

Hazard, disaster, vulnerability and risk



**Workshop for Caribbean Microfinance
Network Round Table
October 7-8, 2009**

*Caribbean Technical Support Facility
(CTSF)/Omtrix Inc.*



Fund Management

OMTRIX

Financial Consulting



Outline of Presentation

- **Definitions:**
 - What is a natural hazard?
 - Natural Hazards vs “Natural” Disasters
 - Risk, vulnerability, hazards and disasters
 - **The concept of Contingency Planning**
 - **The Caribbean Technical Support Facility Methodology**
 - **Concluding Remarks**
-



What is a hazard?

- A **hazard** may constitute a potentially damaging event for people and their surroundings;
- Hazardous events vary in magnitude, frequency, duration, area of extent, speed of onset, spatial dispersion and temporal spacing;
- Hazardous events differ in origins:
 - Natural: Hydro-meteorological – storms, flooding, hurricanes, cyclones
 - Biological: Epidemic (diseases), Insect Infestation,
 - Geological: earthquakes, volcanic eruption, landslides
 - Man-made: Environmental degradation, technological hazards



What is a hazard? (cont'd)

- ▶ The purpose of a **hazard analysis** is to identify the *potential* hazard facing a community served by the MFI - whether they are natural, technological, man-made or national security related :
 - ▶ Tropical Storm, Hurricane, Volcano, flooding
 - ▶ Hazardous materials e.g.. Lead poisoning
 - ▶ Fires
 - ▶ Riots or Civil Unrest

- ▶ A Hazard Analysis consists of: Hazard Identification, Vulnerability Analysis, Risk Assessment



Vulnerability explained

Vulnerability is:

- The extent to which a community's structure, services or environment is likely to be damaged or disrupted by the impact of a hazard.
- **Vulnerability** is measured by the extent to which a community or an environment is susceptible or resilient to hazards, on account of their nature, construction and proximity to hazardous terrains or a disaster prone area



What is a Vulnerability Analysis?

- Identifies areas in the community that may be affected or exposed, individuals in the community who may be subject to injury or death from certain specific hazardous materials, and what facilities, property, or environment may be susceptible to damage should a hazardous materials release or even occur.



Definition of a Disaster

- **Disasters** are:
 - a serious disruption triggered by a natural or anthropogenic hazard causing human, material, economic or environmental losses, which exceed the ability of those affected to cope;
 - are the manifestation of risks that have not been adequately managed and the result of lack of/ inappropriate or inadequate mitigation measures.
 - are a function of physical exposure and vulnerability.



Disaster

Natural or man-caused event which generates intense negative impact on people, goods and services and/or the environment, exceeding the affected community's internal capability to respond. Disasters only occur when hazards meet vulnerable situations



Hazard x Vulnerability = Disaster



Implications of Disasters

- **Social**

- Displaced communities, increase in poverty and hunger; Increase in unemployment leading to alternative income-generating activities.

- **Economic**

- Reallocation of funds to finance disaster recovery including rebuilding infrastructure; Debt servicing may be compromised; Impact on financial sector (including microfinance companies).

- **Environmental**

- Water sources may become polluted; The level of sanitation in both rural and urban areas may decline.
-



Global Trends: Disasters are NOT natural

- **Increasing vulnerability:**

Socio-economic: poverty, unplanned urban growth, lack of awareness and institutional capacities...

Physical: insufficient land use planning, housing, infrastructure located in hazard prone areas, policy-made disasters...

Environmental degradation: unsustainable management of ecosystem services: coral reefs, forests, mangroves, watersheds, wetlands, arid zones...





What is "Risk"?

- The probability of being affected by the undesirable consequences of a hazard.
- In other words, "the chance of something happening that will have an impact upon objectives, measured in terms of consequences and likelihood."



Risk identification

Risk Identification:

- Systematic use of available information to estimate the geographic extent of the hazard, its intensity, and its probability of occurrence and the related consequences;
- The magnitude or intensity of the hazard; and
- The likelihood or probability of the hazard occurring in any particular location within any specified period of time.



What is risk management?

