180	High	110761	HIGH	6.11	Low
Suro-Craic	Ainaro	5582	Low	213100	Low	4510	LOW	4.89	Medium
Soro	Ainaro	7800	Low	935989	Low	7370	LOW	4.75	Medium
Manutasi	Ainaro	5263	Low	540423	Low	20338	LOW	6.49	Low
Cassa	Ainaro	11993	Medium	871267	Low	15902	LOW	6.17	Low
Mau-Ulo	Ainaro	21	Low	1022578	Low	9183	LOW	5.09	Medium
Mau-Nuno	Ainaro	1496	Low	719641	Low	11873	LOW	4.53	Medium
Mulo	Ainaro	11497	Medium	6039511	High	129031	HIGH	4.09	Medium
Nuno-Mogue	Ainaro	9395	Low	3619932	High	107130	HIGH	4.01	Medium
Mau-Chiga	Ainaro	4396	Low	1186329	Low	16107	LOW	3.92	High
Maubisse	Ainaro	16164	Medium	3571851	Medium	70815	MEDIUM	2.68	High
Aitutu	Ainaro	14346	Medium	6306068	High	76270	MEDIUM	2.97	High
Edi	Ainaro	5721	Low	1871877	Medium	30082	MEDIUM	3.06	High
Maulau	Ainaro	10245	Medium	2719446	Medium	29549	MEDIUM	3.61	High
Horai-Quic	Ainaro	4284	Low	458540	Low	20110	LOW	3.06	High
Suco Liurai	Ainaro	1655	Low	324340	Low	4559	LOW	2.51	High
Fatu-Besi	Ainaro	2628	Low	818611	Low	8839	LOW	4.35	Medium
Leolima	Ainaro	65561	High	1679099	Medium	40899	MEDIUM	5.25	Low
Aisirimou	Aileu	32776	Medium	283380	Low	21456	LOW	7.46	Low
Bandudato	Aileu	13060	Medium	464358	Low	17961	LOW	7.28	Low
Fahiria	Aileu	12432	Medium	89154	Low	6669	LOW	7.16	Low
Fatubosa	Aileu	4997	Low	1418756	Low	24004	LOW	4.22	Medium
Lahae	Aileu	3087	Low	791066	Low	7643	LOW	5.32	Low
Lausi	Aileu	2329	Low	500194	Low	5067	LOW	4.67	Medium
Hoholau	Aileu	2908	Low	120212	Low	6468	LOW	4.82	Medium
Seloi Malere	Aileu	2580	Low	781219	Low	37884	MEDIUM	6.41	Low
Seloi Craic	Aileu	5006	Low	2429447	Medium	29953	MEDIUM	6.33	Low
Saboria	Aileu	6016	Low	508742	Low	7299	LOW	7.39	Low
Suco Liurai	Aileu	28980	Medium	1126396	Low	61847	MEDIUM	7.66	Low
Acumau	Aileu	0	Low	2276332	Medium	31615	MEDIUM	5.16	Medium
Fahisoi	Aileu	0	Low	504286	Low	13799	LOW	4.68	Medium
Cotolau	Aileu	891	Low	91435	Low	4900	LOW	5.03	Medium
Talitu	Aileu	4819	Low	1531740	Low	24727	LOW	4.72	Medium
Madabeno	Aileu	325	Low	1241234	Low	14695	LOW	5.19	Medium
Tohumeta	Aileu	462	Low	642118	Low	8029	LOW	6.11	Low
Fatisi	Aileu	15940	Medium	610280	Low	7325	LOW	5.22	Medium
Tocoluli	Ermera	15762	Medium	358967	Low	8397	LOW	6.45	Low
Fatuquero	Ermera	46290	Medium	124543	Low	16837	LOW	5.21	Medium
Railaco Craic	Ermera	4385	Low	537343	Low	10792	LOW	5.42	Low
Railaco Leten	Ermera	3072	Low	622826	Low	9367	LOW	3.81	High
Samalete	Ermera	4028	Low	742989	Low	8348	LOW	6.19	Low
Poetete	Ermera	83172	High	1385110	Low	55061	MEDIUM	4.68	Medium
Talimoro	Ermera	1157	Low	1137439	Low	11317	LOW	5.89	Low
Riheu	Ermera	183205	High	429766	Low	38928	MEDIUM	5.44	Low
Lauala	Ermera	24498	Medium	510927	Low	18795	LOW	4.34	Medium
Catrai-Craic	Ermera	3350	Low	1381052	Low	20162	LOW	1.62	High
Beboi Leten	Ermera	3668	Low	1139905	Low	17090	LOW	2.52	High
Letefoho	Manufahi	166430	High	7288707	High	35174	MEDIUM	6.07	Low
Holarua	Manufahi	20857	Medium	1203558	Low	15915	LOW	3.25	High

Risk Category	Hazard Type			Social Vulnerability
	Probable Maximum Loss (US\$)			Index
	Flood	Landslide	Strong Wind	SoVI
High	83,172 - 183,205	3,619,932 - 7,288,707	107,130 - 129,031	1.62 - 3.92
Medium	32,776 - 83,172	1,679,099 - 3,619,932	29,549 - 76,270	4.01 - 5.22
Low	0 - 32,776	89,154 - 1,679,099	4,510 - 24,727	5.25 - 7.66

Comparative overview of risk assessment at suco level

9. GIS Database Development

The detailed overview of the development of the database of population, buildings, infrastructure assets, and crops for the 49 sucos in the study area distributed over four districts of Timor-Leste. Data management and inventory of such vulnerable buildings, infrastructure, demographics, and other asset elements (e.g., crops) present in hazard zones that were considered for risk assessment have been developed.

Following are important details:

- Collected, collated, and updated all the data available from different sources.
 - High-resolution (0.5m) Pleiades satellite images have been procured through the World Bank. RMSI team processed these imageries and used them to capture building footprints (2014) for the entire study area. A total of 47,846 building footprints in the study area were captured
 - Improved Land Use Land Cover by updating all the data of building level footprints
 - Developed Digital Terrain Model (DTM) using 20m interval contours, high resolution DSM, and Spot-heights for the study
-
- Estimated 2014 population distribution at suco level using Census 2010 data

published by the National Directorate of Statistics, Timor-Leste and population growth rates.

- Developed and improved hazard models for flood, strong wind, and landslide.
- Developed Social Vulnerability Index (SoVI) for each suco for a comparative analysis at suco level.
- Develop suco level hazard and risk profile
- All the GIS data, outputs, and the Suco level Risk Atlas have been uploaded to a GeoNode created by SOPAC/SPC team for Timor-Leste.

10. Capacity Building and Knowledge Transfer

The technical capacity building under this project is viewed as a building block for subsequent strengthening of NDMD capacity to undertake risk assessment exercises. The capacity building and knowledge transfer was divided into three specific categories: in-class intensive training with hands-on, on-the job training through participation to field data collection and field survey, and finally through workshops.

Training



Training Session for Stakeholders at Timor-Leste

As part of their technical capacity development, the staffs at NDMD as well as key stakeholders within ministries were trained within a total of seven days of intensive sessions that included hands-on exercises and one-to-one support was conducted in Dili, Timor-Leste for these select participants. Participants were introduced to the concept of multi-hazard risk assessment with specific sessions on landslides assessment and participation to the social vulnerability assessment survey.

The GIS training were focused on the basics of QGIS, open-source geospatial software that is now installed on all of NDMD's computers. Participants were also trained on the use of the GeoNode PacRIS platform. This GeoNode platform has been specifically developed for Timor Leste, in collaboration with SOPAC/SPC team.

Feedbacks from training were received from the participants through structured questionnaires during different sessions. The participants found the training program useful and rated it from good to excellent.

Field training

NDMD staffs were also trained on-the job during field-surveys and data collection for landslide, flood, and social vulnerability. Officers from NDMD participated in the initial study area observations on May 7, 2014. Officers joined the social vulnerability assessment and landslide field-data collection during May 23- June 7, 2014 to improve their capacity.

Workshops



Workshop with Stakeholders at Timor-Leste

The project has adopted an inclusive approach since the start. Workshops were organized to massively disseminate information about the project to stakeholders and beneficiaries. In total, three one-day workshops were conducted at inception, mid-term, and final stage of the project. The objectives of the workshops were to communicate about the progress and main findings of the project, and to obtain feedback from stakeholders and beneficiaries. Representatives from different ministries of the Government of Timor Leste, donor and partners, NGOs and Civil Societies participated in the workshops. Representatives from the studied Districts and Sucos also attended each workshop.



CBDRM Manual

PARK MANUAL

for CBDRM Pilot Project
Along Dili-Ainaro Road Corridor

NDMD
Timor-Leste



TABLE OF CONTENTS

<i>Acknowledgements</i>	iii
<i>Preface</i>	iv
<i>Abbreviations</i>	v
<i>Chapter 1 Introduction</i>	1
1.1. <i>Background</i>	1
1.2. <i>Project Manual</i>	3
1.3. <i>Structure of the Manual</i>	3
1.4. <i>Who Are Users of the PARK Manual?</i>	6
<i>Chapter 2 Disaster, Climate Change and the Impact to Livelihoods in Timor Leste</i>	8
2.1. <i>Climate Change in Timor Leste</i>	8
2.2. <i>Disasters in Timor Leste</i>	9
2.3. <i>Floods, Landslides and Strong Winds along the Dili-Ainaro Road Corridor</i>	11
2.4. <i>Impact Climate Change and Disaster to Livelihoods</i>	12
<i>Chapter 3 CBDRM/CCA and Timor-Leste's Disaster Risk Management System</i>	15
3.1. <i>Framework - DRM, CCA and Livelihoods</i>	15
3.2. <i>Climate Change Adaptation (CCA)</i>	17
3.3. <i>Community Based Disaster Risk Management (CBDRM)</i>	18
3.4. <i>Principles</i>	20
3.5. <i>Terms in CBDRM</i>	21
3.6. <i>Participatory Development</i>	24
3.7. <i>Timor-Leste's Disaster Risk Management System</i>	25
<i>Chapter 4 PARK Project – CBDRM Program in Timor Leste</i>	28
4.1. <i>Objective</i>	28
4.2. <i>Targets</i>	28
4.3. <i>Strategies and Approaches</i>	28
4.4. <i>PARK Project Cycles</i>	30
<i>Chapter 5 PARK Management at the Suco Level</i>	40
5.1. <i>Strengthening of Local Government</i>	40
5.2. <i>Community Organizing</i>	42
5.3. <i>Resources for Community Project Initiatives</i>	43
<i>Chapter 6 Integrated Program with PNDS</i>	48
<i>Annex: Best Practices in CBDRM</i>	50
<i>Annex 1: CBDRM in Indonesia</i>	50
<i>Annex 2: CBDRM in Vietnam</i>	56
<i>References</i>	59

List of Tables

Table 1.1: Users and Benefits of the Manual.....	6
Table 1.2: Project activities, guidelines, modules and learning media	6
Table 2.1: Historical Loss Due to Strong Winds, Floods, and Landslides in Timor Leste (1992-2003)	13
Table 3.1: Disaster Management Activities.....	18
Table 4.1: Purposes, Activities, and Expected Result Project Dissemination and Community Consultation	31
Table 4.2: Purposes, Activities, and Expected Result Community Risk and Needs Assessment	32
Table 4.3: Purposes, Activities, and Expected Result Community Risk Reduction Planning	34
Table 4.4: Purposes, Activities, and Expected Result Integrated Planning and Partnership	35
Table 4.5: Purposes, Activities, and Expected Result Community Managed Impelemntation	35
Table 4.6: Purposes, Activities, and Expected Result Participatory Monitoring, Learning and Evaluation ..	37
Table 4.7: Implementation Timetable at Suco Level.....	38
Table 5.1: Strenghtening the Roles Xefe Suco, Suco Council and SDMC	40
Table 6.1: Integrated with PNDS	49

List of Figures

Figure 1.1: PARK Manual Structure.....	4
Figure 2.1: Landslide Hazard in Timor Leste	9
Figure 2.2: Flood Risk in Timor Leste	10
Figure 3.1: Framework for DRM/CCA and Livelihood.....	16
Figure 3.2: Disaster Management Cycle	19
Figure 3.3: National Disaster Management Structure of Timor-Leste.....	26
Figure 4.1: PARK Project Cycle	30
Figure 5.1: Proposal and Support Procedure for Community Project Initiative	46

Acknowledgements

The Government of Timor Leste has declared disaster risk management to be one of the priorities of development and a multi-sector responsibility (National Disaster Risk Management Policy (NDRMP) document 2008 – 2013). Disasters that occur in Timor Leste are heavily influenced by the seasons considering the geographical location of East Timor which is situated amid Australia and the Pacific Ocean. Based on experience and several studies on flooding, strong winds and landslides, it is concluded that they are a high threat to lives. Although disasters in the past were local, they should be anticipated in order not to cause a greater impact in the future.

The threat of disaster is estimated to be greater along the Dili-Ainaro road corridor due to the construction plan of the road. In conjunction with the road building, the government of East Timor through Ministry of Social Solidarity (MSS) and National Disaster Management Directorate (NDMD) developed a program to be named PARK - *Programa Aprendijazen Reziliensia Komunidade*. The implementation of this program is along the Dili- Ainaro road corridor and is a pilot project which will be the learning process for communities and the various stakeholders in Community-Based Disaster Risk Management (CBDRM). The pilot project will run for three years from 2015 to 2017. The results of the study will be a pilot project for the development of teaching materials for a broader program throughout Timor Leste.

This manual program is expected to assist program implementation and make it more effective both at the level of government and society, so that at the end of the program, the objectives of the program are achieved.

The program is supported by the ACP-EU Natural Disaster Risk Reduction Programme, an initiative of the African, Caribbean and Pacific group, funded by the European Union and managed by the Global Facility for Disaster Reduction and Recovery.

Dili, January 29, 2015
Ministry of Social Solidarity

Isabel Amaral Guterres

Preface

Floods, landslides and strong winds threaten some communities in Timor Leste, including along the Dili – Ainaro road corridor. This causes vulnerability in people living in these disaster-prone areas. Almost 80 percent of Timor Leste’s community livelihood depends on agriculture, and disasters like floods, landslides and strong winds decrease the quality of life.

The implementation of the *Programa Aprendizagem Resiliencia Komunitade* (PARK) program, which is a CBDRM pilot project along the Dili-Ainaro road corridor, is intended to improve community resilience given the threat of flooding, landslides and strong winds. This program puts the community as the main actor who is responsible for the implementation of the activities. To ensure effective program implementation, it is necessary to have a PARK Manual and Technical Guidelines book, a complementary document.

PARK Manual is a general guideline for the implementation of the CBDRM pilot project at the community level, while the technical guidelines are detailed methodologies for each stage of the activity cycle developed in PARK.

This manual will:

- Guide the facilitator implemented quality control management program at the community level.
- Guide the community in the planning, implementation and maintenance of development outcomes related to disaster risk management.
- Guide program managers in controlling the achievement of each component of the program.
- Guide the monitoring and evaluation of community assistance programs in order to prepare the program accountability report.

Thus, it is expected that all PARK components will work well, and the community resilience to disaster risks can be increased to achieve a sustainable livelihood.

Dili, January 29, 2015
Director of NDMD

Francisco F.M. do Rosario

Abbreviations

CBDRM	Community-Based Disaster Risk Management
CCA	Climate Change Adaptation
CCFSC	Central Committee for Flood and Storm Control
CIGD	Inter-Ministerial Commission for Disaster Management
CVTL	Cruz Vermelha de Timor Leste
DARD	Department of Agriculture and Rural Development (Vietnam)
DDMC	District Disaster Management Committee
DED	Detail Engineering Design
DRM	Disaster Risk Management
DRR	Disaster Risk Reduction
FDTL	Defence Force of Timor Leste
INGO	International Non-Governmental Organization
MAF	Ministry of Agriculture and Fishery
MARD	Ministry of Agriculture and Rural Development (Vietnam)
M & E	Monitoring and Evaluation
MLE	Monitoring, Learning and Evaluation
MoU	Memorandum of Understanding
MPW	Ministry of Public Work
MSS	Ministry of Social Solidarity
NDC	National Disaster Coordinator
NDMD	National Disaster Management Directorate
NDRMP	National Disaster Risk Management Policy
NGO	Non-Governmental Organization
O & M	Operations and Maintenance
PARK	Programa Apendijazen Reziliensia Komunitade
PIU	Project Implementation Unit

PNDS National Suco Development Program
POM Project Operation Manual
SDDMC Sub-District Disaster Management Committee
SDMC Suco Disaster Management Committee
TG Technical Guidelines
TM Technical Manual

Chapter 1 Introduction

1.1. Background

Timor-Leste, which has a mountainous topography, is located in an area of high regional seismic activity and exposure to heavy monsoon rains; conditions that make the population and assets susceptible to disasters. While most disasters in Timor Leste are localized and periodic, they do have serious impacts on local communities. Major hazards include flash floods, droughts, landslides and destructive winds. In addition, substantial risk of earthquakes and tsunamis have the potential to impact several areas along the southern coast.¹

From November to April, this part of the country is at risk from tropical cyclones and lesser tropical storms which can cause coastal flooding and wave damage. In the dry season, drought conditions exist in large parts of Timor Leste. A delay in the onset of seasonal rains can become disastrous as fires can quickly spread out of control. Due to the effects of El-Nino, severe drought conditions have appeared in some parts of the country at two year intervals.²

Local communities are vulnerable in many areas, and disasters can cause people's livelihoods to become unsustainable. In addition to El-Nino, the la Nina weather phenomena has also had a significant impact on Timor Leste communities, both positive, in terms of improving agricultural production and water security, and negative in terms of increased flooding, landslides and soil erosion. Although Timor Leste has no active volcanoes, it could be affected by the Holocene volcanic groups in the neighboring Indonesian Islands to the West and East. To date, cyclones have had a low frequency of occurrence. In the future however, this is likely to change. Climatologists are predicting that due to climate change, Timor-Leste is likely to become increasingly vulnerable to cyclones, tropical storms, floods, landslides and water borne diseases like malaria, dengue fever and other emerging infectious diseases.³

The Government of Timor Leste has been committed to managing disaster risks as detailed in The National Disaster Risk Management Policy of 2008-2013 (NDRMP). This document outlines a set of priorities that includes elevating Disaster Risk Management (DRM) to a national policy priority, generating political commitment, and making DRM a multi-sector responsibility. Institutionally, disaster risk management in Timor-Leste is coordinated by the National Disaster Risk Management Directorate (NDMD), which is the lead agency under the Ministry of Social Solidarity (MSS). NDMD has a district level agency that is related to disaster risk reduction, namely the District Disaster Management Commission (DDMC). At the sub-district level, there is the Sub-District Disaster Management Commission (SDDMC) and at the suco level, there is the Suco Disaster Management Commission (SDMC).

