COMMUNITY DISASTER RISK REDUCTION FUND







CLIMATE AND DISASTER VULNERABILITY < SCORING WORKS











Adaptive Capacity







INTRODUCTION

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1. Exposure to natural hazards (extent and frequency) 2. Sensitivity

3. Adaptive capacity

The Climate and Disaster Vulnerability Score is a simplified indicator-based scoring framework to assess and compare current household-level vulnerability to climate change and disaster risks. The score is primarily populated from information collected in administering the SLCHB. The household level scores can be rolled up to a given administrative level and mapped to visually highlight differences in vulnerability. It does not include a specific cut-off to determine whether a household (HH) is climate and disaster vulnerable or not. Rather, the score allows for comparison and aggregation to identify areas of higher vulnerability.

The score further leverages existing hazard susceptibility and vulnerability maps, where they exist. Where maps do not exist, scoring will need to be adjusted. However, the use of the latitude and longitude information collected with the survey should be used to provide as accurate as possible figures related to proximity to the coast, steep slopes, rivers, and other hazards.

Elements of the Climate and Disaster Vulnerability Score include

- a) a criteria and indicator framework;
- b) information sources; and
- c) a scoring system.

Sample worksheets have been provided to illustrate the application of these three elements.

CRITERIA AND INDICATOR FRAMEWORK

Each component of vulnerability (Exposure; Sensitivity and Adaptive Capacity) is assigned a value based on a series of criteria and underlying The indicators. assessment is semi-quantitative and points are allocated to indicators if certain conditions are met (for example, if the household (HH) is located at least 3 kilometres from the coastline and less than 20 metres in elevation). The figure below summarises the structure of the scoring framework, up to criteria level.



eCPA SLCHR Toolbox: Tool 6 (Climate and Disaster Vulnerability Scoring Worksheet

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Criteria and indicators were selected based on existing or new questions in SLCHB. Therefore, related answers would stem from survey results. In some cases, answers can be corroborated or arrived at in advance through enumerator observation or review of hazard maps (Exposure to natural hazards).

SCORING SYSTEM

Methods to screen and assess climate and disaster vulnerability based on indicators generally derive values for each component of vulnerability and then aggregate scores to arrive at an aggregate index. As opposed to indicator-based climate change vulnerability assessments, which use actual values (for example, % of municipal infrastructure exposed to flood risk) and then need to normalise these values (with values between 0 and 1) so they can be aggregated within and across vulnerability components (exposure, sensitivity or adaptive capacity) the method proposed here uses a simplified, binary approach. Points are allocated according to whether the household (HH) meets the condition described in the indicator or not. The worksheets below explain how a score is estimated for each vulnerability component.

Points are added and then normalised to values between 0 and 1, which depend on the spread of points possible and number of indicators. The equation used to normalise values within each component is as follows:

$$I = \frac{Iobs - Imin}{Imax - Imin}$$

Where I = combined indicator value per component m of indicator values observed) – (lowest value possible)]/[(highest value possible) (lowest value possible)]

Once a normalised score per component has been obtained, the combined score for household vulnerability can be calculated as such:

$$VS = (E_i + S_i) - AC_i$$

Where VS = vulnerability score; E_i = the normalized value for exposure; S_i = the normalized value for sensitivity; and, AC_i =the normalized value for adaptive capacity

The calculated vulnerability score is unweighted. Analysts could opt to assign differential weights to selected indicators or vulnerability components are weighted, provided sufficient research and stakeholder support existed.

Once a series of vulnerability scores have been estimated for households, these values can be put into context by binning them in quartiles. Household values can also be aggregated into different spatial units.