- ... the process of taking calculated risks, a systematic approach that identifies and prioritizes the risks and implements strategies to mitigate the risks. The objective of risk management is:
 - the prevention of potential problems;
 - the early detection of actual problems;
 - a continuous process that involves staff at all levels of the organization.



The risk management process

- Systematic application of management policies, procedures and practices to the tasks of communicating, establishing the context, identifying, analyzing, evaluating, treating, monitoring and reviewing risk.



The changing face of risk

- **Changing nature of hazards**

Hazards are changing : increased intensity and/or frequency of known hazards. Some countries will face hazards they have no experience with.

- **Changing nature of vulnerability**

Vulnerability to hazards is increasing, and rapidly. Climate-change-specific impacts (sea-level & temperature rise) will aggravate existing vulnerability



International disasters 2008

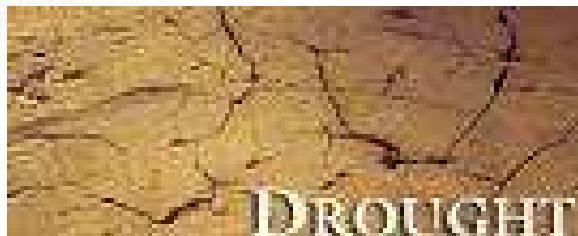
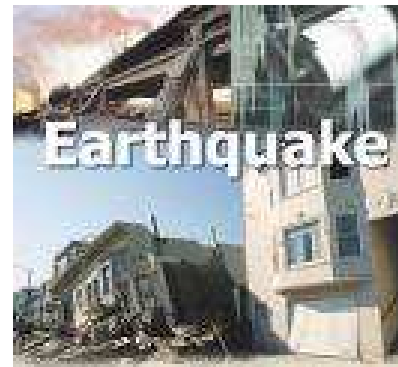
- The human and economic losses caused by natural disasters in 2008 were devastating. More than 235 000 people were killed, 214 million people were affected and economic costs were over 190 billion US\$.
- In 2008, 354 natural disasters were recorded in the EM-DAT database, which is less than the 2000-2007 yearly average number of 397. **The death toll was three times higher** than the annual average of 66 813 for 2000-2007, mainly caused by two major events: Cyclone which killed 138 366 people in Myanmar and earthquake in China which caused the deaths of 87 476 people. Disaster costs in 2008 were more than twice the 82 billion US\$ annual average for 2000-2007 and were mainly attributed to the earthquake in China (85 billion US\$) and hurricane Ike in the U.S. (30 billion US\$).
- In 2008 once again, **large numbers of persons were affected by a few natural disasters**. The earthquake and severe winter conditions in China affected a total of 122 million people. Many other people were affected by droughts in Asia (12 million) and Africa (14 million) and severe weather conditions in the U.S. in May and June 2008 (11 million).

Source: Centre for Research on the Epidemiology of Disasters (CRED) , CRED has maintained EM-DAT, a worldwide database on disasters.





Hazards/Disaster photos



Influenza A (H1N1) Pandemic



Contingency planning

Some guidelines for managing risks

It is better to plan when it is not needed, than not to have planned when it was!.



Contingency planning: definition

- A forward planning process:
 - in a state of uncertainty,
 - scenarios and objectives are agreed to,
 - managerial and technical actions defined,
 - potential response systems put in place in order to prevent, or better respond to, an emergency or critical situation.



Questions Answered In The Contingency Plan

- **WHO:** Designates responsible individuals within the MFI and vests with authority.
- **WHAT:** Explains expectations and any local procedures associated with an incident.
- **WHEN:** Identifies tasks that need to be performed before, during, and after an incident.
- **WHERE:** Identifies key locations for incident planning and response, including locations of emergency equipment, escape routes, and indoor post-evacuation rendezvous points.
- **WHY:** Protects people and serves as a gateway to continuity.
- **HOW:** Explains the way the MFI should prepare and respond.



Contingency planning: principles

- A dynamic process, focused on preparation and flexibility.
- Integrated into on-going operational planning activities.
- Provides useful input to managers and staff.
- An integral part of all companies preparedness activities.