One of the commitments of NDMD on disaster risk management is to provide a pilot project along the Dili-Ainaro road corridor as part of road building. The Government of Timor Leste will build a 110 km road between Dili and Ainaro. This road will increase communities' access to public services, employment and markets, and facilitate efficient and reduced-cost movement of people and goods. The Dili-Ainaro road corridor area is located among the hills and valleys in the region. It lies at an altitude of 1.195 to 2.000 meters above sea level. The humidity averages 76.45 percent with heavy rainfall throughout the year. Nowadays the rainy season has become longer, averaging eight to nine

¹ Pacific Castrathope Risk Assessment and Financing Initiative (PCRAFI), Timor Leste Risk Profile, 2011

² Asian Disasters Preparedness Center, 2006.

³ National Disaster Risk Management Policy, MSS Timor-Leste, 2008

months, from April to December.⁴ Climate change and heavy rainfall are two causes of floods, landslides and strong winds along the Dili Ainaro road corridor.

Many of the communities along the Dili-Ainaro road corridor are vulnerable as they are situated in areas with difficult road accessibility, and their capacity to deal with possible disasters is low. The effects of disasters on Timor Leste's transportation infrastructure multiplies the negative impact of disasters on the national and local economy by restricting connectivity and accessibility, and hindering the movement of people, goods, agricultural products and services.

NDMD has to manage sustainable and resilient road infrastructure on the Dili-Ainaro road corridor throughout its rehabilitation. It is expected that the rehabilitation will significantly improve the connectivity and accessibility of the rural population, which in turn is expected to provide opportunities for making livelihoods more resilient, including resilient to disaster/climate risks.

According to the needs assessment conducted by the World Bank in several sucos along the Dili-Ainaro road corridor, DDMC-SDDMC and SDMC work mostly in response to the occurrence of disasters. The efforts are still limited to responding to disasters, and there isn't an overall systematic effort in disaster management that ranges from mitigation to rehabilitation and reconstruction. The communities that participated in the efforts were limited and dependent on the government and the other agencies.

A community based approach will be effective to managing disaster risks. The importance of community-based approaches has long been recognized in promoting a culture of safety through a reduction of location vulnerability and building capacity. Based on experiences in Indonesia⁵, Vietnam⁶ and many other countries, a community based approach is seen to be effective in minimizing the negative impact of disasters and improving communities' livelihoods. It is the active participation and involvement of communities at the grassroots level that makes the community involved in the whole process. If the community is involved in the whole process, their real needs and problems will be identified. Problems will be addressed with appropriate interventions, and the probability of huge losses of life and property minimized

To address these needs, NDMD, with support from the World Bank, developed a community-based disaster risk management (CBDRM) project for capacity building along the Dili-Ainaro road corridor. In Phase I of this project, NDMD and the World Bank conducted studies consisting of: (1) A hazard and risk assessment focusing on landslides, floods, and strong winds, and (2) A capacity building needs assessment for planning and delivering community based disaster risk management. Phase II of the CBDRM project will be implemented as a pilot project in 26 Sucos in 4 districts along the Dili-Ainaro road corridor. The pilot project is to be named PARK - *Programa Aprendizajen Resiliensia Komunitade*.

⁴ Study Report, CBDRM Needs Assessment, Building Climate and Disaster Resilience in communities along Dili Ainaro Road Corridor Timor Leste, The World Bank, 2014.

⁵ REKOMPAK, government program in Java, NAD and West Sumatera, supported by the World Bank.

⁶ CBDRM activities have been carried out in Thua Thien Hue and Quang Tri province by CIS and World Vision since 2001. Since then CBDRM projects/ programmes have been implemented in various area in Vietnam.



PARK is expected to be one of the learning instruments through which the community and other stakeholders implement CBDRM. Through PARK projects in the pilot sites, it is expected that the community will have opportunities to practice DRM and improve their capacity in this area. The knowledge gained from this project can be used by the community and other stakeholders to improve their practice of CBDRM in the future.

1.2. Project Manual

The PARK project will be implemented in 26 Sucos in 4 districts along the Dili-Ainaro road corridor, and is eventually expected to be expanded to the whole country. This project will be managed by various stakeholders at the national, district, sub-district and suco level. The participating actors all have different levels of knowledge, requiring project guidelines in the form of an operation manual.

The PARK manual has the following three functions:

- It will be a guideline for the actors on the field regarding the actions that should be taken, the actions that should not be taken, and the achievements expected of the program;
- It will provide standard quality assurance for project achievement at the suco level that can make it easier for the national evaluation to determine whether the program is successful or not; and
- It will facilitate replication and adoption by different actors.

1.3. Structure of the Manual

The guidelines describe the rules, procedures and management of the PARK project in general. They also detail implementation steps outlined in the technical guidelines. The content of the technical guidelines include the concept of each project cycle, detailed methodology and technical facilitation. The guidelines for facilitators and the community will be incorporated into the project. They will be

- **Capacity Building Strategy:** contains guidelines related to training and communication strategy at all levels.
- **Learning materials:** are learning kits created to improve the capacity of facilitators and the community on CBDRM concepts (training modules and learning media).
- **Communication Kits:** are communication material created to help facilitators and community champions undertake awareness campaigns and disseminate PARK to communities. The materials include flip charts of PARK project cycles that contain the principles and activities for each phase of the project activity.

The guideline logframe can be seen on Table 1.2.

1.4. Who Are Users of the PARK Manual?

The main target/user groups of the PARK manual are facilitators, xefe suco⁷, suco council⁸ and volunteers⁹ in the community who are willing to facilitate CBDRM program in the context of Timor Leste. The secondary target/user groups are Program Implementation Unit (PIU) members who are responsible for capacity building and monitoring of all project activities, including the Community Grant. The users of the manual are described in detail in Table 1.1.

Table 1.1: Users and Benefits of the Manual

Users	Benefits	Relevant Document
Project Implementation Unit (PIU)	<ul style="list-style-type: none"> • Understand the objectives of the project. • Have quality assurance. • Have indicators of monitoring, learning and evaluation. 	<ul style="list-style-type: none"> • PARK Manual • Capacity Building Strategy
Program Facilitators	<ul style="list-style-type: none"> • Understand CBDRM, CCA and impact to livelihoods • Understand PARK project and dissemination to the community. • Provide services to the community. • Have guidelines for their roles. • Have quality assurance. 	<ul style="list-style-type: none"> • PARK Manual • Technical Guidelines • Learning Materials • Communication Kits
Xefe Suco, Suco Council and volunteers	<ul style="list-style-type: none"> • Understand CBDRM and CCA and its impact to livelihoods. • Understand PARK project and its rules. 	<ul style="list-style-type: none"> • Park Manual Chapters 2,4 • Technical Guidelines 2 - 5 • Learning Materials • Communication Kits
The Community	<ul style="list-style-type: none"> • Understand PARK project and its benefit for their livelihoods • Have indicators of participatory monitoring and evaluation. 	<ul style="list-style-type: none"> • Learning Materials • Communication Kits

Table 1.2: Project activities, guidelines, modules and learning media

⁷ The Xefe suco is a suco chief who is elected by the community.

⁸ Suco council is comprised of community representatives (xefe suco, traditional leaders, Indigenous elders, hamlet chiefs, women and youth representatives).

⁹ Champions in the community who are willing to facilitate CBDRM

Project Activities, Guidelines, Modules and Learning Medias

	Project dissemination and community consultation	Community Risk and Needs Assessment	Suco Planning	Integration Planning and Partnership	Community Managed Implementation	Community Monitoring, Learning and Evaluation
Community Activities	<p>Community dream</p> <p>Community hazard profile and vulnerability context</p> <p>Hazard Map and exposure</p> <p>Risk Map (land use, houses and basic infrastructures)</p> <p>List of external and internal potential to reduce disaste</p> <p>Increased community awareness</p>	<p>Suco master plan (mid term planning for 3 years).</p> <p>First year planning.</p> <p>List of community contributions</p>	<p>Integraion of community planning into suco planning</p> <p>Partnership between communities, government and stakeholders</p>	<p>Community Grant Planning (including DED) and implementation</p> <p>O & M Planning</p> <p>Community groups</p> <p>Safeguards</p>	<ul style="list-style-type: none"> • M, L & E system. • M, L & E report. • Input for next year plan. • Learning communities 	
Facilitator	<p>Informal meeting with community leader</p> <p>Suco workshop</p>	<p>Participatory Suco and Aldeia assessment</p> <p>Suco workshop</p> <p>Public consultation</p>	<p>Planning workshop</p> <p>Working groups</p> <p>Public consultation</p>	<p>Social Marketing</p>	<p>Working groups</p> <p>Building community groups</p>	<p>M,L & E working group</p> <p>Share learning</p>
Facilitator	<p>Socialization</p> <p>Social Analysis</p> <p>Awarness campaign</p> <p>Documentation</p>	<p>Awarness campaign</p> <p>Training for community</p> <p>Facilitation</p> <p>Documentation</p> <p>Monitoring and evaluation</p>	<p>Awarness campaign</p> <p>Training for community</p> <p>Facilitation</p> <p>M & E</p> <p>Documentation</p>	<p>Awareness campaign</p> <p>OJT for working groups,Xf Suco ,SDMC</p> <p>Facilitation</p> <p>M & E</p>	<p>OJT community working groups and community groups</p> <p>Awareness campaign</p> <p>Facilitation</p> <p>M & E</p>	<p>OJT community working group</p> <p>Awareness campaign</p> <p>Facilitation</p> <p>M& E</p>
Guidelines	<p>PARK CBDRM Manual</p> <p>TM- 00</p>	<p>PARK CBDRM Manual</p> <p>TM-01</p>	<p>PARK CBDRM Manual</p> <p>TM - 02</p>	<p>PARK CBDRM Manual</p> <p>TM - 03</p>	<p>PARK CBDRM Manual</p> <p>TM - 04</p>	<p>PARK CBDRM Manual</p> <p>TM - 05</p>
Modules & Media	<p>Basic training modules of Facilitators</p> <p>Flip-chart of PARK cycle</p> <p>Film animation</p> <p>CBDRM Poster</p>	<p>Basic training for community</p> <p>Flip-chart of PARK cycle</p> <p>Film animation</p> <p>CBDRM Poster</p>	<p>Project cycles flipchart</p> <p>Soil fertility management Poster</p> <p>1st advanced training modules</p>	<p>The results of community risk, needs assessment and planning.</p> <p>1st advanced training modules</p>	<p>Project cycles flipchart</p> <p>Soil Fertility management poster</p> <p>2nd advanced training modules</p>	<p>Project cyles flipchart</p> <p>The results of all activities</p> <p>3th advanced training Modules</p>

Chapter 2 Disaster, Climate Change and the Impact to Livelihoods in Timor Leste

2.1. Climate Change in Timor Leste

In the current global situation, people are faced with the challenge of adapting to climate change. The current rate of global climate change is unusually high compared to the past. Over the past 100 years (1906–2005), global surface temperatures have increased by 0.74°C (90 percent, uncertainty interval 0.56–0.92) with global warming occurring faster over land than over oceans.¹⁰

In Timor Leste, climate change is occurring. Prediction for the future indicates an increase in temperature of around 1.5°C and an increase in rainfall of around 0 – 10% over the next 50 years. It is predicted that there will be a greater increase in rainfall in the higher altitudes where the rainfall is generally higher.¹¹ Timor- Leste has a monsoonal climate with a dry and a wet season. The dry season occurs from around May to October and the wet season from November to April.

Timor-Leste's climate is affected by the Western Pacific Monsoons; weather which is driven by large differences in temperature between land masses and the ocean. It moves north to mainland Asia in the Southern Hemisphere during the winter, and south to Australia in the Southern Hemisphere during the summer. Its seasonal arrival usually brings a switch from very dry to very wet conditions. The normal South-Easterly trade winds in Dili are replaced by Westerly Winds from the onset of monsoon season until the end of the monsoon season

The temperature in Timor-Leste is significantly influenced by El-Nino and La-Nina because Timor-Leste is located between Australia and the Pacific Ocean. In all places, El Nino causes reduced rainfall in the January to March wet season, with some places experiencing reduced rainfall in comparison to the amounts usually received in these months during non-El Nino years. In general, the wet season is delayed by two to three months in El Nino years, a phenomenon that has implications for crop planting and food security. In the year following an El Nino, rainfall can be higher than the annual average, with implications for flooding (Barnett et al., 2007).

El- Nino is the climate disruption caused by sea-surface temperatures in the tropical part of the Pacific ocean, specifically in the equatorial central and eastern parts. Increasing temperatures in the Pacific ocean leads to changes in wind and rainfall patterns. In normal times, heavy rainfall occurs in Australia, Timor-Leste and Indonesia, but due to El-Nino, heavy rainfall instead occurs in the Pacific Ocean, while on the eastern side of the Pacific, parts of Australia, New Zealand, the Philippines, Timor-Leste and Indonesia, drought conditions are experienced.

La Nina is the climate disruption caused by Pacific Ocean sea-surface temperatures in the surrounding areas. The large pool of warm water in the Pacific shrinks because the eastbound trade winds strengthen and carry the colder surface water from the east to the west. This reduces the overall temperature of the surface water. On the eastern side of the Pacific Ocean, West Australia, Timor –Leste and Indonesia, rainfall is generally heavier than normal and can result in increased flooding everywhere.

¹⁰ Global Climate Change and Extreme Weather Events, 2008

¹¹ Climate and Soil Research, Seed of Life Timor Leste, 2014

2.2. Disasters in Timor Leste

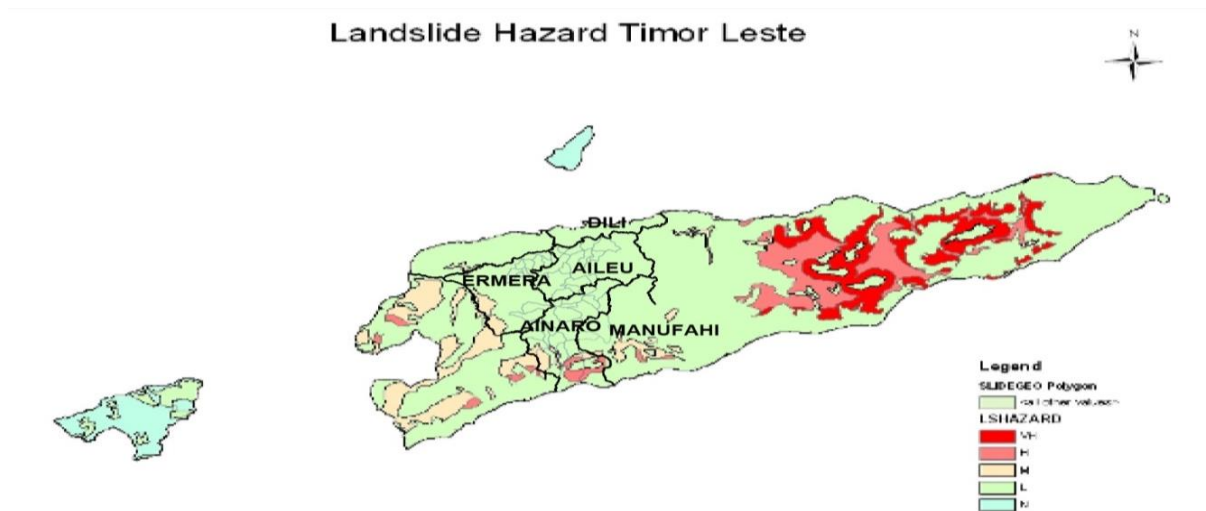
Climate conditions in Timor Leste make the country prone to flooding, landslides and strong winds. During La Nina years, above normal rainfall leads to increased flooding and landslides. The Government of Indonesia has estimated that 67 percent of the total area of the island of Timor (including Timor-Leste) is prone to landslides and 6 percent to flooding.¹²

Geographical conditions combined with extreme climate events are known to cause landslides, which in turn causes significant damage to agricultural land and infrastructure. In 1999, landslides affected nearly 30 percent of the country's road system (2,332 km).¹³ Furthermore, the risk of hazards is being exacerbated due to ecosystem degradation resulting from existing land-use practices such as: i) timber logging; ii) slash-and-burn agriculture; iii) overharvesting of fuel wood; and iv) burning for hunting and fodder production.

Landslides

Landslide hazards are categorized into five levels: very high, high, medium, low and no data. The Landslide Map below (Figure 2.1) shows that the eastern half of the country contains almost all the areas of 'very high' and 'high' landslide hazards.

Figure 2.1: Landslide Hazard in Timor Leste



Source: UNDP, 2010

Inappropriate land clearing for subsistence farming, illegal logging and agricultural practices on steep land has caused an increase in land erosion. Severe landslides often destroy agriculture, forests, property and infrastructure.