INFORMATION SOURCES

1. EXPOSURE TO NATURAL HAZARDS (extent and frequency)

1.1.1 is the household located in an area of high or very high susceptibility to floading? National, local hazard maps, or enumerator observation Direct exposure 1.1.2. is the household located 50m from a liver or steam AND in genity stopping/flat area? SLCHB Household (HH) Cuteted in an area of high or very high susceptibility to landslides, mudslides or erosion? Direct exposure 1.2.1. is the household (HH) located in an area of high or very high susceptibility to landslides, mudslides or erosion? National, local hazard maps, or enumerator observation Direct exposure 1.2.2. Is the household (HH) located in an asteop area (with stops greater than 30%)? National, local hazard maps, enumerator observation Direct exposure 1.2.2. Is the household (HH) located in a steop area (with stops greater than 30%)? National, local hazard maps, enumerator local hazard maps, enumerator observation Direct exposure 1.3.1. is the HH located on or input from inclose provinity (Km or less area (MH) located in a steop area (WH stops greater than 30%)? National Emergency Management Agency Indicators below only apply if the household (HH) cocated area and is the rearine coastline? 1.3.1. is the HH located on or input from the located or least 3tm from the coastline or input from the National Emergency Management Agency Hazard maps (I have NAD enumerator estimation with input from the National Emergency Management Agency Hazard maps (I have NAD enumerator estimation with input from the National Emergency Management Agency	Questions	Yes? (insert 1)	Information source	Comment
1.1.2. Is the household located 50m from a fiver or stream AND ingently sloping/fid aced? Indirect exposure Section 1 Housing Q1.1 & 1.4 NEW3 1.2 Landslides 1.4 NEW3 Direct exposure 1.2.1. Is the household (HH) located in an area of high or very high susceptibility to landslides, mudslides or erosion? National, local hazard maps, or enumerator observation Direct exposure 1.2.2. Is the household (HH) located in an area of high or very high susceptibility to landslides, mudslides or erosion? National, local hazard maps, enumerator observation Direct exposure 1.2.2. Is the household (HH) located in a steep area (with slopes greater than 30%? SLCHB Household (HH) Questionnaire: Section 1 Housing Q Direct exposure 1.3.1. Is the HH located on or less oway) to the matine coastline? Hazard maps, enumerator observation or input from the National Emergency Management Agency Indicators below only is on the matine coastline? Add 1 point if the HH is located between 3 and 5 km from the coast sthan 20m in elevation Hazard maps More exposed Q1.1NEW AND enumerator induction with input from National Emergency Management Agency Less exposed Less exposed 1.4.2. If the answer to 1.4.1 is "yes"; A ad 1 point if the HH is located book from the National Emergency Management Agency More exposed Less exposed 1.1.1. Dees the HH eport having experienced stock from the coast in an elevation aline past from the coastin and the port having experienced stock an	1.1.1 Is the household located in an area of high or very high susceptibility to flooding?		National, local hazard maps, or enumerator observation	Direct exposure
1.2 Landsildes National, local hazard maps, or enumerator observation Direct exposure 1.2.1. Is the household (HH) located in an area of high or very high susceptibility to landsildes, mudsildes or erosion? National, local hazard maps, or enumerator observation Categories of land surface susceptible to erosion include: sparsely vegetated areas, precatious urban settlements, landfills and surficial mining areas. 1.2.2. Is the household (HH) located in a steep area (with slopes greater than 30%? SLCHB Household (HH) Direct exposure 1.3.1. Is the HH located on or indeced in an asteep area (with slopes greater than 30%? SLCHB Household (HH) Direct exposure 1.3.1. Is the HH located on or indeced in an asteep area (swith slopes greater than 30%? National Emergency Indicators below only apply if the household (in put from the marine coastine? 1.3.1. Is the HH located on or indeced in an asteep area (swith slopes greater than 30%? Hazard maps, enumerator the National Emergency Indicators below only apply if the household (in put from the marine coastine? 1.4.1. Does the HH is located between 3 and 5 km from the coastine and less than 20m in elevation Hazard maps Less exposed 1.4.1. Does the HH report hours and least 3km from the coastion or input from the National Emergency Management Agency Less exposed Less exposed 1.4.2.1 If the answer to 1.4.1 Is to specify the answer to 1.4.1 Is specific s - Q 9.1.1 9.2 SucHB Household (HH) Less exposed	1.1.2. Is the household located 50m from a river or stream AND in gently sloping/flat area?		SLCHB Household (HH) Questionnaire: Section 1 Housing Q1.1 & 1.4 NEW3	Indirect exposure