Characteristics of a GOOD contingency plan

- ▶ It should be comprehensive yet not too detailed.
 - The aim is to find the right balance between covering all the important issues yet not flooding the plan with too much details.
- ▶ It should achieve the balance between flexibility and concrete actions.
- ▶ The Plan must not be too directive, restrictive and confining, but should give adequate guidance and direction on the way to proceed.
- ▶ The definition of plan is "*intention, way of proceeding*" and not "*blueprint*".



Characteristics of a GOOD contingency plan

- well structured, easy to read and easy to update.
- action oriented: layout clearly what needs to be done, by whom and by when will implementation be finished.
- should not contain too many assumptions. The skill is to minimize the number of assumptions or at least consider the level of probability in all assumptions.
- should be a dynamic document, constantly being updated, amended and improved.



Omtrix/CTSF : Objectives

- The objective of the CTSF is to perform a risk assessment and diagnostic at each institution which will provide institution-specific input for a contingency plan, which the consultant will prepare and then implement with the institution. The combined product of the technical assistance will both provide a conceptual framework for understanding the vulnerabilities and threats facing the institution and its clients (important also for future strategic decisions such as opening new branches or targeting different sectors) as well as a clear post-disaster plan that the institution will employ to mitigate the effects of a disaster should one strike and disrupt the operations of the MFI.
-



Omtrix/CTSF's objectives

- **Natural disaster Risk Assessment:** performed on-site at the institution, examines the risks the MFI faces based on geographic location, portfolio concentration, human and physical assets of the institution and risk management procedures already in place. A comprehensive approach is used to analyze the different risks through a complete analysis of the vulnerabilities and threats associated with the MFI's operations.



Vulnerability analysis of a MFI: General considerations 1. **Institutional Vulnerability**

Table 6
Elements considered in the institutional vulnerability analysis

FACTOR	VARIABLES AND PARAMETERS	RATIONALE
FACTOR 1.- INSTITUTIONAL VULNERABILITY	Strategic planning	Factor with incidence in prevention and long term planning. Generally speaking, vulnerability is higher when planning mechanisms do not exist, which means there is a tendency to work on a short-term horizon.
	Risk reduction policy	Internal risk reduction policies are considered an institutional strength, because it denotes an institutional political will and guarantees the availability of means and resources to make risk management effective.
	Organization	Key factor for prevention. When an organizational structure is functional -roles, functions and profiles have been defined and the structure is sound-, the institution has a relative strength for risk minimization and for introducing actions towards risk prevention and management.
	Social factors	Leadership, organizational quality, term of permanence of employees in the institution, etc. are important issues related to risk prevention and emergency management. These issues define internal interrelationship mechanisms among staff.
	Coordination mechanisms	Internal and external coordination are a priority to structure risk prevention and operative emergency management. The existence of mechanisms, means, instruments and coordination channels guarantees risk reduction, even if these were not designed for that purpose. Existing coordination mechanisms make possible actions more efficient and reduce response times in case of emergency.
	Institutional strengthening	The existence of institutional strengthening plans and programs is a factor that can contribute to risk reduction and management.
	Operative issues	Monitoring and control are vital to increase the safety level of the institution. The absence of monitoring and control mechanisms is a weakness and a factor that adds to the level of institutional vulnerability.



Vulnerability analysis of a MFI: General considerations 2. **Social Vulnerability**

Table 7 Elements considered in the social vulnerability analysis		
FACTOR	VARIABLES AND PARAMETERS	RATIONALE
FACTOR 2.- SOCIAL VULNERABILITY	Socio-demographic characteristics	In the configuration of the level of vulnerability of the institution, an important role is placed by variables and social characteristics of the target group. These variables are assessed in terms of poverty, unemployment, diversification of clients' activities, access of clients to health and education services, gender participation, etc.