Floods

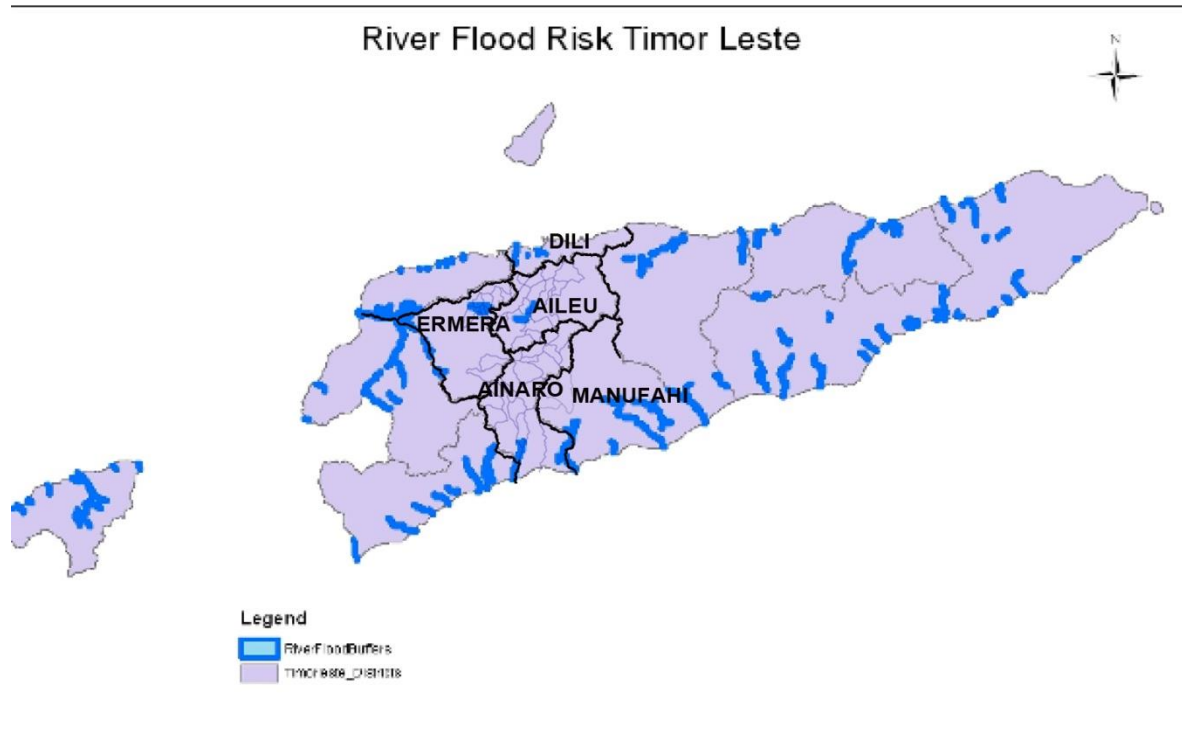
¹² Indonesia Regional Physical Planning Project for Transmigration (RePPPProT), 1989

¹³ GERTIL

Flooding in Timor-Leste occurs as flash-flooding, when the heavy seasonal rain in high catchment basins converges into tributaries as it descends, resulting in the rapid rise of discharged water. La Nina, which brings heavy rainfall, causes an increase in floods. According the data from NDMD, the number of floods has increased since 2010. From 2001 to 2009, NDMD recorded 32 floods, a number which has increased to 185 since 2010.

The map below (Figure 2.2) shows the areas where water accumulates in lowland or upland flood plains when river banks have insufficient capacity to contain the flow.

Figure 2.2: Flood Risk in Timor Leste



Source: UNDP, 2010

Strong Winds

Different extreme temperatures between the Pacific Ocean and Australia results in increased wind speeds. Most of the country traverses a steep mountainous topography which includes a lot of hills and valley areas. Winds through the hills and valleys can merge in one place and generate strong and powerful winds. Strong winds are most frequent during the easterly trade wind season which occurs between March-April and September-October.

2.3. Floods, Landslides and Strong Winds along the Dili-Ainaro Road Corridor



According to the needs assessment conducted by the World Bank in several sucos along the Dili-Ainaro road corridor, the communities in these areas consider the weather to have become increasingly unpredictable from three years ago. The dry season extends over a longer period of time, and the wet season can occur twice in one year. The beginning of the wet season has been delayed over two to three months.



There are three types of hazard and disaster risks. The sucos which are located in the hilly areas have strong winds and landslides, and the sucos which are located in the valley areas have strong winds and floods.

Floods and landslides occur in the event of heavy rains. In general, landslides occur at higher elevations with a slope of about 45 degrees or higher, and on lands along rivers during the times when heavy rains increase the water volume. On soil structures with cavities and plenty of cracks, the beginning of the rainy season brings a water content which increases rapidly and the soil quickly becomes saturated. Rain water infiltrates the cracks and accumulates at the bottom of the soil layer and results in lateral soil movement which causes landslides.

2.4. Impact Climate Change and Disaster to Livelihoods

Climate change and disasters impact the quality of natural resources which in turn affects livelihoods. The changing climate impacts society and ecosystems in a broad variety of ways. Climate-related impacts are occurring across regions, and affect many aspects of livelihood. Changes in temperature and the frequency and intensity of extreme weather could have significant impact on crop yields. Warmer temperatures may make many crops grow more quickly, but warmer temperatures could also reduce the total yield. Crops tend to grow faster in warmer conditions. However, for some crops (such as grains), faster growth reduces the amount of time that seeds have to grow and mature, which in turn can reduce yields.

Changes in the frequency and severity of droughts and floods also poses challenges for farmers. More extreme temperatures and precipitation can prevent crops from growing. Extreme events, especially floods and droughts, can harm crops and reduce the yield. Dealing with drought could become a challenge in areas where summer temperatures are projected to increase and precipitation is projected to decrease. As water supplies are reduced, it may be more difficult to meet water demands.

Droughts may threaten pastures and feed supplies. Drought reduces the amount of quality forage available to grazing livestock. Some areas could experience longer and more intense droughts as a result of higher summer temperatures and reduced precipitation. For animals that rely on grain, changes in crop production due to drought could also become a problem.

Disasters in Timor Leste are generally localized but have an impact on community livelihoods. These events cause damage to land and plantations directly. A decrease in food production could have an impact of the national economy. Agriculture is the most important sector as 80 percent of the population are farmers, and the majority of food consumption depends on local food production. Floods, landslides and strong winds have caused basic infrastructure damage. Damages caused by strong wind, flood, and landslide can be seen in the following table (Table 2.1).

Table 2.1: Historical Loss Due to Strong Winds, Floods, and Landslides in Timor Leste (1992-2003)

District	Losses Due to Strong Wind Events				Losses Due to Flood Events				Losses Due to The Landslide Events			
	Houses Destroyed	Houses Damaged	Victims	Affected	Houses Destroyed	Houses Damaged	Victims	Affected	Houses Destroyed	Houses Damaged	Victims	Affected
AILEU	3	7	4	7	2	8	11	10	-	15	-	15
AINARO	38	1,415	4,538	1,571	5	310	312	906	-	95	-	36
BAUCAU	1	65	100	54	-	10	3	10	25	19	44	44
BOBONARO	61	30	272	89	-	15	38	8	-	10	-	10
COVALINTA	-	110	78	-	650	5,312	5,998	5,036	-	54	54	41
DILI	3	86	99	267	6	3,478	1,625	3,264	8	41	116	135
ERMERA	3	306	266	364	-	168	162	-	1	-	-	-
LAUTEN	-	57	59	82	-	275	275	245	-	2	2	2
LIQUIDA	-	30	-	86	1	56	75	140	-	-	-	-
MANATUTO	1	17	5	14	-	386	125	1,451	4	18	96	103
MANUFAHI	2	436	238	439	21	1,540	2,095	2,963	-	-	-	-
OECUSSE	-	43	1	43	-	73	147	73	-	2	2	2
VIQUEQUE	17	210	403	223	1	23	24	23	-	-	-	-

Source: Desinventar 1992 - 2003

Strong winds often damage vulnerable housing structures and thus directly affects the people. From 2002 to 2011, there were about 19 strong wind events experienced in the country that affected a total of 2,015 individuals and damaged 1,863 houses. For example, the cyclonic winds from tropical cyclone “Daryl” in 2006 destroyed more than 500 houses, and corn and rice crops in at least four districts. The destructive winds blew off rooftops, overturned houses and knocked down infrastructure such as power lines. A similar case occurred in 2012 when heavy rains and strong winds wrecked more than 20 homes in the District of Oecusse including some public buildings. The strong winds also brought down electricity poles and damaged rice and corn crops (UNDP, 2013).

Most of the population along the Dili Ainaro road corridor are agrarian and cultivate commodities such as *rice*, *maize*, *coffee* and *cassava*. Therefore, even low intensity disasters can significantly increase food insecurity. The impacts of most of these disasters is the destruction of plantations, gardens and rice fields.

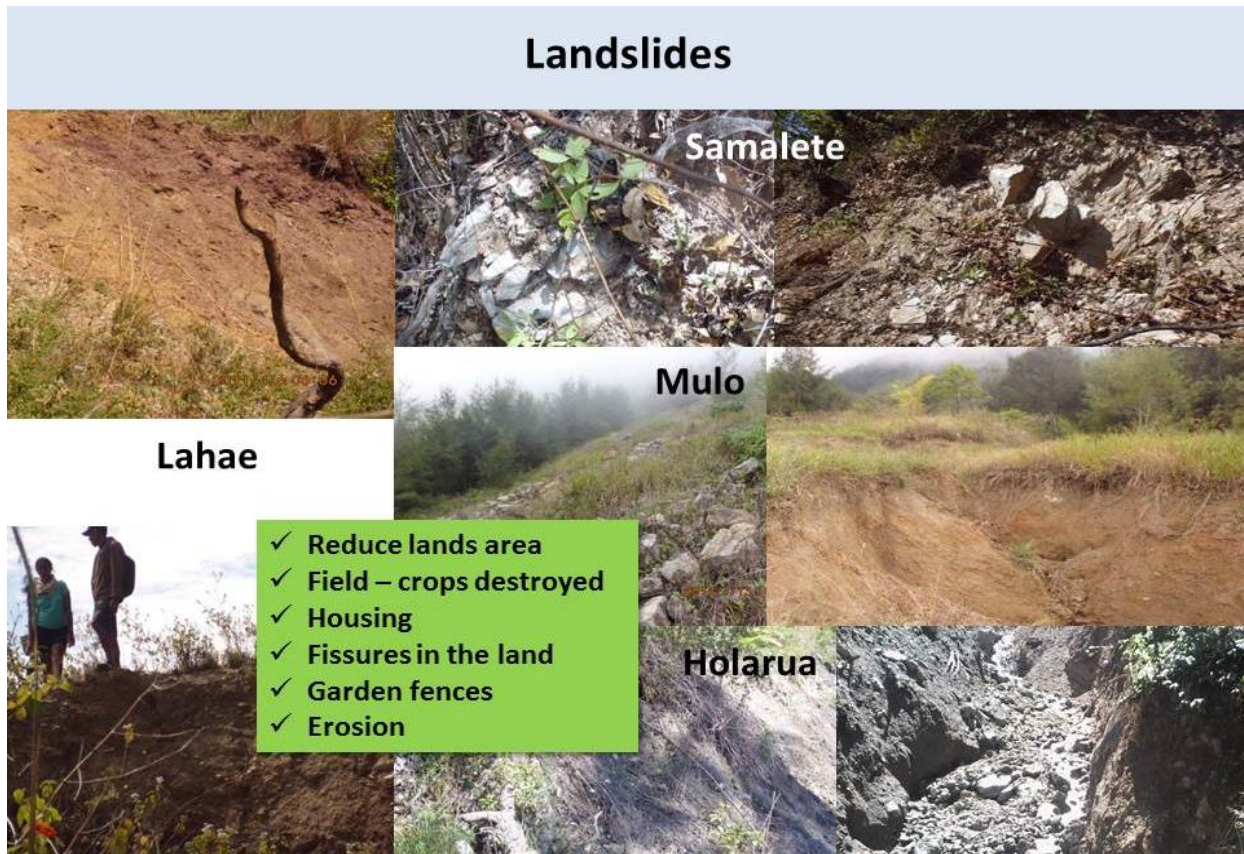
Heavy rainfall due to climate change is resulting in a decline of agriculture production, and it is also likely to contribute to the emergence of various diseases and plant pests, as well as a decline in soil fertility because much of the soil’s organic matter gets washed away.

Strong winds causes damage to crops, particularly seen in the shedding of the coffee production. Also, it is common for houses to be damaged by high winds, especially if they are not protected by wind-breaks in the form of trees or by another buffer against the strong winds.

Floods cause damage to houses in the areas around rice fields, and they also erode sections of riverbanks, and thus reduce the area of paddy fields and widen the rivers.

The most severe impact of landslides is the accumulation of damaged lands, which in turn results in crop destruction, especially when they occur in garden areas. Landslides also contribute to land erosion which results in a narrowing of existing useable land.

The consequence is that these disasters have been decreasing the quality of community livelihood. There are some people who argue that in the future, the potential for landslides will be higher and will occur in many places if the current situation is ignored.¹⁴



¹⁴ Study Report, CBDRM Needs Assessment, Building Climate and Disaster Resilience in communities Along Dili Ainaro Road Corridor Timor Leste, The World Bank, 2014

Chapter 3 CBDRM/CCA and Timor-Leste's Disaster Risk Management System

3.1. Framework - DRM, CCA and Livelihoods

From the description in chapter 2, it can be assumed that natural disasters such as floods and landslides can be some of the factors that decrease the quality of livelihoods in the long run. These disasters are not only caused by climate change, but also by the exploitation of natural resources. Destruction of forests due to excessive logging depreciates the soil so that it is no longer able to preserve water; therefore, if there is heavy rainfall, the surrounding areas will flood. Obviously, this could pose a risk to the surrounding community in both the short and long term. Disaster risks can occur in the form of loss or death, or damages and economic losses caused by the impact of a disaster in an area or region at a certain time.

The quality of livelihood is related to not only the needs for today, but also to the sustainable future. Livelihoods can be considered sustainable if the community is able to overcome the obstacles and disadvantages that could arise at any moment, whether expected or unexpected. Also, we can still focus attention on improving livelihoods in the future in a manner that is reasonable and sustainable, without damaging natural resources, and without sacrificing the livelihoods of others or the public for the sake of short-term temporary interests.



If the current livelihood is derived by the exploitation of natural resources, community livelihoods would be unsustainable. Exploitation can cause the destruction of natural resources through floods,

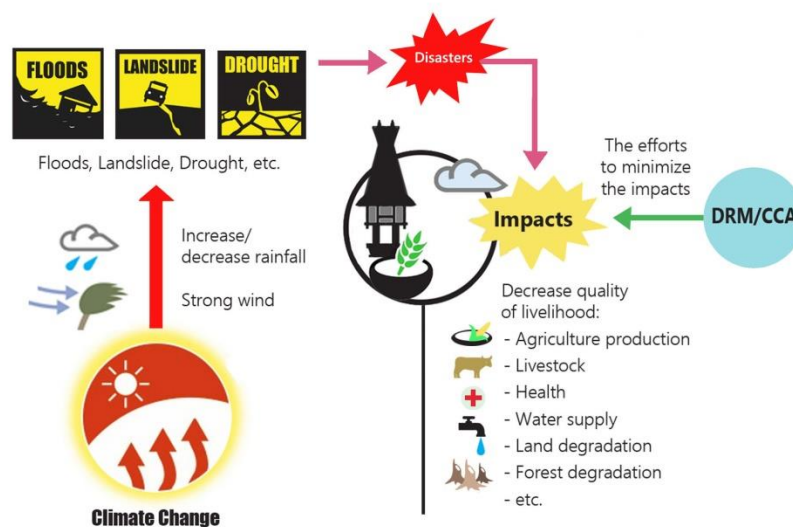
droughts, landslides and others that can destroy all that has been achieved. Similarly, if people only rely on human physical power without developing efficient technologies, in one day, the quality of their livelihood can be decreased in line with the weakening of the physical power.

Therefore, there are several requirements for livelihoods to be sustainable, namely:

- People should have the ability to adapt to environmental changes. Environmental changes are caused by shocks. Shocks can happen because of natural disasters, policy changes, decreased individual and family income, and other disturbing events.
- Livelihoods should be pursued through reasonable means, should not damage natural resources, and should not harm common interests in the long run. Moreover, the current destruction of natural resources including the negative impact of deforestation is occurring in many different places. Ways of pursuing one’s livelihood by damaging natural resources is ultimately negative, and will result in future losses.

Climate change is related to hazards, vulnerability and disasters. Therefore, climate change adaptation should be a part of disaster risk management, especially in regard to mitigation, rehabilitation, and reconstruction. The framework for DRM/CCA and can be seen in the Figure 3.1.

Figure 3.1: Framework for DRM/CCA and Livelihood



3.2. Climate Change Adaptation (CCA)

Climate Change Adaptation (CCA) means anticipating the adverse effects of climate change, and either taking appropriate action to prevent or minimize the damage they can cause, or taking advantage of opportunities that may arise. It has been shown that well planned, early adaptation actions saves money and lives earlier. Adaptation can mitigate the adverse impacts of climate change, but it will not prevent all damages.

Adaptation strategies are needed at all levels of administration: local, regional, national, district, and suco level. These strategies ensure that disadvantaged regions and those most affected by climate change are capable of taking the necessary measures to adapt. Adaptation occurs at the range of inter-linking scales, and can either occur in anticipation of change (anticipatory adaptation), or as a response to those changes (reactive adaptation). Most adaptations being implemented at present are merely responding to current climate trends and variability.

Adaptation refers to efforts by society or ecosystems to prepare for, or adjust to, future climate change. These adjustments can be protective (i.e., guarding against negative impacts of climate change), or opportunistic (i.e., taking advantage of any beneficial effects of climate change).