1.2.2. Is the household (HH) located in a steep area (with slopes greater than 30%)?SLCHB Household (HH) Questionnaire: Section 1 Housing Q 1.4.NEW3Direct exposure1.3.1. is the HH located on or in close proximity (5km or less away) to the marine coastline?Hazard maps, enumerator observation or input from the National Emergency Management AgencyIndicators below only apply if the household is on the marine coastline?Add 1 point if the HH is located at least 3km from the coastline and less than 20m in elevationHazard maps Hazard mapsMore exposedAdd 1 point if the HH is located between 3 and 5 km from the coastline and less than 20m in elevationHazard maps Hazard mapsMore exposed1.4. Frequency and recurrence 1.4.1. Does the HH report avards bagened three part from natural hazard in the past 5 yearsSLCHB Household (HH) He answer to 1.4.1 is "yes", has at least 1 of those hazards happened three or more times?NoreMALISED SCORE FOR EXPOSURE (1)NORMALISED SCORE FOR EXPOSURE (1)NorMALISED SCORE 	1.2 Landslides 1.2.1. Is the household (HH) located in an area of high or very high susceptibility to landslides, mudslides or erosion?		National, local hazard maps, or enumerator observation	Direct exposure Categories of land surface susceptible to erosion include: sparsely vegetated areas, precarious urban settlements
1.3 Coastal hazards (storm surge, erosion)1.3.1. Is the HH located on or in close proximity (5km or less away) to the marine coastline?Hazard maps, enumerator observation or input from the National Emergency Management AgencyIndicators below only apply if the household is on the marine coastIf the answer to 1.3.1. is "yes": Add 2 points if the HH is located at least 3km from the coastline and less than 20m in elevationHazard maps Between 3 and 5 km from the coastline and less than 20m in elevationMore exposedAdd 1 point if the HH is located between 3 and 5 km from the coastline and less than 20m in elevationHazard maps (Q1.1NEW AND enumerator estimation with input from National Emergency Management AgencyLess exposed1.4 Frequency and recurrence 1.4.1. Does the HH report having experienced shock from natural hazard in the past 5 yearsSLCHB Household (HH) Questionnalie: Section 9 Shocks and 	1.2.2. Is the household (HH) located in a steep area (with slopes greater than 30%)?		SLCHB Household (HH) Questionnaire: Section 1 Housing Q 1.4NEW3	landfills and surficial mining areas. Direct exposure
If the answer to 1.3.1. is 'yes': Add 2 points if the HH is located at least 3km from the coastline and less than 20m in elevation Add 1 point if the HH is located between 3 and 5 km from the coastline and less than 20m in elevation Add 1 point if the HH is located between 3 and 5 km from the coastline and less than 20m in elevation 1.4 Frequency and recurrence 1.4.1. Does the HH report having experienced shock from natural hazard in the past 5 years 1.4.2. If the answer to 1.4.1 is "yes", has at least 1 of those hazards happened three or more times? TOTAL SCORE If the answer to 1.4.1 is TOTAL SCORE If the answer to 1.4.1 is If th	1.3 Coastal hazards (storm surge, erosion 1.3.1. Is the HH located on or in close proximity (5km or less away) to the marine coastline?		Hazard maps, enumerator observation or input from the National Emergency Management Agency	Indicators below only apply if the household is on the marine coast.
Add 1 point if the HH is located between 3 and 5 km from the coastline and less than 20m in elevationLess exposed1.4 Frequency and recurrence 1.4.1. Does the HH report having experienced shock from natural hazard in the past 5 yearsSLCHB Household (HH) Questionnaire: Section 9 Shocks and Coping Strategies – Q 9.1.1; 9.21.4.2. If the answer to 1.4.1 is "yes", has at least 1 of those hazards happened three or more times?SLCHB Household (HH) Questionnaire: SLC/HBS Section 9 Shocks and Coping Strategies: Q 9.1.1; 9.21.4.2. If the answer to 1.4.1 is "yes", has at least 1 of those hazards happened three or more times?SLCHB Section 9 Shocks and Coping Strategies: Q 9.1.1; 9.21.4.2. NORMALISED SCORE FOR EXPOSURE (1)NORMALISED SCORE FOR EXPOSURE (1)	Add 2 points if the HH is located at least 3km from the coastline and less than 20m in elevation		Hazard maps If none: Section 1 Housing Q1.1NEW AND enumerator estimation with input from National Emergency Mangaement Agency	More exposed
1.4 Frequency and recurrence1.4.1. Does the HH reporthaving experienced shockfrom natural hazard in the past5 years1.4.2. If the answer to 1.4.1 is"yes", has at least 1 of thosehazards happened threeor more times?TOTAL SCORENORMALISED SCOREPoint State St	Add 1 point if the HH is located between 3 and 5 km from the coastline and less than 20m in elevation		Hazard maps If none: Section 1 Housing Q1.1NEW AND enumerator estimation with input from the National Emergency Management Agency	Less exposed
"yes", has at least 1 of those hazards happened three or more times? TOTAL SCORE NORMALISED SCORE FOR EXPOSURE (1)	 1.4 Frequency and recurrence 1.4.1. Does the HH report having experienced shock from natural hazard in the past 5 years 1.4.2. If the answer to 1.4.1 is 		SLCHB Household (HH) Questionnaire: Section 9 Shocks and Coping Strategies – Q 9.1.1; 9.2 SLC/HBS Section 9 Shocks	
TOTAL SCORE NORMALISED SCORE FOR EXPOSURE (1)	"yes", has at least 1 of those hazards happened three or more times?		and Coping Strategies: Q 9.1.1; 9.2	
	TOTAL SCORE		NORMALISED SCORE FOR EXPOSURE (1)	