Vulnerability analysis of a MFI: General considerations 3. **Physical Vulnerability**

Table 8 Elements considered in the physical vulnerability analysis		
FACTOR	VARIABLES AND PARAMETERS	RATIONALE
FACTOR 3.- PHYSICAL VULNERABILITY	Urban-territorial component	<p>The characteristics of the environment where the branches are located are a key piece of information to assess vulnerability. In general, it can be said that when a branch is located in an area where there is evidence of (i) factors of urban friction; (ii) disorganized/unplanned growth; (iii) weakness to adapt to urban regulations, and (iv) risk infrastructure and equipment, the levels of vulnerability increase as a result of the functional link that exists between the branch and its environment.</p> <p>If these external factors were uncontrollable by the institution, there could be negative impacts on the institution's activity, and in extreme cases, even making impossible the operation of the institution.</p>
	Buildings	<p>The building in itself is a vulnerability related factor. If the type of construction and the design is adapted to the limitations of the environment, it will be possible to guarantee performance under safety conditions. The assessment of main construction materials, building techniques, type of structures, etc. constitute the basis for the evaluation and forecast about their potential behaviour.</p>
	Accesses	<p>Given that the activity performed by the institution tends to concentrate people in time and space (both clients and employees), the branches need an adequate development of the access areas to the offices. The location of accesses, dimensions, construction materials, type and orientation of openings allows the evaluator to quantify the risks associated to a potential evacuation process in case of emergency.</p>
	Safety	<p>Availability of identified safe areas, safety equipments and/or security strategies (contingency plans) is a contributing factor to internal risk reduction.</p>



Vulnerability analysis of a MFI: General considerations 4. **Clients' Vulnerability**

Table 9

Elements considered in the portfolio/clients vulnerability analysis

FACTOR	VARIABLES AND PARAMETERS	RATIONALE
FACTOR 4.- PORTFOLIO/ CLIENTS' VULNERABILITY	Clients and type of activity	The MFIs' mission , the type of clients and the intrinsic characteristics of the activities financed are both an institutional asset and a factor of vulnerability. The weaker the conditions of the clients or the activities they develop, the higher the degree of institutional vulnerability.
	Concentration and services	Concentration is a factor of occurrence of disasters. When human and urban concentration increases, there is a tendency for explosive growth or uncontrolled forms of population settlements to appear. As a result of the above, if a natural or anthropogenic event occurs, it is possible to expect greater impact.
	Location	The location conditions of clients over the territory (areas of high fragility or unsafe areas), inadequate access (roads), lack of adaptation to existing regulation on land occupation, are factors that determine the clients' vulnerability pattern. Likewise, these weaknesses determine, though indirectly, the vulnerability of the financial institution.
	Installation	This factor is assessed considering the development conditions of the clients' activity: analyze if the client lives and develops its economic activity in the same place, and then assess the safety conditions of the infrastructure. Concentration of activities in one place is considered a factor of vulnerability.



CTSF: Vulnerability analysis of a MFI

The ranges for the valuation of the global vulnerability are (Table 10):

Table 10		
Valuation of vulnerability levels		
Vulnerability level	Index	Points
HIGH	3	Between 9 y 12 points
MEDIUM	2	Between 5 y 8 points
LOW	1	Between 1 y 4 points

Note: For the individual vulnerability conditions, refer to ANNEX 2: Vulnerability Analysis for the MFI, in which the elements and conditions identified are explained for each parameter.



CTSF: Vulnerability analysis of a MFI

Methodology further explained:

- Each variable has been assigned parameters, and each parameter has been assigned a weight in order to (i) quantify a value for each factor; (ii) assess the relative impact of each factor, and (iii) suggest strategies/actions to reduce vulnerability.
- The analysis for individual vulnerability conditions can be found in the Tables of Vulnerability Assessment, where for each parameter the identified conditions are described. The information contained in the tables is generated from interviews held and field visits.



CTSF: Risk Diagnostic

- **Risk Diagnostic:** written report prepared during and after the initial visit to the MFI. Provides the institution's management with a clear and detailed analysis of the MFI's present position in terms of managing the different risks associated with external factors to include:
 - Information on Disasters impacting the Caribbean
 - Disaster Risk Analysis of the specific country
 - Emergency Contingency Plan - *Institutional Diagnostic Form used to perform a Hazard Analysis of the MFI: Identification of most important hazards with potential of occurrence (Physical security, protection of data and information, measures to prevent/mitigate losses)*



CTSF: Risk Diagnostic (cont'd)

- Disasters and Microfinance: direct and indirect impact analysis.
- Risk Management Proposal
 - **PART I:** Preventive and corrective measures - risk reduction plan
 - **PART II:** Proposal of actions for the short-run(12 month period)
 - **PART III:** Management Plan for emergencies resulting from disasters



CTSF: Risk Diagnostic (cont'd)

To aid the MFI to better understand how the vulnerability assessment is performed, Annexes 3 and 5 are prepared as methodological Annexes .