Climate change will likely produce more drastic and permanent shifts in temperature and precipitation. In agricultural society, farmers have always had to cope with variability in the weather, but climate change impacts on agriculture and food production will vary by region. In some places, warmer temperatures may extend the growing season, while in other regions heavier downpours may increase crop losses.¹⁵ Regardless of whether shifts in climate are ultimately beneficial or harmful, the agricultural industry will have to modify certain practices to adapt to new conditions due to anticipated changes in weather patterns. Efforts are needed to cope with the impact of climate change through ‘adaptation’, which is planning for the changes that are expected to occur.

Adaptation can consist of a wide variety of actions by an individual, community, or organization to prepare for, or respond to, climate change impact. Many measures are things people are already doing but could be stepped up or modified to prepare for climate change. Some examples include:

- Using scarce water resources more efficiently and building additional water storage capacity.
- Building floods defences and raising the levels of dykes.
- Choosing tree species and forestry practices less vulnerable to storms and fires.
- Breeding crop varieties that are more tolerant of heat, drought, and water logging from heavy rainfall or flooding.
- Protecting livestock from higher temperatures by providing more shade and improving air flow in barns.
- Protecting and restoring stream and river banks to ensure good water quality and safe guard water quantity.

¹⁵ Agriculture and Food Supply, EPA, 2014

3.3. Community Based Disaster Risk Management (CBDRM)

Disaster Management

Natural resources must be managed efficiently so that they can be used to improve the quality of people's livelihoods in the long run. Natural disasters can be reduced and/or avoided by better management. In the present, damages to natural resources has caused many disasters to happen. People should be able to address these vulnerabilities by addressing the disaster, anticipating it, and adapting to the changing seasons, as well as maintaining and utilizing the resources that already exist, or even increasing resources for the present and the future.

Precautions can be taken by using risk reduction methods to mitigate frequency of disasters and severity in pre-disaster situations, as well as providing assistance during and after the disasters. Efforts to avoid disasters can be categorized into two areas: mitigation and preparedness. This combined effort is called the Disaster Risk Management (DRM). Effort in the time of disaster is called Emergency Response. The effort after a disaster occurs is called Recovery Management. Most communities are not aware of the importance of disaster risk management. Efforts are only enacted when disasters happen. However, mitigation and preparedness can reduce the risks and impacts of disasters. For example, planting trees in a settlement area can reduce the risk and impact of strong winds.

The management activities can be seen in the following table (Table 3.1):

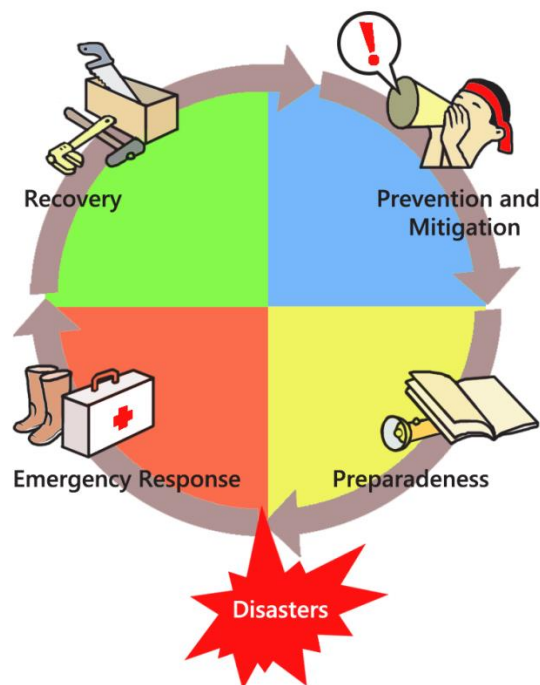
Table 3.1: Disaster Management Activities

Stages	Pre-Disaster		During Disaster		Post Disaster	
Purposes	Disaster risk reduction		Emergency handling		Recovery	
Management	Disaster risk management		Emergency management		Post disaster management	
Implementation	No disaster	Potential disaster	Emergency response		Rehabilitation	Reconstruction
Activities	<ul style="list-style-type: none"> • Planning • Disaster risk reduction • Prevention • Integrated into development planning • Risk analysis • Spatial planning • Education and training • Technical requirements • Research 	<ul style="list-style-type: none"> • Mitigation • Early warning system • Preparedness 	<ul style="list-style-type: none"> • Rapid assessment • Determination of emergency status • Rescue and evacuation • Supply of basic needs • Vulnerable groups protection • Emergency recovery 	<ul style="list-style-type: none"> • Environmental rehabilitation • Basic infrastructure rehabilitation • Home repair assistance • Psycho-social rehabilitation • Health care • Conflict resolution and reconciliation • Economic rehabilitation • Restoring security 	<ul style="list-style-type: none"> • Rebuild basic infrastructure • Rebuild public facilities • Rebuild community social and cultural life • Using appropriate designs for reduce disaster. • Community participation • Partnership between communities, 	

Planning	<ul style="list-style-type: none"> • Capacity building and empowering 	<ul style="list-style-type: none"> • Public services rehabilitation • Governmental functions rehabilitation 	<ul style="list-style-type: none"> government and private sector
	<ul style="list-style-type: none"> • Disaster management planning 	<ul style="list-style-type: none"> • Contingency planning 	<ul style="list-style-type: none"> • Emergency handling planning

The processes of the types of management in the table above are interrelated processes, and can be illustrated as a cycle (Figure 3.2):

Figure 3.2: Disaster Management Cycle



A person or a family’s access to resources varies based on the rules that apply to a particular community. For example, access to agricultural land in East Timor is governed by customary rules where traditional leaders have access to a much larger area than ordinary people. The coffee market is dominated by large corporations and the prices are determined by them. This means that large corporations have more access to the market and exert more influence on the price than the community.

Community Based Disaster Risk Management (CBDRM)

Community-based disaster risk management (CBDRM) is a process in which at-risk communities are actively engaged in the identification, analysis, treatment, monitoring and evaluation of disaster risks in order to reduce their vulnerabilities and enhance their capacities.¹⁶ This means that people are at the heart of decision-making and implementation of disaster risk management activities. The involvement of the most vulnerable social groups is considered as paramount in this process, while the support of the least vulnerable groups is necessary for successful implementation.¹⁷



The importance of CBDRM approaches has been long recognized in promoting a culture of safety by reducing local vulnerabilities and building capacities. Because the community is involved in the whole process, their felt and real needs, as well as their inherent resources, are considered. Problems can be addressed with appropriate interventions, and probabilities for huge losses of life and properties will be minimized.

The capacity of the local population is enhanced in order to help them assess situations, identify risk reduction measures including mitigation and preparedness activities before any disaster occurs, and perform response and recovery activities during and after any disaster occurs.

The CBDRM approach emphasizes community involvement in all phases of disaster risk management, including the participation of vulnerable social groups. Vulnerable group involvement is an important factor for the success of CBDRM programs. In CBDRM, local and national governments should be involved and support the programs carried out by the community. CBDRM is an approach that emphasizes community participation where the community acts not only as beneficiaries but also as active agents.

The involvement of the community is important to ensure these values.¹⁸

The information collected will be more relevant and will reflect the opinions and realities of community members, particularly the vulnerable and poor.

- The capacity (self confidence, knowledge, skills sets including: team work, planning, etc) of the entire community to deal with hazards will be developed.
- Outsiders (experts, consultants, government officers, etc) will better understand the nature and needs of the community.
- Disaster management and community development activities and programs will achieve better, more practical and more effective results.
- Community life will become more stable and sustainable.

3.4. Principles

The core principles of CBDRM are:

¹⁶ ADPC 2003

¹⁷ Abarquez and Murshed, 2004

¹⁸ ADPC, 2003



Community Participation. The community is not only the primary beneficiary, but also the key actor in disaster risk management. The community is empowered to have meaningful participation in the whole process.



Vulnerable people should be the target priority. The process must be built upon the interest of the most vulnerable members of the community, including women, children, the elderly, people with disabilities, etc. The most vulnerable people have the chance to participate in disaster management activities at the local level, and they are supported in activities to both reduce vulnerability and promote their own responsive capacity to disasters.



Consideration of indigenous knowledge. The recognition that local communities already have knowledge and experience relating to strategy, methods, and technologies to adapt to disaster risk management and climate change adaptation.



Application of multi-sectoral approach. Disaster risk management brings together many local community, sub-district, district and national stakeholders. Throughout the CBDRM process, all possible measures should be taken to establish and strengthen the links and partnership between the community, non-governmental organizations (NGOs) and governmental agencies.



Application of multi-disciplinary approach. A wide range of approaches to disaster risk management is employed. These approaches may include both structural and non-structural measures.



Integration of disaster management into local development process. Disasters are viewed as unmanaged development risks and unsolved problems of the development process. CBDRM should lead to a general improvement of the quality of life of the vast majority of the poor and the natural environment. Disaster risk management interventions are to be conceived as part of a long-term development process that seeks to reduce poverty, social inequity, and environmental degradation.

3.5. Terms in CBDRM

Disaster

Disaster is a serious disruption of the functioning of a community or a society causing widespread human, material, economic, and environmental losses, which exceeds the ability of the affected community or society to cope using its own resources (UNISDR, 2004). A disaster happens when a hazard impacts a vulnerable community and causes extensive damage, casualties and disruption.

Hazard

A hazard is an event or occurrence that has the potential to cause injuries to life, damage property, and negatively impact the environment. Examples of natural hazards are landslides, droughts and fires. Some hazards can cause secondary hazards: e.g. an earthquake can cause landslides.

Vulnerability

Vulnerability is a set of prevailing or consequential conditions which adversely affect the community's ability to prevent, mitigate, prepare for, and respond to hazardous events.

Examples of vulnerable people:

- Poor people who have few physical and material resources usually suffer more from disasters than rich people.
- People who are poor often live on marginal lands; they don't have any savings or insurance; they are in poor health.
- People who have been marginalized in social, economic or political terms are more vulnerable to suffering from disasters than groups.
- People who have low knowledge and capability on disasters management are vulnerable.
- Disabled people are more vulnerable from disasters than non-disabled people.

Capacity

Capacity is the asset, resource and skill level available within a community, society or organization that can be used to reduce the risks or effects of a disaster. Capacity may include physical, institutional, social and economic means, as well as skilled personal or collective attributes such as leadership and management. Capacity enables households and communities to cope with, prepare for, prevent, withstand, mitigate, or quickly recover from a disaster.

Disaster Risk

Disaster risk is the chance that livelihoods will suffer harm and loss as a result of hazardous event. It closely depends upon the exposure to hazardous conditions and risks. This can be expressed as:

$$\text{Disaster Risk} = \frac{\text{Threat} \times \text{Susceptibility}}{\text{Capacity}}$$

The output of risk analysis is usually an estimation of the risk scenario.

Disaster Risk Reduction

The reduction of disaster risk is a conceptual framework to prevent and mitigate disaster risk. Disaster risk reduction includes activities that will minimize disaster-related losses of life, property or assets and the environment. Such activities are also described as mitigation measures.

Mitigation

The lessening or limiting of the adverse impacts of hazards and related disasters.¹⁹ Mitigation measures can range from physical measures (building dykes and safe houses, etc) to legislation (restricting people building houses on the side of dykes) to non-structural measures (training, public awareness, consultation and training for crop diversity).²⁰

Disaster Preparedness

¹⁹ ISDR, 2009

²⁰ Mardi, 8

Disaster preparedness covers activities that enhance the ability to predict, respond to and cope with the effects of a disaster. It includes precautionary activities by households, communities and organizations to react appropriately before, during and a disaster event.

Emergency Response

Emergency response covers measures required in the search and rescue of survivors, and in meeting basic survival needs of shelter, water, food and health care.

Recovery

Recovery is the process to fully restore the community to pre-disaster levels of functioning or improving on it. This refers to the rehabilitation of livelihoods, restoration of social and economic activities and the reconstruction of shelter and infrastructure.

Relief

Relief includes activities that are undertaken during and after a disaster to assist affected people, including search and rescue, providing food and non food relief, health care, repairing of essential services, and psychological intervention.²¹

Climate Change

Climate change is the change in average weather that a given region experiences. Average weather includes temperatures, wind patterns and precipitation. Today climate change is happening at a very fast rate. This is amplifying the occurrence of extreme hazard events.

Climate Change Adaptation

Climate change adaptation is the adjustment in the natural or human systems as a response to actual or expected climatic stimuli or their effects, and which moderates harm or exploits beneficial opportunities.²²

Community

Community is a group of people or social units living in the same area who share common values.

Community Resilience

Community resilience is a measure of the sustained ability of a community to utilize available resources to respond to, withstand, and recover from adverse situations.

Participatory Development

Participatory development is a process through which stakeholders can influence and share control over development initiatives, and over the decisions and resources that affect themselves.

Monitoring

Monitoring is the systematic and routine collection of information from projects and programmes to learn from experiences to improve practices and activities in the future; to have internal and external accountability of the resources used and the results obtained; to take informed decisions on the future of the initiative; and to promote empowerment of beneficiaries of the initiative.

Evaluation

Evaluation is assessing, as systematically and objectively as possible, a completed project or programme (or a phase of an ongoing project or programme that has been completed). Evaluations

²¹ AAV2

²² ISDR

appraise data and information that inform strategic decisions, thus improving the project or programme in the future.

Learning

Learning is the act of acquiring new, or modifying and reinforcing, existing knowledge, behaviors, skills, values, or preferences and may involve synthesizing different types of information.

Participatory Learning and Action

Participatory Learning and Action is an approach for learning about and engaging with communities. The approach can be used in identifying needs, planning, monitoring or evaluating projects and programmes and has been used traditionally, with rural communities in the developing world. It enables local people to share their perceptions and identify, prioritise and appraise issues from their knowledge of local conditions.

3.6. Participatory Development

Development is an organized effort to create prosperity through the implementation of social and/or structural changes. Many approaches can be used to make these changes. In this decade, a participatory approach to development has become a useful and effective alternative.

Participatory approaches arise because of the dissatisfaction of various parties to a top-down development scheme that positions people as objects and subjects them to the will of outside authorities, including the government or other agencies. In a top-down approach, people have no authority to make good decisions and determine their own destiny. Thus the developed program often does not fit the needs of the community as it is domination by the perspective of the outsiders who are often not perceived as either trustworthy or relevant. In addition, people often become dependent on outside assistance. They are not independent. There is no sense of belonging and many become marginalized from the benefits of development itself.



The emergence of various critiques and the reflection on the benefits of a top-down approach has led to a participatory approach in development. This approach emphasizes the development of society as a subject and not an object. Society has the authority to determine the outcome of its own destiny guided by the ideals of development activities which are developed and owned by the community. In the top-down approach, the community participates in an activity (program) which belongs to outsiders such as the officers of development organizations. With the participatory approach, the outsiders are the ones who participate in community activities. The program is not designed by people outside of the community who ask the people to participate in it, but rather the program is designed by the community and then facilitated by outsiders. So outsiders are the development agents, but the people are always the main actors of development.

By allowing people to become the main actors of the disaster risk management process, solving problems related to climate change and disaster programs will be more in line with their needs of their communities. Community ownership will be higher, it can cause an increase in community participation in program maintenance. Through participation in analysis, planning, implementation and monitoring and evaluation, communities will gain experience in CBDRM/CCA. In other words, community capacity for resilience, adaptation and DRM will gradually increase, and dependence on outside parties will be reduced. In the end a participatory approach to development will allow welfare objectives to be achieved faster and more substantially. See the Annex for experiences in Indonesia and Vietnam.

3.7. Timor-Leste's Disaster Risk Management System

The Ministry of Social Solidarity under the Government of Timor Leste has been developing a National Disaster Risk Management Policy (NDMRP) since 2008. This Policy outlines a series of priorities includes elevating Disaster Risk Management (DRM) as a national priority and making DRM a multi-sector responsibility.