The range of possible values is 0 (minimum) to 9 (maximum). To calculate the normalised score for exposure, divide the difference between the total score and the minimum possible value by the difference between the maximum possible value and the minimum possible value. In other words: Normalised score for exposure = [(total score observed) – (minimum value possible)] [(maximum value possible) – (minimum value possible)]

2. SENSITIVITY

Questions	Yes? (insert 1)	Information source	Comment
2.1 PHYSICAL SENSITIVITY OF DWELLING			
2.1.1. Are the dwelling's outer walls constructed with materials OTHER than concrete, stone or bricks?		SLCHB Household (HH) Questionnaire: Section 1 Housing Q1.2	
2.1.2. Are roofing materials makeshift/thatched or sheet metal (galvanise/galvalume)?		SLCHB Household (HH) Questionnaire: Section 1 Housing Q1.3	
2.2 LIVELIHOOD SENSITIVITY			
2.2.1. Is most (over 50%) of the HH income directly dependent on natural resources (water, marine resources, soil, forests, fauna)?		SLCHB Household (HH) Questionnaire: Section 4 Economic Activity Q 4.19 & 4.20 (selected responses)	
2.3 HISTORICAL LOSSES			
2.3.1. Has the HH suffered historical losses due to shocks from natural hazards?		SLCHB Household (HH) Questionnaire: Section 9 Shocks Q 9.1 screening question	Indicators below only apply if household (HH) has suffered historical losses in income, jobs, assets
If the answer to 2.3.1 is "yes":			
Add 1 point if the household has experienced a moderate or greater impact on income due to shocks		Questionnaire: Section 9 - Q9.4.1 Yes & Q 9.4.2	potential sensitivity in the future
Add 1 point if the household has experienced a loss of job due to shocks.		SLCHB Household Questionnaire: Section 9 - Q 9.5	Leading indicator of potential sensitivity in the future
Add 1 point if the HH has lost at least 2 major assets due to potential sensitivity in the shock.		SLCHB Household (HH) Questionnaire: Section 9 - Q 9.6	Leading indicator of potential sensitivity in the future
TOTAL SCORE		NORMALISED SCORE FOR SENSITIVITY (2)	

The range of possible values is 0 (minimum) to 9 (maximum). To calculate the normalised score for exposure, divide the difference between the total score and the minimum possible value by the difference between the maximum possible value and the minimum possible value. In other words: Normalised score for exposure = [(total score observed) – (minimum value possible)] [(maximum value possible) – (minimum value possible)]