The lead agency on Disaster Risk Management is the National Disaster Management Directorate (NDMD) under the Ministry of Social Solidarity (MSS). NDMD is responsible for providing disaster risk management coordination and technical support to the government and community in Timor Leste. It works in support of the National Disaster Coordinator (NDC) during times of operational disaster response.²³

Functions of the NDMD include:

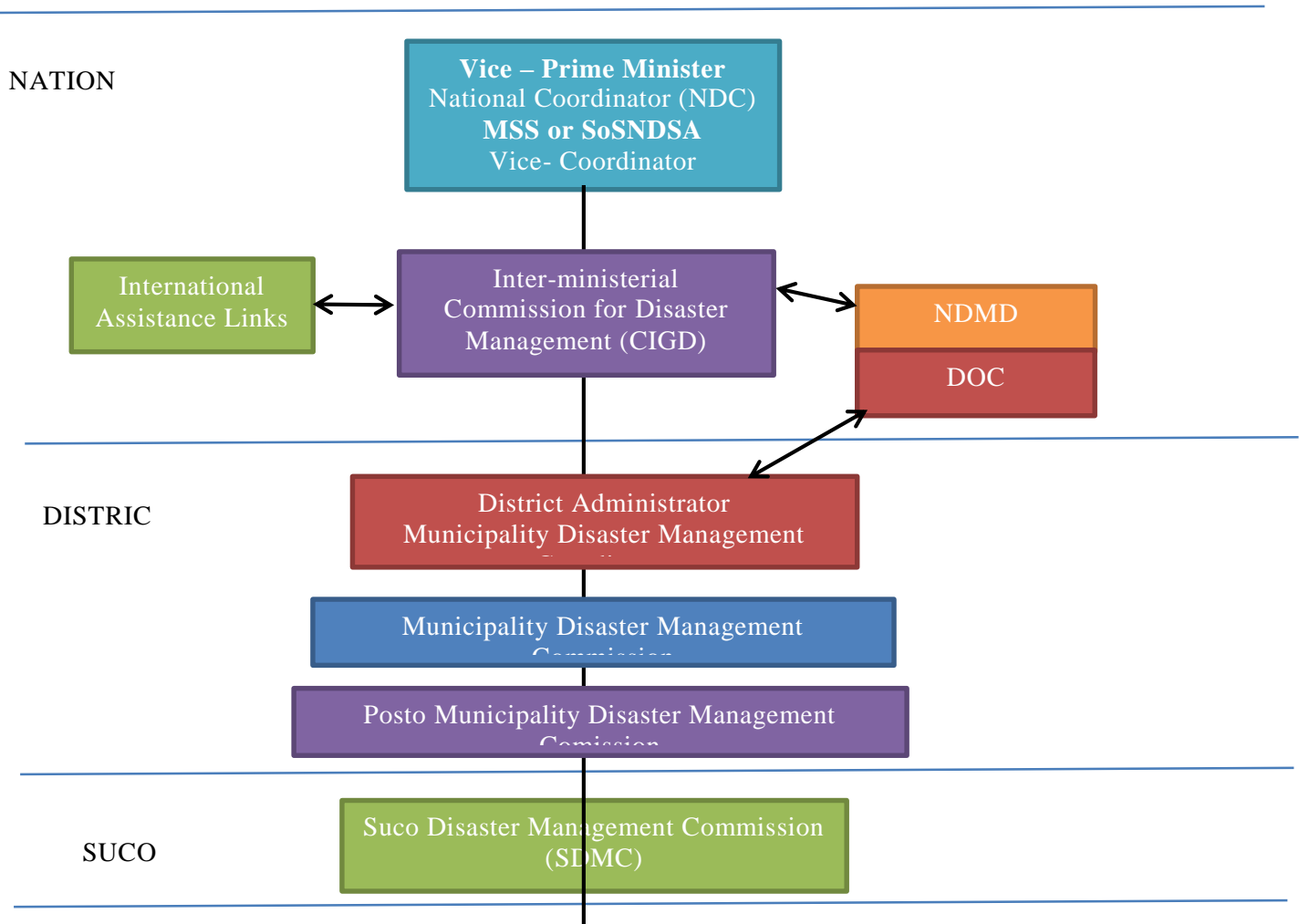
- Acting as Timor-Leste's center for disaster risk reduction activities and knowledge; collecting information; monitoring overseas developments; and proposing developments for incorporation into the national disaster risk reduction system.
- Developing strategies in disaster risk reduction including preparedness, response plans and procedures, and assisting in district planning.
- Administering and providing secretariat support to the CIGD.
- Establishing and sustaining links to risk assessment and monitoring in the region, and interpreting and providing warning and strategic planning in relation to developments that may affect Timor Leste.
- Acting as the contact point for initial reports of emergencies and disasters in conjunction with the DOC.

²³ National Disaster Risk Management Policy, Ministry of Social Solidarity-Secretary of State for Social Assistance and Natural Disaster Management Directorate, March 2008, Dili, Timor-Leste.

- Coordinating disaster risk management, including scheduling of regular meetings of actors and stakeholders.
- Organizing and leading multi-sector damage and needs assessment teams during response when necessary.
- Developing and conducting public information and awareness programs in cooperation with other relevant agencies.
- Maintaining and developing a National Disaster Risk Management Information System.
- Identifying and developing the sources of baseline data for use in disaster preparedness and response activities.
- Maintaining, reviewing and developing the National Disaster Risk Management Policy (NDRMP), and advising on other sector and development policies, strategies and legislation related to disaster risk management.
- Administering a national regional strategic stockpile of disaster response assets.

The National Disaster Management structure can be seen in the following chart (Figure 3.3).

Figure 3.3: National Disaster Management Structure of Timor-Leste



The municipality is the key to risk management at the administration level. Municipality administrators should have their mandates extended to include Municipality Disaster Coordinators in

their functions. Should the Municipality Administrators be unavailable, the Deputy Municipality Administrator will act as the Municipality Disaster Coordinator.

A Municipality Management Committee comprised of municipality representatives from key government and non-governmental agencies likely to become involved in disaster risk management activities, as well as community representatives, is to be formed by the Municipality Disaster Coordinator in response to operations and disaster risk reduction. Membership may vary from municipality to municipality, but typically might include members of the Municipality Administrator's staff, sectoral officer, F-FDTL, PNTL, representatives of Catholic and Protestant Churches, Mosques, CVTL, major NGOs and appropriate community leaders.

The Municipality Disaster Coordinator will be responsible for disaster response decision-making within the district, and assist in decision-making of the Municipality Disaster Management Commission when appropriate. During an emergency response, functions of the Municipality Disaster Management Commission may include:

- Coordination of rapid assessment surveys of affected areas and analysis of results.
- Coordination of financial resources of the district to provide the most effective response to identified needs.
- Recommendations on the timing and content of requests for national support; identifying the description, scale and timing of the support; and the logistical information needed for effective delivery.

At posto-municipality level, the Posto Municipality Administrator is responsible for emergency and disaster risk reduction activities. When the response to a major emergency or disaster is beyond the capability of posto municipality resources, assistance should be sought from the Municipality Disaster Coordinator, then from the national level if necessary.

At the suco level, generally, within each village, the Suco Chief and village leaders (such as elders, traditional leaders and village councils) are responsible for emergency and disaster risk reduction activities. When the village requests assistance, the request should be passed through the Xefe Suco.

Municipality Disaster Management Commission, Posto Disaster Management Commission and Suco Disaster Management Commission have preventive and curative tasks, but in fact they work mostly in response to the occurrence of disasters. In some districts these institutions do not work properly. The efforts being made are still limited to responding to disasters, and there isn't an overall systematic effort in disaster management that ranges from mitigation to rehabilitation and reconstruction.

In disaster management, the communities are still very dependent on assistance from the Government and Non-Government agencies. This is due to the experience so far of people not having been involved from the start in the development of disaster management plans.

Chapter 4 PARK Project – CBDRM Program in Timor Leste

To minimize the risk of hazards in Timor Leste, especially from floods, landslides and strong winds that are related to climate change, the government of Timor Leste (through NDMD) has developed PARK - *Programa Aprende Resiliensia Komunitade* – a project to build climate and disaster resilience in communities. This project will commence as a pilot project in 2015 in 26 Sucos along the Dili Ainaro road corridor in conjunction with the road construction of Dili-Ainaro. The approach of this project is community based, and through this project the community and disaster commission will be involved together at all levels. All parties will have experience in all parts of the DRM cycle, and it is an opportunity for the community, SDMC, Posto Municipality Disaster Management Commission and Municipality Disaster Management Commission to increase their capacities in DRM/CCA, not only in response to the occurrence of disasters, but also in the mitigation, preparedness and recovery of disaster events.

4.1. Objective

The objective of the pilot project is to build the capacity of communities in the 26 Suco pilot sites in community-based disaster risk management and adaptation in order to reduce the impacts of recurring landslides, strong winds and floods.

4.2. Targets

The key performance indicators for the project are:

- 780 pilot sucos community members trained.
- 26 pilot sucos have the results of participatory risk and needs assessment.
- 26 Suco pilot have Suco Planning, which is mainstream DRR/CCA. The planning is both spatial and socio-economic planning. Spatial planning involves the organization of farm lands, rice fields, settlements, and public service facilities including evacuation routes in the safe area of disasters. Socio economic planning involves the development of community groups, awareness campaigns on DRM/CCA, and other programs that can increase economic livelihoods with sensitive DRM/CCA.
- 35 DRR/CCA infrastructure and non-infrastructure project activities that have been carried out by the community.
- A minimum of 50 percent of vulnerable people at pilot suco have benefitted from community DRR/CCA project activities, of which 49 percent are women.
- In each Suco, at least 2 community program plans are integrated with the government's programs or other stakeholder's programs.

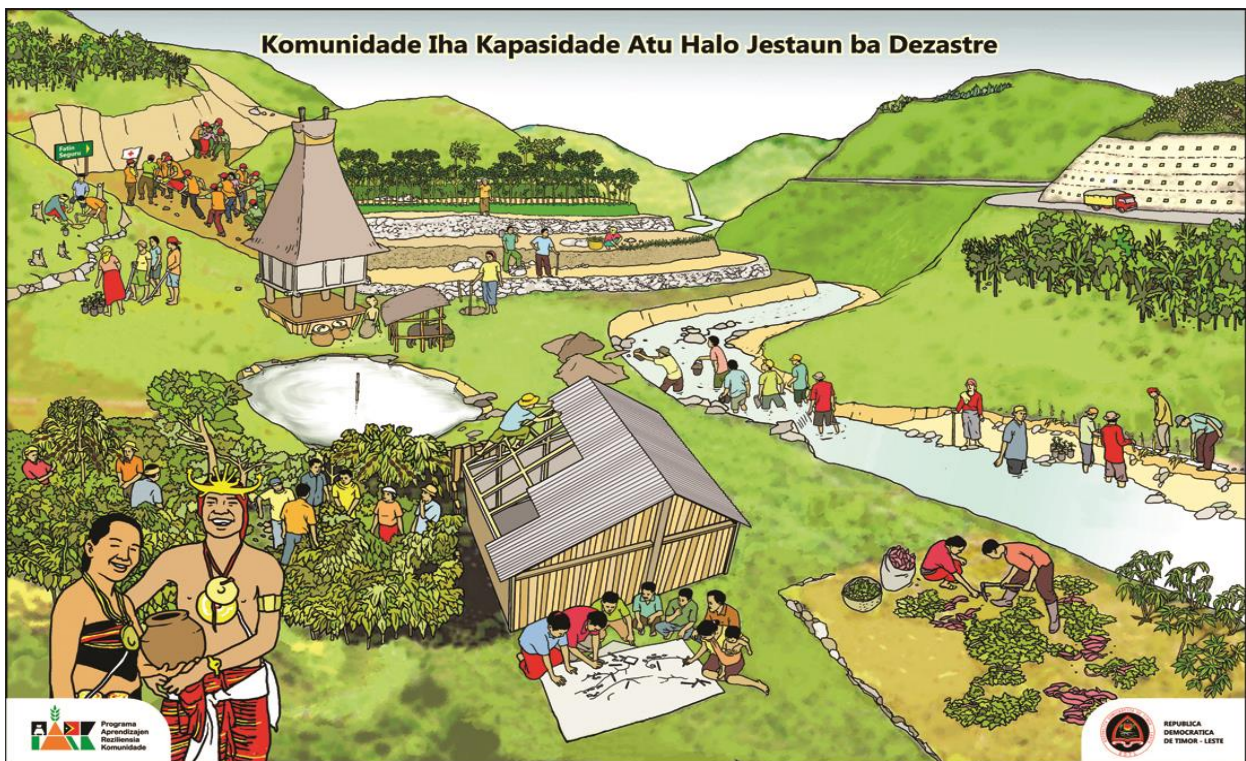
4.3. Strategies and Approaches

The location of the CBDRM target program are the 26 Sucos along the Dili-Ainaro road corridor. The locations that have been chosen have higher risk than the others due to road construction.

To achieve the program objectives and goals, the following strategies, approaches and principles have been developed.

Strategies

- Find and encourage the growth of local champions who will be agents of DRM/CCA activities in the community. The champions should be individuals who are concerned about the issues involved and willing to work on DRM/CCA.
- Ensure community participation in each stage of the program.
- Ensure the dissemination of DRM/CCA in the planning community.
- Ensure the integration of community planning with government planning and a variety of other programs.
- Strengthen community institutions, both existing formal and informal institutions, as well as new institutions that are needed for the DRM/CCA program.
- Provide grants to communities as a learning instrument for the community implementation of infrastructure and non-infrastructure projects which mainstream DRM/CCA. Through these grants, communities can not only learn about infrastructure and non-infrastructure activities, but can also learn how to work with transparency and accountability on project management.



Approaches

Participatory learning and action. The entire activity stages of the program are a means of gaining new experiences in DRM/CCA for the community. The community can learn from new experiences by reflecting together on what has happened through both formal and informal discussions. Learning outcomes are used to improve the next stage of development, and to increase the benefits of the program for the community

Ecological approach. Disasters are not limited by administrative regions, but are instead connected by ecological boundaries such as river flows, wind patterns and other natural phenomenon that often cross administrative boundaries.

Livelihood approach. Sensitivity to disasters in the context of mitigation and adaptation of climate change is closely linked to the development of community livelihood such as food security, livelihood for farmers, water supply, land tenure, and others.

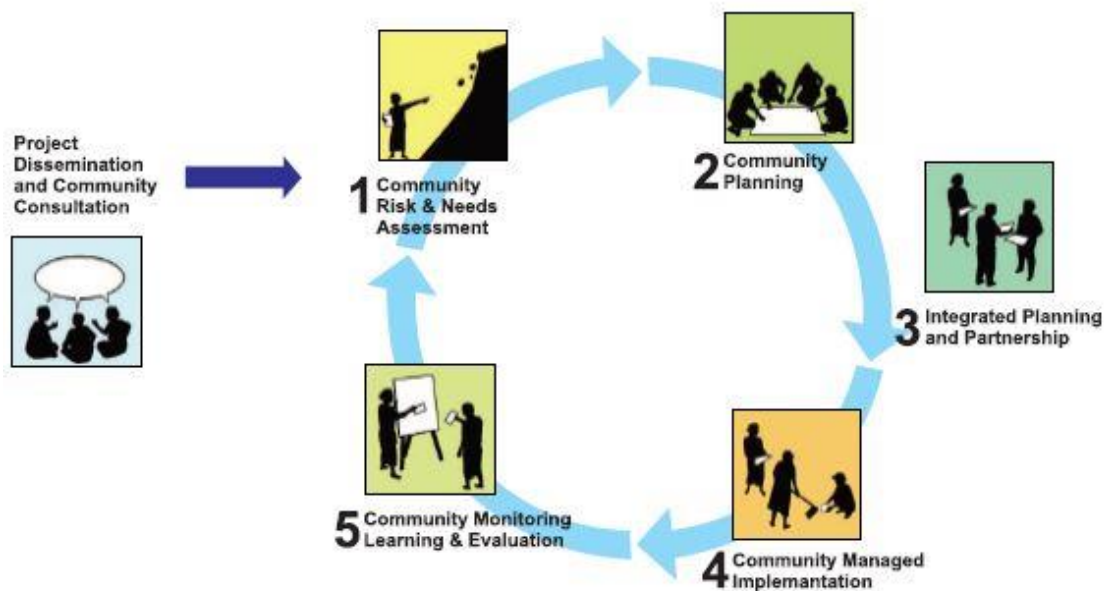
4.4. PARK Project Cycles

PARK Project implementation at the community level follows the process of project cycle management in the context of CBDRM, and includes some adjustments to the goals and objectives of the programs. The process is divided into five stages, namely:

- 1) Community risk and needs assessment.
- 2) Community disaster risk reduction planning.
- 3) Integrated Planning and Partnership.
- 4) Community-managed implementation.
- 5) Community-Monitoring, Learning and Evaluation.

The stages of CBDRM project is depicted below (Figure 4.1):

Figure 4.1: PARK Project Cycle



The implementation of all stages is conducted according to the timeframe of regular development planning in East Timor. This will be carried out in order to easily perform the integration of community planning with government planning. All five stages are implemented within a year, and are repeated the following year. This process will be conducted annually for three years with the project expected to be continued by the community with the support from the government so that the process will be sustainable.

4.4.1. Project Dissemination and Community Consultation



In the early stages of the program, the facilitator will introduce PARK to the public as well as conduct awareness campaigns so that people understand the purpose of the program and are willing to work together to implement CBDRM through PARK in the region.

The communities have the right to accept or refuse the project. In cases where the community accepts the project, an agreement between NDMD and the community should be developed. Through this process, the community should be aware of the consequences of program implementation. This means that the community must participate in all relevant activities and in issues related to funding.

Along with this process, facilitators will engage in a social process analysis to identify the socio-economic profile of a community, and a general overview of hazard and disaster programs in the target areas. The results from the analysis will be used to develop strategies of facilitation and community capacity building through training, learning and awareness campaigns.

Below is a general overview of dissemination and consultation activities for two months in the 26 sucos (Table 4.1).

Table 4.1: Purposes, Activities, and Expected Result Project Dissemination and Community Consultation

Purposes	Activities	Expected Result
<ul style="list-style-type: none"> To introduce the project to the formal and informal leaders and the communities To introduce the facilitation team to the community To identify and develop a general information profile on the community (social structure, roles, demography, etc) To convince the leaders and communities to accept this project 	<ol style="list-style-type: none"> Public awareness campaign Dissemination Social analysis Suco workshop Documentation 	<ul style="list-style-type: none"> An MoU between the project and the communities to implement the CBDRM program A list of community contributions (human and financial resources) Strategies on how the facilitators will be working with the community

Detailed methodology and activities can be seen in the PARK Technical Manual (TM-00)

4.4.2. Stage 1: Community Risk and Needs Assessment



The main purpose of this stage is to: (1) Describe the suco which is expected by the community, (2) Conduct disaster risk assessment, (3) Conduct an assessment of the potential that exists in the community or outside of the community, and (4) Analyze disaster risks associated with livelihood and the potential that can be used in disaster risk reduction to pursue their dream suco.

This activity is facilitated by the facilitator of the project, and the agents of change in society who have been identified in the first phase. Activity first begins at aldeia level with the results analyzed at the suco level. In this way the community is expected to gain experience in formulating dream sucos and in analyzing the gap between dreams and current conditions.

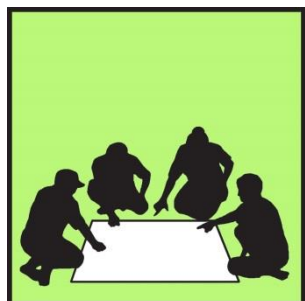
The results of the assessment are disseminated at all levels of society by means of written and oral communication in order to get a comprehensive response. Here is a general overview of assessment activities with a time duration of three months in 26 sucos (Table 4.2).

Table 4.2: Purposes, Activities, and Expected Result Community Risk and Needs Assessment

Purposes	Activities	Expected Result
<ul style="list-style-type: none"> To enable the community to carry out a community risk assessment exercise. An assessment and analysis of types and causes of hazards, disasters and impacts on the people's livelihoods carried out by the community itself. To assess and analyze the community's potential (external and internal) to reduce disaster risks by the community itself. To develop a shared knowledge and experience of the community on disaster risk, their dream, their needs and their livelihoods. 	<ol style="list-style-type: none"> Establish a working committee to facilitate risk and needs assessment. Training for working committee. Suco workshops to formulate suco development in the future (3 years later) Risk and needs assessment at the aldeia level Suco workshops to integrate assessment results from each aldeia and gap analysis. Public awareness campaign. Documentation 	<ul style="list-style-type: none"> Community dream. Community hazard profile and vulnerability context. Hazard map and exposure of the most vulnerable groups Hazard exposure of livelihood assets. Risk map of landuse, houses, basic infrastructure and public infrastructure. Causes of hazards and disasters. List of external and internal potential to reduce disasters. Increased community awareness. Gap analysis between potential future suco and current conditions.

Detailed methodology and activities can be seen in the PARK Technical Guideline (TG-01)

4.4.3. Stage 2: Community Risk Reduction Planning



An analysis result of the assessment activity is used as a basis for planning at the suco level. Community planning is divided into two parts, namely: (1) Medium-term planning, and (2) Annual Planning

Mid-Term Planning

Mid-Term Planning is development planning at the suco level for disaster risk management and CCA mainstreaming. The plans are prepared for three years and adjusted to the pilot project period. The purpose of planning is to encourage a variety of efforts that can be done in order to achieve the dream sucos which have already been formulated in the assessment process.

Disaster risk reduction cannot be separated from the issue of spatial planning because it involves safety areas, prone areas, and land use. Therefore, product plans that are prepared must consist of two things, namely: (1) spatial planning related to prone areas and safe areas, and (2) suco development planning related to the society, economics and environment, including both structural and non-structural issues. Both of these plans will become a master plan for the development of sucos over the course of three years. Programs that are developed should provide good benefits for vulnerable people, women and children, the elderly, poor people and disabled people.

Annual Planning

Annual planning is a detailed plan for a period of one year specifically for DRR /CCA. The foundation of this plan is a master plan which results from the formulation of mid-term planning. In the first year, the community prioritizes programs/activities that are urgently needed. The determination of prioritization will consider available resources, such as human resources, financial resources and other resources. The programs that are prioritized in the first year are then broken down into detailed activities, including organizing, funding needs and their sources. Program activities consists of non-structural and structural activities. Some examples of structural activity are small scale bio-engineering, slope stabilization, river embankment stabilization, and secure roofing of houses. Some examples of non-structural activities are related to preparedness, community awarness campaigns, training, and evaluation and planning. Most funding sources for program implementation are derived from the CBDRM project, but if that is not sufficient, funding will be augmented by other resources including NGOs.

The preparation of both types of planning will be carried out through workshops at the Suco level assisted by facilitators, volunteers at the community level and the Xefe Suco / Suco council. Detailed planning of the work will be prepared by a team consisting of suco councils and volunteers champions from the community. Planning documents are to be discussed with sucos both orally and written to get a response. Then they will be refined and validated by Xefe Suco and Suco Council. Below is a general overview of planning activities with a duration of two months in the 26 Sucos (Table 4.3).

Table 4.3: Purposes, Activities, and Expected Result Community Risk Reduction Planning

Purpose	Activities	Expected Result
<ul style="list-style-type: none"> To mainstream DRM/CCA into the Suco's development plan. To prioritize disaster risk reduction activities for the first year. Community agreement and willingness to do DRR/CCA program. Community participation in planning. Community experience and capacity to mainstream DRM/CCA into Suco's development planning. 	<ol style="list-style-type: none"> Establish working committee for planning. Train xefe Suco, suco council and working committees. Suco workshop for midterm planning. Suco workshop for yearly planning. Working groups for detail planning. Public consultations. Community awareness campaigns. 	<ul style="list-style-type: none"> A Suco master Plan (development planning), which is sensitive to DRR/CCA. DRR/CCA first year planning both of structural and non-structural activities. List of community contributions.

Detailed methodology and activities can be seen in the PARK Technical Guideline 2 (TG-02)

4.4.4. Stage 3: Integrated Planning and Partnership



The master plan that has been drawn up by people at the suco level cannot be implemented by relying only on non-governmental and CBDRM projects. It also requires resources from various other parties, both government and non-government agencies. Various sectors in government and non-government agencies have identified programs relating to DRM/CCA and other development programs. But so far, these programs are running in their own way. This is an opportunity for the community to encourage these institutions to integrate their programs into planning that has already been arranged. Hopefully, through this integration process, results are expected to be significant for decreasing disaster risk and improving the quality of community livelihood.

Xefe Suco, Suco Council and community volunteers have a role to advocate for various external parties to integrate their programs into suco planning. The integration can be done both for the program contained in the master plan (suco development plan) as well as for the annual plan. The forms of integration can be a mentoring program in community capacity building, technical assistance in several activities, and supporting funds. Integration programs should be arranged so that both parties benefit. The rules are set forth in the partnership agreement (MoU) between communities and other institutions.

The implementation of the integration process can be done in parallel with other activities after the planning process is complete. Below is a general overview of the activities that need to be done in the program integration efforts (Table 4.4).

Table 4.4: Purposes, Activities, and Expected Result Integrated Planning and Partnership

Purposes	Activities	Expected Result
<ul style="list-style-type: none"> The government and other stakeholders will integrate their programs into suco development planning and Disaster Risk Reduction Planning. The community participates in project implementation The community will have experience and capacity to advocate government and stakeholders related DRR/CCA 	<ol style="list-style-type: none"> 1. Training Xefe Suco, Suco council and community members. 2. Advocacy and social marketing. 	<ul style="list-style-type: none"> Integrated community planning into suco planning. Partnership between communities, government and stakeholders.

Detailed methodology and activities can be seen in the PARK Technical Guideline 3 (TG-03)

4.4.5. Stage 4: Community Managed Implementation

Structural and non-structural activities that have been arranged for the first year should consist only of the technical planning details. Documents to be prepared for each project are:



- The DED (Detail Engineering Design) for structural projects with appropriate technology in accordance with the local environment conditions of the land.
- Proposal for structural and non-structural activities which are equipped with an action plan.
- Environment safeguards and social safeguards to avoid negative impacts on the environment and social life.
- Operation and maintenance system (O & M).
- Participatory, learning and monitoring systems.

All the documents serve as references for the community in the managed implementation. The working group has the responsibility of implementing the program including operations and maintenance.

The following is description of the activities that needs to be done in the implementation of activities in 26 Sucos (Table 4.5).

Table 4.5: Purposes, Activities, and Expected Result Community Managed Impelemntation

Purposes	Activities	Expected Result
<ul style="list-style-type: none"> Community experience and capacity to manage 	<ol style="list-style-type: none"> 1. Establish a working committee for each activity. 	<ul style="list-style-type: none"> Working committee for each project.

<ul style="list-style-type: none"> structural and non-structural projects. • Community development of detailed technical design for each project. • Community participation in the implementation and monitoring project activities. • Community development an O&M action plan and subsequent action. 	<ol style="list-style-type: none"> 2. Provide training for the working committees. 3. Develop detailed technical designs for each project. 4. Project implementation. 5. Develop project monitoring systems. 6. Project implementation monitoring. 7. Develop an O&M system. 	<ul style="list-style-type: none"> • Defined roles of working committees. • Detailed Engineering Design (DED) for structural projects. • Environmental safeguards. • Social safeguards • Budget analysis for each project. • Implementation of Community Grant monitoring systems. • O&M systems.
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Detailed methodology and activities can be seen in the PARK Technical Guideline (TM – 04).

4.4.6. Stage 5: Participatory Monitoring, Learning and Evaluation



Participatory monitoring and evaluation (M&E) is used to review the progress and support the decision-making and management system. The results of monitoring and evaluation should result in the distribution of regular learning materials to communities for better implementation in the following year.

Monitoring and evaluation system indicators should be measured and compiled by the community supported by the facilitator. Monitoring and evaluation content of project implementation is not only for the society, but also for the overall implementation of CBDRM cycle. The indicator of the development refers to the project goals and objectives contained in the planning community.

Organizing the agents of monitoring and evaluation should be determined and agreed upon by the community. The results of monitoring and evaluation are discussed together and becomes material for: (1) the input for program improvements next year, and (2) learning materials for the people and various parties. Therefore, the activities and results of monitoring and evaluation should be documented. The experiences in the implementation of the program should be distributed to the public and various stakeholders through face-to-face activities or a variety of other media.

Here is a general overview of monitoring activities, learning and evaluation (Table 4.6).

Table 4.6: Purposes, Activities, and Expected Result Participatory Monitoring, Learning and Evaluation

Purposes	Activities	Expected Result
<ul style="list-style-type: none"> • Community experience and capacity to participate, monitor and evaluate progress. • Community possession of participatory monitoring and evaluation systems. • Community possession of a workable learning system. • Community ability to register program documentation. 	<ol style="list-style-type: none"> 1. Establish working committees for monitoring, learning and evaluation. 2. Provide training for M, L&E committees. 3. Develop community M, L& E systems and indicators. 4. Regular monitoring and evaluation activities. 5. Workshop to review all program activities (evaluation and input for next year plan). 6. Documentation in various media. 7. Regular learning activities. 	<ul style="list-style-type: none"> • Working committees for M, L&E. • Community M, L&E system and indicators. • Document the result of M&E. • Input for next year plans. • Sharing knowledge and experience of this project.

Detailed methodology and activities can be seen in the PARK Technical Guideline (TG-05)

4.4.7. Implementation Timetable

All activities of the project will be implemented for a duration of three years. The cycle of CBDRM projects in the community will repeat annually in the hopes that people will become accustomed to doing it. The goal is that at the end of the project people will have sufficient capacity to continue the annual process, and the project will mature into a program that will change the community. Overall projects at the suco level and the required timetables can be seen in Table 4.7.

Table 4.7: Implementation Timetable at Suco Level

No	Activity	Time	Executors
1	Basic training of facilitators.	The 1 st month.	PIU/NDMD.
2	Dissemination and community consultation.	The 1 st – 2 nd month.	Facilitators to work with Xefe Suco.
3	Basic training for xefe suco, suco council, community champions and SDDMC.	The 2 nd month.	Fasilitators to work with Xefe suco.
4	Community assessments.	The 3 rd – 6 th month.	Facilitators, xefe suco, suco council, SDMC and community champions.
5	Organizing Community Groups.	The 3 rd – 12 th month.	Facilitators, SDMC, community champions.
6	The first advanced training of facilitators	The end of the 6 th month or at the beginning of the 7 th month	PIU/NDMD
7	First advanced training of xefe suco, suco council, community champions and SDDMC.	The beginning of the 7 th month.	Facilitators.
8	Community Planning.	The 7 th – 8 th month.	Facilitators, xefe suco, suco council, SDMC and community champions.
9	<ul style="list-style-type: none"> • Proposals. • Detail plans of each program/activities (first year priorities). • Training for SDMC and community champions. 	The 8 th – 9 th month.	Community groups (working groups) assisted by facilitators, SDMC, community champions and INGO
10	Implementation (first year priorities).	The 9 th month.	SDMC and community groups assisted by Facilitators, SDMC, community champions and INGO
11	The second advanced training of facilitators.	The 9 th – 10 th month.	PIU/NDMD.
12	Community Participation, Learning and Action.	The 9 th – 12 th .	Community assisted by facilitators and community champions
13	Operational & Maintenance System	The 9 th – completion.	Community groups , Xefe Suco, SDMC and community champions assisted by facilitators
14	Community annual review (Second year priorities).	The 12 th month.	Facilitators, xefe suco, suco council, SDMC and community champions.
15	<ul style="list-style-type: none"> • Proposals. • Detail plans of each program/ activities (second year priorities). • Training for SDMC and champions. 	The 13 th month	Community groups (working groups) assisted by facilitators, SDMC, community champions and INGO.

16	Implementation (second year activities).	The 14 th month – completion.	SDMC and community groups assisted by facilitators, SDMC, community champions, INGO.
17	Community Participatory, Learning and Action.	The 13 th – 24 th month.	Community assisted by facilitators and community champions
18	Operational & Maintenance Systems.	The 14 th month	Community groups, Xefe Suco, SDMC and community champions assisted by facilitators.
19	Knowledge documentation and sharing.	The 14 th – 24 th month.	Xefe suco, suco council, SDMC and community groups assisted by facilitators, SDMC, community champions and INGO.
20	Community annual review (Third year priorities).	The 24 th month.	Facilitators, xefe suco, suco council, SDMC and community champions.
21	<ul style="list-style-type: none"> • Proposals • Detail plans of each program/ activities (second year priorities) • Training for SDMC and community champions 	The 25 th month.	Community groups (working groups) facilitated by facilitators, SDMC, community champions and INGO.
22	Implementation (Third year activities).	The 26 th – 34 th month.	SDMC and community groups assisted by facilitators, SDMC, community champion and INGO.
23	Community Participatory, Learning and Action	The 25 th – 12 th	Community assisted by facilitators and community champions.
24	Operational & Maintenance Systems.	The 26 th month.	Community groups , Xefe Suco, SDMC and community champions assisted by facilitators
25	Knowledge documentation and sharing	The 26 th – 36 th month	Xefe suco, suco council, SDMC and community groups assisted by facilitators, SDMC, community champions and INGO.
26	Final Project Evaluations and Suco workshops.	The 35 th month.	PIU, Facilitators, Xefe Suco, SDMC, community groups.
27	Community Program (Midterm Planning) – sustainability.	The 36 th month	Xefe suco, SDMC, Suco council, community groups.

Chapter 5 PARK Management at the Suco Level

Implementation of all activities of the PARK project cycle will be managed by the community. After three years, the learning process to implement the PARK project will improve the capacity to handle disaster risk management, which will prove that this methodology can be sustainable. To ensure sustainability, some prerequisites should be met including: (1) people who have the willingness and ability to organize CBDRM/CCA; (2) coordination and integration between the community and the government; and (3) the ability of communities to manage resources, and the importance of transparency and accountability that starts at the community level.

Strategies in disaster risk management at the pilot project location are:

1. Strengthening government and community organizations existing at suco level such as xefe suco, suco council, and SDDMC.
2. Developing aldeia scale community groups and/ or smaller scale groups based on the proximity of residences, arable land, interests, etc.
3. Encouraging the growth of community champions who work based on volunteerism.

5.1. Strengthening of Local Government

The process of organizing at the suco level uses institutions that already exist, specifically xefe suco, suco council and SDDMC. Efforts are made by maximizing existing roles written by government regulation *law no 3. 2009 about Community Leadership and Their Election*. These roles are reinforced and/or supplemented by roles related to disaster risk management. Table 5.1 shows the organizations and the roles they perform.

Table 5.1: Strengthening the Roles Xefe Suco, Suco Council and SDMC

Roles Based on Government Regulation	Strengthening the Roles
Xefe Suco	
<ul style="list-style-type: none"> • Coordinating the implementation of Suco Council decisions relating to the development of society; conducting consultations and discussions with the community regularly regarding development; and cooperating with the government for program implementation at the suco level. • Dealing with minor disputes, e.g. between aldeia in suco. • Promoting the prevention of domestic violence, including setting penalties for perpetrators. • Enlisting the help of security forces in the event of a problem / crime that cannot be handled at the local level. 	<ul style="list-style-type: none"> • Coordinating all agencies existing at in the suco level with regard to disaster risk management. • Introducing CBDRM project to the community. • Encouraging the growth of DRM champions. • Facilitating the implementation of community meetings for each phase of the cycle. • Encouraging the formation of community groups. • Facilitating the process of preparing suco planning. • Facilitating the process of submitting a proposal to the PIU community (NDMD).

- Submitting annual reports and annual financial statements for the Suco Council authorized by the government.
- Carrying out any other relevant community tasks, or tasks assigned by the government.
- Facilitating the process of Community Grant disbursements.
- Supervising and evaluating the implementation of community activities, both structural and non-structural.
- Promoting suco planning to outsiders.
- Facilitating the integration of suco planning with other programs including PNDS.

Suco Council

- Maintaining social harmony and peace.
- Registering and censusing the population.
- Advancing civic education.
- Promoting the use of the official language.
- Economic development.
- Promoting food security.
- Protection of the environment.
- Education, culture, and sports.
- Assisting the government in the maintenance of social infrastructure.
- Assisting Xefe suco in introducing the program to the community.
- Increasing the capacity of communities in disaster risk management.
- Building cooperation with Xefe suco and DDMC in facilitating planning process at suco level.
- Monitoring, learning and evaluating of the overall CBDRM at the suco level.

SDDMC

- Verifying disaster sites.
- Reporting verifications results to DDMC
- Assisting Xefe suco in introducing the program to the community.
- Organizing and managing CBDRM champions.
- Increasing the capacity of communities in disaster risk management.
- Cooperating with Xefe suco and suco council in facilitating the planing process of planning at suco level.
- Verifying the community proposals together with Xefe Suco.
- Helping Xefe suco promote suco planning to others.
- Facilitating the integration of suco planning with other programs including PNDS.
- Assisting Xefe suco in verifying the proposals of the community.
- Monitoring, learning and evaluating of the overall CBDRM at suco level.

5.2. Community Organizing

In an effort to encourage a structured and systematic way to make people aware of potential disaster problems and their ability to reduce the risks, community organizing is needed. Organizing is the first step community organizations can take in order to develop a social structure which is more sensitive and responsive to shared conditions, and which can enact the changes in order to achieve a better quality of life. It is expected that a community formed through a process of "community organizing" will be dynamic and able to face challenges and changes both from inside and outside the community.

Community is not seen as a legal entity, but rather as a set of interpersonal relationships that are interacting and interrelated and mutually dependent on each other. Therefore, community organizing is also a part of a process of establishing the potential capacity of community groups (empowerment) at aldeia and suco levels. Ideally, they will actively participate in disaster risk management and development, and will be able to perform community management in their respective environments.

A community organization is basically an organization where common interests are the unifying priority. The organization must represent the elemental interests of the society and the reconciliation of various conflicting interests. So basically, when forming a community organization, it must include all elements of society, from different socio-economic status, and thus must be diverse and heterogeneous. If this is not achieved, there will be only an exclusive community organization which will be viewed with suspicion and will not serve the interests of all its members.

5.2.1. Building Community Groups

Considering the widespread settlements and general community livelihoods of farmers, participation is unlikely to be conducted at the suco level only. It is necessary to try and raise participation through community organizing on a smaller level. The community groups are encouraged to take on important roles in managing disaster risks. The group can be divided into three types, namely:

- The first group: people who come together based on proximity of residence. This group is formed to communicate and carry out disaster risk management activities related to the settlement.
- The second group: farmers who come together based on the proximity of arable lands such as farms and/or rice fields. This group is formed to communicate and carry out disaster risk management activities related to lands that cover their farms and rice fields.
- The third group: people who assemble based on specific interests such as women's groups, youth groups, etc. This group is formed to communicate and perform activities that are tailored to their interests.

The role of community groups are as follows:

- Participating in the overall process of CBDRM project cycle.
- Building cooperation and coordination with Xefe Suco, Suco Council, SDDMC and the champions in the planning and implementation of activities.
- Managing the execution of development which has been determined in suco planning.
- Creating an O&M working group for development that has been implemented.
- Documenting the entire process of development and O&M that is carried out by the group.
- Taking responsibility for the whole process of implementation and finances for/from Xefe Suco, Suco Council and SDDMC.

- Conducting periodic and regular discussions about community settlement improvements primarily related to disaster risk management and livelihood. This activity is an evaluation event and involves mutual learning among its members.

Development of the groups will be started after the MoU process for the implementation of CBDRM is completed. This process is not limited by time, meaning that at any time the community should be encouraged to form groups or become involved in a group that has been formed. The more people involved in the group, the better because it indicates the participation is getting bigger. When forming the group, it must be ensured equal opportunities are there for vulnerable people such as women, the elderly, the poor and the disabled.

Facilitators of the program along with volunteers facilitate the formation of the group, implementation of the activities, and the development of the group. This process must be carried out with awareness that the groups formed are not instant and are only intended to get help from the project.

5.2.2. Building Champions of DRM

The presence of champions, who work as volunteers is a consequence of the implementation of community-based development. They contribute to the application of the concept of development from within. Their presence becomes one of sustainability assurance in the future, especially when the project is over and the facilitators do not work anymore in their neighborhoods.

The primary roles of champions are:

- Community drivers in the overall CBDRM process initiated by this project. They are expected to participate and encourage community participation and facilitate the process cycle which is the medium of capacity building in disaster risk management community.
- Providing guidance to community groups that have been formed.
- Building social control in the community on the implementation of the project by ensuring the transparency, and accountability of all actors, and being active in the process of monitoring, learning and evaluation.

Recruitment of the champions is organized by SDDMC and is supported by the facilitators from the dissemination of the project. This process is continuously done so that the number of disaster risk management champions increases. SDDMC and facilitators should provide greater opportunities to all people to become champions whether they are male, female, rich, poor, the elite of suco or common people.

5.3. Resources for Community Project Initiatives

The resource from the PARK project is a stimulant and is not intended to fund all development plans that have been made by the community. The provision of this resource is intended for the community to learn how to implement the parts of the development plan that are more highly prioritized at suco level. Therefore, it is necessary to raise funds from *non*-government institutions, as well as funds from other sources

5.3.1. Objective

The objective of resources of community project initiative distribution is to help people bolster the resilience of their livelihoods against disaster risks and climate change.

5.3.2. Principles of Resources of Community Project Initiative

The principles which must be held in the distribution of resources of community project initiative are:

- *Transparency.* Community resources are resources to support the public, not the individual. Thus, in terms of management, both the support received, the use of resources, and accountability system should be made clear to the public.
- *Accountability.* The resources supporting management must be accountable both to the public as the grantee, and the government (NDMD) as the donor.
- *Efficiency.* Resources support received by the people must be used for activities that are prioritized and have a broad impact on the improvement of livelihoods through disaster risk management.
- *Learning.* Resources of the community project initiative are an educational tool for the community in order to establish responsibility, public trust and social cohesion. If people successfully manage these resources in a transparent, accountable and efficient way, this process will automatically increase their capacity to manage risks and enlarge community trust.

5.5.3. Types of Resources of Community Project Initiative

The resources of community project initiative distributed to the public are comprised of the following:

1. **Capacity Building support** distributed to community organizations at the suco level that are used to finance action plans in the process of suco planning participation, including: training, awareness campaigns, community meeting activities, etc.
2. **Community Sub-Project support.** The Community Sub-project support is a stimulant resource for the community to learn how to implement CBDRM activities and climate adaptation plans contained in CBDRM action plan. Available resources are intended to build infrastructure and facilities, and non-structural and livelihood activities to build community resilience. The resource are provided per suco per fiscal year for three (3) consecutive years beginning in 2015. A resource support for the 2nd year (and beyond) is awarded only if the implementation of activities and accountability reports of the first year as assessed by the PIU (NDMD) demonstrates good performance.

5.5.4. Target Groups of Community Project Initiative

The target groups that may be eligible to receive the Community Project Initiative are:

1. Community organizations at the suco level; which is a combination of the government and the communities that already exist at suco level such as xefe suco, suco council, and SDMC. This group could manage a support for community capacity building, training and awareness campaigns as well as for community meetings.
2. Community groups as groups for implementation of programs written in the suco development plan. (*Refer to chapter 6 on community organizing*).

5.5.5. Activities that can/cannot be supported

The types of structural and non-structural activities that can be supported by the resources of community project initiative are based on criteria as described below:

1. Protecting basic functions of pre-existing the infrastructure against the dangers of landslides, soil erosion, and flooding. Examples of infrastructure protection include building small scale bio-engineering, structures slope stabilization, river embankment stabilization, and improving the drainage system of the roads.

2. Increasing the resilience of environmental infrastructure such as simple village water systems (including gravity systems, wells, rainwater catchments, and spring protection), and could also possibly include washing facilities, and public sanitation facilities.
3. Improvement of irrigation and drainage erosion, including dam inspections, canal maintenance, gate repair, etc.
4. Extension, renovation or rehabilitation of local health posts/clinics, including, for example, furniture, roofing, painting, basic equipment, water and sanitation facilities.
5. Multi-purpose community halls, including storage for stocks of foodstuffs and other survival necessities.
7. Strengthening the roofing of schools and houses to prevent damage from strong winds.
8. Small scale bio engineering projects.
9. Soil and water conservation programs/initiatives.
10. Development of evacuation systems and procedures.
11. Improving access to weather information and databases.
12. Community based early warning systems.
13. Testing of climate tolerant varieties of crops.
14. Emergency drills in schools.

The types of activities not supported under this Community Grant include:

1. Anything against the laws of the country.
2. Anything having to do with firearms, drugs, tobacco, asbestos or other harmful substances.
3. Payment of compensation or rent for use of land.
4. Government offices and places of worship.
5. Payment of government salaries.
6. Any funding for political parties, political activities, campaigning etc.
7. Activities considered too large or complex for the community to construct and maintain.

5.5.6. Proposal and Support Procedure

5.5.6.1. Support for Capacity Building

Support for capacity building will be distributed by NDMD to the community organizations at the suco level to finance a number of action plans via a participatory process of suco planning including: training, public awareness campaigns, and the activities of community meetings.

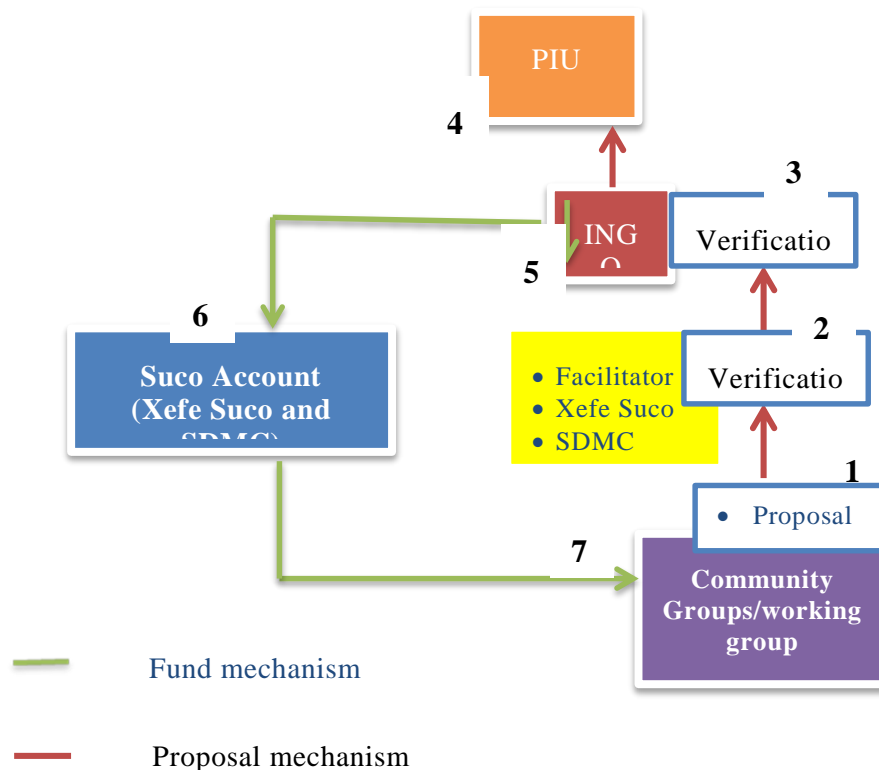
The disbursement is done three times, once every year, on the condition that:

1. There will be an annual work plan (action plan) for developing capacity building and community meetings signed by the leader of community organization, along with the xefe suco, and verified by facilitators.
2. Suco council and SDMC set up a bank account to receive the resources to support for capacity building, which then requires signatures by xefe suco and a person from SDMC.
3. Suco council and SDMC submit a proposal to PIU (NDMD) through an international NGO (INGO) which has been given a mandate by NDMD based on annual action plan. The proposal is signed by xefe suco, a representative from suco council and SDMC.
4. INGO verifies the submitted proposal. If it is verified, it is sent to NDMD to get approval and disbursement.
5. Funds are sent to the accounts of community organizations that have been initiated by the suco council and SDMC.
6. Suco councils can use the resources to support the activities of forming community organizations, participatory planning process at the suco level, aldeia, and smaller community organizations.

7. The utilization of support resources should be done with a simple calculation which uses good accounting principles. Therefore, the suco council or community groups will be accompanied by a facilitator and INGO.
8. At each stage of the resource of Community Project Initiative, the account holder (beneficiary) shall report to the PIU (NDMD) after the work is completed and prepare annual reports. The report of the support resources used for capacity building is verified by facilitators and INGO. The financial statements, documentation of activities and performance assessment are required for the submission of proposals and disbursement of support resources next year.

The chart of resources for the Community Project Initiative proposal and support procedures can be seen in the following figure (Figure 5.1).

Figure 5.1: Proposal and Support Procedure for Community Project Initiative



5.5.6.2. Support for Community sub-project Initiative

Community sub-project resource is a stimulant for the community to learn how to conduct CBDRR activities and climate adaptation as written in one CBDRM action plan

The disbursement is done in two stages (each 50 percent of the amount of sub-project money approved by PIU through the sub-project proposals for funding), with several conditions, including:

1. Providing a Suco Development Plan for both spatial and non-spatial planning.
2. Providing Annual Planning for priority annual activities based on Suco Development Plans.
3. Providing activity plans developed by community groups based on Annual Planning.

4. Community groups write the proposal along with facilitators and expert team appointed by NDMD. The proposal is signed by facilitators, xefe suco and SDMC representative.
5. The proposal submitted by Xefe suco is verified by INGO and is submitted to NDMD represented by PIU to get approval for disbursement.
6. NDMD disburses 50 percent of the funds for the first phase through an account at suco level that is equal to account for capacity building.
7. The use of the support resources at the level of working groups is set according to the needs of each stage of the project which has been included in the action plan of each project.
8. The working group is assisted by a facilitator, INGO, and SDMC records all receipts and use of resources and reports to Xefe suco and SDMC. The report is then verified by facilitators and INGO and is used as a condition for further withdrawals.
9. The second disbursement is worth 50 percent after the community achieves at least 45 percent of the project activity progress. Progress of the activities is evidenced a by financial accountability report, documentation and performance assessment activities including a specific record of activities and financial transparency.
10. The same mechanism applies for the second disbursement as the first one.

5.5.7. Transparency and Accountability

All citizens, including vulnerable people, have the right to obtain information regarding the implementation of the project including the receipt and the use of resources. Transparency is shown by providing information in a variety of ways, either orally or written. Media transparency that can be used includes:

- Announcements in a church since most of the people in the target area are Catholic.
- Installations at the clinics at suco level.
- Installations in Xefe suco offices.
- Announcements at public meetings.
- Announcements at other locations identified as gathering places for community members.

Activity management both at the suco level and project group implementation has the right to be responsible for the activities and public finances as a grantee and NDMD as a donor.

Accountability mechanism is performed as follows:

- Working groups and community organizations throughout the suco level must record the receipt and the use of support resources.
- Working groups submit financial reports to the Xefe Suco, suco councils and SDMC.
- Financial reports of capacity building and project activities are reported by Xefe Suco to NDMD after they are verified by the facilitators and INGOs.
- Financial reports for each project are reported to the public through meetings held at aldeia or suco level.
- Xefe suco along with suco councils and SDMC report all receipts and the use of resources to the community each year through annual meetings in conjunction with annual planning review processes.

Chapter 6 Integrated Program with PNDS

Since 2012, the Government of East Timor through the Ministry of State Administration, has developed a participatory planning process, namely the National Suco Development Program - *Programa Nasional Dezenvolvimentu Suku* (PNDS), which has focused on infrastructure development at the suco level. PNDS mechanisms apply a community demand-driven and community-managed approach. This approach is in accordance with the approach used in the CBDRM project. At some pilot locations, CBDRM will work with sucos intended as a PNDS location. At these locations, the project facilitation process should be jointly conducted so that it will result in an integration of PNDS and this project.



The integration process has two main objectives, namely: (1) suco planning with a community-based approach so as not to confuse the public, and (2) the mainstreaming of DRM into suco planning. If this is carried out, then the infrastructure planning facilitated by PNDS will automatically be sensitive to disaster risk management.

Suco planning not only addresses the issue of infrastructure, but is also expected to provide for social, economic and environmental issues.

This means that the programs to be developed in suco planning will vary, including infrastructure programs. Funds derived from PNDS and CBDRM can be used to finance part of the programs contained in the planning, and can become priorities for the community in accordance with the provisions set by each party. Thus there will be no overlap, and more programs can be realized to their full potential.

Ideally, all locations governed by PNDS and CBDRM facilitators will take part in the community assessment and planning process together. In fact, PNDS programs have already been implemented, and at several locations, the process in the community has reached the stage of planning and/or implementation. Nevertheless, CBDRM facilitators must encourage the development of infrastructure related to DRM. The facilitation process can be done through several models, as seen in the Table 6.1.

Table 6.1: Integrated with PNDS

CBDRM Stage	PNDS Stage	Integration and Cooperation
Assessment	Assessment	Facilitating a joint assessment process until the start of the planning, and preparation of detailed engineering designs for infrastructure.
Assessment	Aldeia and suco set priorities	CBDRM facilitators coordinate with PNDS facilitators to encourage priority infrastructure activities that are sensitive to DRM.
Assessment	Project Proposal	CBDRM facilitators work with the facilitators from PNDS so that infrastructure development planning considers disaster risk management aspects.
Assessment	Detailed Plan	CBDRM facilitators work with PNDS facilitators in the development of detailed engineering designs.

Annex: Best Practices in CBDRM

Annex 1: CBDRM in Indonesia

Source: REKOMPAK – Rebuilding Indonesia’s Communities after Disaster

Between 2004 and 2010, Indonesia was struck by several devastating natural disasters. A major earthquake triggered a tsunami of unimaginable scale that leveled much of the heavily populated coastal areas in Aceh and Nias in December 2004. Another massive earthquake, with its epicenter close to the island of Nias, followed in March 2005. While Indonesia was still in the process of rebuilding Aceh and Nias, tragedy occurred again, this time in Java. In May, 2006 the historic city of Yogyakarta and the province of Central Java were struck by an earthquake. Just two months later in July 2006, an earthquake followed by a tsunami hit the south coast of West Java.

The disasters caused massive losses of life and injuries and destroyed hundreds of thousands of homes, infrastructure facilities and livelihoods. In addition, more than one million people were displaced. In many cases, traumatized survivors were left with only their own inner strength to start the slow process of rebuilding their lives and communities.

The outpouring of solidarity, compassion and support from around the world was unprecedented. Two funds were established to coordinate donor support for the Government of Indonesia’s reconstruction efforts. The World Bank served as trustee for both funds at the request of the Government of Indonesia.

The Government of Indonesia and development partners agreed that a community-based approach would be used for rebuilding houses and community infrastructure, first in Aceh and later in Java. A community-based approach places the responsibility for the process of rebuilding, including the management of the funds, directly into the hands of household groups in communities affected by the disaster. The program of disaster management is namely REKOMPAK.

In Indonesian, REKOMPAK conveys the meaning of ‘reunion’ and to increase cohesiveness and become solid again – in this case, as a community. The name REKOMPAK embodies the spirit of the community based approach and captures the essence of this project that works to rebuild lives and communities. The community based approach through the government and the community ensures the community is involved in participatory planning and takes control of the planning.

In the REKOMPAK community-driven approach, the beneficiaries are at the center of the action. All decisions are made by the community members themselves: confirming who is eligible for assistance, how the community will be planned, what types of houses will be built, the community infrastructure that is needed and how maintenance will be handled. The REKOMPAK approach requires homeowners to be in charge of the reconstruction or rehabilitation of their homes. This leads to higher levels of both quality and satisfaction as compared to other approaches to reconstruction of housing after disasters

Under the REKOMPAK project, disaster-affected communities were given the opportunity to rebuild their homes and community infrastructure with funding channeled directly to them through the government’s budget in the form of block grants. Homeowners could reconstruct the houses by themselves, together with their neighbors, or with the help of hired laborers under the supervision of the homeowner. Facilitators provided technical assistance and supervision.

The REKOMPAK approach is effective for onsite reconstruction as well as for situations that require communities to move to new locations. In Aceh, hundreds of miles of coastline that had supported thriving communities simply disappeared into the ocean. Survivors from these communities had to move to other locations - to land they owned or land granted by provincial or local government. Other communities in Aceh were able and chose to rebuild in the exact locations where their homes had been before the tsunami. After the earthquake in Central Java, housing reconstruction was simpler because most people could rebuild in the exact location where their former homes had been, without requiring complicated land acquisition and relocation issues. Response to the volcanic eruptions of Mount Merapi, however, resulted in the relocation of several communities. These communities were located within the “red zone,” an area deemed unsafe for human settlements because it is in the direct path of possible lava flows or exposure to poisonous gases when the highly-active Merapi volcano erupts. Voluntary relocation was offered to these communities. A community-based, decision-making process was followed to decide where they would relocate, and this process took some time. The challenges presented by the varying requirements of the different disasters cannot be underestimate.

REKOMPAK is a constantly evolving and flexible approach that can be adapted to meet conditions in a variety of contexts and environments. In Indonesia, the REKOMPAK approach has been successfully used in situations devastated by tsunamis, earthquakes and volcanic eruptions. In Aceh, it worked in an environment that was not only a post-disaster situation but also a post-conflict situation.

Steps in the Community Settlement

Planning Process. The Community Reconstruction Planning process involves a range of activities that include dissemination of information about REKOMPAK activities, setting up of beneficiary groups and supervisory committees and preparation of a Community Settlement Plan. When plans have been completed and approved the final step of the process leads to disbursement of the first tranche of funding so that the rebuilding can begin. Below is a brief explanation of a REKOMPAK community planning process used in Indonesia. It should be noted that the process continually evolves and must be adapted to specific situations. Some steps may take place concurrently and in most cases include housing and community infrastructure.

1. Information dissemination

Information dissemination and awareness building for affected communities was organized by village trustee boards with assistance from facilitators. In Indonesia, village trustee boards were initially set up by the Urban Poverty Program, and REKOMPAK relied on these existing bodies for information dissemination where they existed. Using existing mechanisms allows for more rapid and efficient project implementation. Other village management/leadership structures may also be used or a new body can be set up when existing structures are weak or unavailable.

2. Formation of Volunteer Committees

In Indonesia, volunteer committees included a Planning Committee, an Implementation Committee, and an Operations and Maintenance Committee. The committees were not necessarily set up at the same time and were phased in as required. Other committees, such as a Procurement Committee, were also set up as needed. Volunteer community representatives served on and led the committees.

3. Community Surveys

Community representatives conducted housing and infrastructure self surveys with assistance from facilitators and in coordination with local government. Surveys included identification and verification of beneficiaries and finalization of the list of beneficiaries. Land ownership was also confirmed at this time and land deeds were provided by the relevant government agency. The findings were presented to the village trustees and community to be agreed upon before the physical rebuilding process began.



4. Formation of Housing Groups and Committees

Rebuilding under REKOMPAK was organized by community housing groups composed of approximately ten families living in close proximity. Members of the group were usually neighbors or relatives who were willing to work together to rebuild their settlement. Volunteers from the group formed a committee composed of a chair, a secretary, a treasurer and household representatives, usually one per household. Together with its household members, the committee decided on investments, procured materials, controlled funds, assisted with construction, supervised accounts for funds expended and reported on progress. Each committee reported to the village trustees.

5. Community Settlement Plans Prepared



The Community Settlement Plan developed through a participatory process became the guiding document for how physical rebuilding took place. Spatial plans were prepared and communities agreed on priority village infrastructure and facilities to be rebuilt. Systems and procedures for operation and maintenance were also established. The Plan identified areas prone to potential hazards so that action could be taken to avoid, or at least mitigate, possible future disasters. If land and

property demarcations had to be established as was the case in some areas in Aceh and Java, this was also included in the planning process. Every REKOMPAK village had its own Community Settlement Plan, based on its unique needs, conditions and potential. REKOMPAK facilitators provided assistance in all aspects of developing the plans.

6. Community Settlement Plans Submitted for Approval to Village Trustees

Once completed, Community Settlement Plans were submitted for approval to village trustees. After the facilitators and trustees verified and approved the plans (there could be revisions required at each stage), the plan was submitted to the Project Management Unit for approval. Once plans were approved, funding to proceed was provided. Building began when the first funding tranche was disbursed. This launched the process that eventually led to the homeowner receiving approval to occupy his or her home.

In seven years of operation, the MDF and JRF REKOMPAK projects evolved to meet the housing and community infrastructure needs of some of the largest post-disaster community-based

reconstruction efforts ever attempted. Over the years, REKOMPAK introduced many innovative processes and activities to ensure success as measured by quality seismic-resistant construction, disaster risk mitigation and beneficiary satisfaction. This was possible because the projects were flexible and continually evolved based on lessons learned, solid partnerships and implementation of best practices.

Key REKOMPAK project principles or characteristics that contributed to success are listed below.

Self-Reliance and Empowerment. REKOMPAK beneficiaries were empowered to manage resources for the activities in their communities. This included fulfilling criteria for receiving grants, making grant applications, planning their homes and communities, ensuring construction quality, and taking responsibility for their own collective actions including disaster management. Beneficiaries rose to the expectation that they were capable, rather than helpless victims, and showed that they had within them the resilience and tenacity to succeed in the face of great hardship and tragedy. This level of self-reliance and empowerment helped with the healing process. The high levels of community involvement led to excellent beneficiary satisfaction rates and enhanced community ownership in the reconstruction process.

Inclusive decision making. Each decision was made through a democratic process that included: community mapping and planning, house and community infrastructure construction, and use of funds. The community planning process encouraged involvement of marginal groups in reconstruction decisions. Efforts were made to ensure everyone in the community had a voice (for example, holding separate meetings for women beneficiaries) so that their opinions were heard, documented, and considered in decision making.



Transparency and Accountability. REKOMPAK demands transparency in all transactions. The bank account for each community was opened and maintained by housing groups. All financial records and transactions were openly shared and subject to review by group members. Measures such as counter-incentives to discourage misuse of funds, follow up on reported cases of fraud, suspension of funds if agreed upon conditions were not met, and the use of complaint reporting channels helped to promote accountability and deterred corruption. Information about these mechanisms was widely disseminated through posters, the media and websites.

Seismic-resistant Quality Construction. To ensure that future disasters would result in fewer fatalities, REKOMPAK required strict adherence to seismic resistant construction standards. Technical audits and monitoring and evaluation activities were carried out at all stages of the reconstruction process. Technical assistance and frequent monitoring by facilitators as well as regular supervision by partner agencies helped to ensure consistent quality. Funding for the construction was disbursed in tranches and if one or more of the households in a housing group was not compliant with the standards required, release of the next tranche of funding was suspended for the entire group until the problem was



fixed. As a result, household group members and neighbors supported each other to ensure that all met the required standards. Raising community awareness on the importance of construction quality was also a key design feature.

Culturally Appropriate Solutions for Local Problems. Household groups must reach consensus on many decisions. Members have to agree, for example, on who will be selected as a REKOMPAK beneficiary, the location of homes, and the type of community infrastructure to build. At times conflicts arise. Existing local social structures for resolving disputes often have culturally sensitive and locally appropriate means of coming to consensus. Using these creates an environment of trust and enables finding culturally appropriate compromises beneficial for the common good. Managing differences in priorities and perspectives and finding acceptable solutions are important skills in binding communities together.

Supporting Local Economic Recovery. REKOMPAK supported local economic recovery by channelling funds directly to communities. The project encouraged local procurement of construction materials and created jobs at a time when there were few available in devastated communities. Purchasing building materials and supplies locally and hiring local laborers circulated money in the community which helped to stimulate local economies.

Building Disaster Risk Reduction into Design and Implementation. Disaster risk reduction interventions in REKOMPAK projects resulted in communities that are resilient and better able to withstand future disasters. REKOMPAK helped villages to develop Community Settlement Plans with an emphasis on disaster risk reduction. Community infrastructure such as bridges, roads, retaining walls, evacuation routes, and irrigation and drainage channels, were identified and built. Disaster risk awareness was included in capacity building components of all REKOMPAK projects. Residents of REKOMPAK villages are aware of what they need to do and where they need to go for safety if a natural disaster strikes. Local governments have enhanced capacity to manage risk reduction and evacuation when a disaster occurs.

Flexibility and Adaptability. Projects that implement reconstruction activities following disasters need to be flexible. Reconstruction needs vary greatly depending on the scale and scope of a disaster and the local context. It is not always possible to know immediately following a disaster exactly what the needs are and how they might best be met. In both Aceh and Java, REKOMPAK was flexible and responded to evolving priorities. The projects adapted to changing contexts as the reconstruction progressed. Midway through the REKOMPAK project in Java, a midterm review stressed the need for greater disaster risk reduction and REKOMPAK responded by scaling up disaster mitigating activities. In villages where homes with unique and historic architectural style were damaged by the earthquake in Java, REKOMPAK was adapted so that this important cultural heritage could be preserved. The REKOMPAK approach has proven its adaptability: it has been used successfully in Indonesia in situations devastated by different types of disasters, including tsunamis, earthquakes, and volcanic eruptions. The approach was used successfully through different implementation arrangements in an extremely remote and difficult environment on the island of Nias under the MDF's KRRP project. REKOMPAK's success in Aceh also proved that the community-based approach to housing reconstruction can work in a post-conflict situation as well as in post-disaster settings.



Lambung, Banda Aceh
After The Tsunami



Lambung, Banda Aceh
Three years later.

Annex 2: CBDRM in Vietnam

Source: Community Based Disaster Risk Management – End of Project Report, Natural Disaster Risk Management Project Vietnam, 2009.

Vietnam is one of the most disaster-prone country in the world. Because of the country's geographic position and topography, Vietnam is regularly affected by typhoons, tropical storms, floods, droughts, seawater intrusions, landslides, forest fires and occasionally earthquakes. Disasters triggered by typhoons and floods are by far the most frequent and severe. With around 70 percent of the population living in lowland areas in the Red River and Mekong deltas or along the 3,200 km coastline, these disasters result in human casualties, economic losses and environmental damage.

Strengthening disaster risk management remains a priority of the Government's development agenda. Vietnam has in the past given priority to laws and policies relating to the complex tasks of disaster mitigation and management, and has instituted a structure for water-related disaster management: the Central Committee for Flood and Storm Control (CCFSC) and its subordinate provincial and local committees. The CCFSC is a cross ministerial agency that was established in 1990 to strengthen institutional coordination, especially in the area of emergency response and long-term reconstruction and recovery.

The Government embarked on a Community-Based Disaster Risk Management (CBDRM) project with the support of the Japan Social Development Fund and the Netherlands Trust Fund through the World Bank. The CBDRM component aims to strengthen the capacity of villages and communes, and the disaster management institutions to become more responsive to the short and longer-term needs of the most vulnerable villages through participatory risk assessment and identification, prioritization and implementation of risk reduction measures. The project intends to help communes implement activities that deal with natural hazards through capacity development in participatory planning and management. Safer village and commune plans that focus on long term intervention and preparedness measures will be developed. The project will build on existing community based disaster management and risk reduction models, and will seek to empower flood-prone communes to prevent and reduce the impact of disasters, and secure and protect their livelihoods.

In year 1 of Phase 1, CBDRM will be implemented in 10-pilot communes. This is funded by the Japan Social Development Fund. A further 20 communes will be identified for project expansion. In year 2 of Phase 2, the project will cover implementation in 20 communes with funding from the Netherlands Trust Fund. The CBDRM steps are:

1. Setting up Project Implementation Structures.
2. Community Participatory Risk Assessment.
3. Participatory Planning.
4. Community Managed Implementation.
5. Participatory Monitoring and Evaluation.

Setting Up Project Implementation Structure

The Ministry of Agriculture and Rural Development (MARD) is the ministry responsible for CBDRM implementation. MARD and Department of Agriculture and Rurla Development (DARD) at the Provincial level act as the Secretariat of the Flood and Storm Control Committees (FSCCs) at each level. MARD/DARD holds key responsibilities for flood and storm related disasters, as well as

rural development activities. So the project was well placed in this ministry to coordinate such activities under its mandate. MARD as the implementing agency had prepared the following documents: (1) Project Implementation Manual, and (2) CBDRM Facilitator's Guide.

To ensure project objectives are met, project implementers needed to be provided with the knowledge and skills training needed to understand project objectives, activities and procedures as well as be able to facilitate the project CBDRM process with communities. The CBDRM component was provided with funding to engage international and national CBDRM specialists who will provide technical assistance to the project.

Implementing at the Community Level

Project implementation at the community level involves: risk assessment, planning, implementing and monitoring and evaluation conducted by the community and assisted by facilitators. Facilitators provide training for the communities on methodology. This project has used Participatory Rural Appraisal for all steps in the community.

Based on the results of the risk assessment, participants and communities identified both structural and non-structural disaster risk reduction and mitigation measures. This process involved community meetings where possible disaster risk reduction measures were identified and later prioritized. Operational and Maintenance Procedures were also discussed in the planning process. This procedure is addressed in the community training.

Results

The results of the project are:

- 87 villages in pilot areas (10 communes) have Safer Village Planning.
- Structural project planning with Detailed Engineering Design. Infrastructure projects which were proposed by community were built. An example is in the Duc Chao commune in Ha Tinh where the local school is often made inaccessible because it is cut-off from the main road because of flash floods coming from the hillside. The CCCC identified the upgrade and construction of the commune road that links the school to the main commune road. School children, the CCCC and villagers mention that the project has greatly reduced the risk during the flood season of 2009. Also, the road was further enhanced with boats, rescue equipment and other non-structural measures also provided under the project. The community is now better prepared to respond to emergencies and disasters.
- There is partnership between communities and local government on monitoring and evaluation.
- Partnership with NGOs.

Lessons Learned

The following are the lessons learned and constraints encountered in implementing the pilot CBDRM project:

CBDRM is an Integrated Organized Response. Organized communities can better launch disaster risk reduction with functional organizations. They can better study their situation, plan their moves and maximize their scarce resources. The extent, cohesiveness and sustainability of disaster risk reduction is anchored on the level of development of the organization of people doing CBDRM. All

stakeholders including each individual, family, organization, government units at various levels, NGOs and service organizations, with or without (direct) programmes on disaster risk reduction have a stake in disaster risk reduction.

Capacity building and community organizing, an essential task of community based disaster risk reduction. Increasing community capacity and motivation is an important part on disaster risk reduction. Community training have various results. However, the capacity and motivation of local leaders is highly variable, increasing the challenge for trainers and facilitators. Training curricula needs to be appropriately customized, and above all made simple and relevant. Training needs to be followed up immediately with practical training-related activities, otherwise much of the new knowledge is lost.

Prevention and mitigation must stress social rather than physical solutions. It is more cost effective in the long run to prepare a community than to organize massive relief distribution or construct massive civil works projects. Villagers, CFs, local authorities and PCs all tend to view DRR in terms of the possible “microprojects” (i.e. small-scale infrastructure achieved through external assistance) rather than broader DRR. Villagers, local authorities and PCs instinctively look for structural rather than non-structural solutions. Investing in community organizing is more cost-efficient and effective than constructing roads and buildings which are sub-standard or ill equipped because of budget and technical constraints.

Targeted Information dissemination and public awareness. Public awareness about disaster risks and possible measures of reducing impact of disasters on their livelihoods and lives is essential. Public information and awareness materials should be developed to inform large sections of the community. Community meetings and mobile propaganda teams are useful, but they should be complemented with reading materials that can be distributed and read by communities and families.

Customizing assistance according to the varying needs within a community. Communities in Vietnam have varying economic and social conditions. A village or commune will have any of the following people and families: poor/destitute, middle income and well off households, women or elderly headed households, households with disabled family members, households socially discriminated against or socially influential households. Thus, various communities, families and individuals will have varying degrees of vulnerabilities and needs. Most of the sub-grants identified by communes were projects benefiting whole villages and communes. There were a number of projects that built flood or storm Evacuation Centres. However, to build an evacuation centre that will be used only 3-4 times a year during storm occurrences might not be cost-effective. Instead of this, commune officials and communities should provide the resources to individual households to strengthen or retrofit their houses against floods and storms.

Need to encourage community contribution. Communities have been surviving disasters for centuries using their own initiative and limited resources. External support should support these initiatives and promote communities to contribute to the undertaking. There was an indication of a growing dependence on external support for preparedness and mitigation activities which communities should be doing and are very much capable of doing so without external support.

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