- Annex 1 – Pictures of the organization and clients
- Annex 2 - Vulnerability analysis of the MFI
- Annex 3 - Methodological process for identification of vulnerability conditions
- Annex 4 - Format for evaluation of client vulnerability (proposal to used with Hazard Maps).
- Annex 5 - Methodological process for the identification of vulnerability conditions of clients: explains how to use Annex 4.
- Annexes 6-12 -Formats for monitoring of damages (human, assets, institutional process, clients, and financial indicators)
- Annexes 13 -15 - Training materials for the MFI and its clients



CTSF: Contingency Plan

- A **Contingency Plan** is prepared to provide a guide for the MFI to follow to secure the institution's resources (human and physical), as well as the clients, and mitigate the impact in the wake of a natural disaster. This plan will use the Risk Assessment and Diagnostic as a base and will include a training plan and operational manual for the institution; the plan will also include indicators to measure the success of the implementation and a monitoring system to gauge the level of implementation by the MFI.



Annex 4: Evaluation of client vulnerability

ANNEX 4.: EVALUATION OF CLIENT VULNERABILITY (VULNERABILITY ASSESSMENT)

INFORMATION NEEDED FOR THE EVALUATION OF CLIENT VULNERABILITY (PRE-DISASTER INFORMATION)				QUANTIFICATION AND ESTIMATION OF THE VULNERABILITY SCENARIO (to serve as a basis for credit analysis and estimation of portfolio at risk)										
				VULNERABILITY									RECOMMENDATION	
				WEIGHT ASSIGNED	WEIGHT SUMMATION FOR EACH VULNERABILITY FACTOR	The estimate is based on the summation of weighted values			Space to write the resulting level of vulnerability : 3 (HIGH), 2 (MEDIUM)	INDICATOR OF TOTAL VULNERABILITY OF THE CLIENT				
HIGH (3)	MEDIUM (2)	LOW (1)	VULNERABILITY LEVEL			INDICATOR OF TOTAL VULNERABILITY OF THE CLIENT (SUM OF LEVEL OF VULNERABILITY FOR ALL FACTORS)	HIGH	MEDIUM		LOW				
PERSONAL INFORMATION	NAME OF CLIENT													
	HOME ADDRESS													
	BUSINESS ADDRESS													
	FAMILY COMPOSITION	TOTAL NUMBER OF MEMBERS												
		HEAD OF HOUSEHOLD												
		SPOUSE												
		NUMBER OF TEENAGERS LIVING AT HOME (AGES 13-18)												
		NUMBER OF CHILDREN LIVING AT HOME (AGES 1-12)												
		NUMBER OF ELDER PEOPLE LIVING AT HOME (AGES 65 AND UP)												
	OTHER PEOPLE LIVING AT HOME													
SENIOR PROJECT OFFICER														
SOCIAL STATUS	Indicate the client's condition in terms of economic level:	HIGH INCOME		1										
		MEDIUM INCOME	X	2										
		LOW INCOME		3										
INCOME SOURCE	The activity financed by National Development Foundation SVG is the only source of income of the household?	ONLY SOURCE	X	2										
		MULTIPLE SOURCES		1										
LEVEL OF POPULATION CONCENTRATION	In the area where the house is located...	LOW		1										
		MEDIUM	X	2										



Annex 4: Evaluation of client vulnerability

- Annex 4 constitutes the foundation for structuring a risk profile of clients. It assumes that with the data collected by the MFI, it is possible to:
 - Have inputs for decision making with respect to providing/approving loans
 - Integrate the Risk Profile of Clients: instrument to quantify potential effects on the portfolio
- The proposal aims at gathering information of clients related to the following aspects, by means of simple questions with different alternatives for answers:
 - **SOCIAL**
 - **PHYSICAL**
 - **EXPOSURE**
 - **AVAILABILITY OF BASIC SERVICES**



Annex 4: Evaluation of client vulnerability

- The information compiled from the use of Annex 4 form must be supported by the Information system: the questionnaire is part of the data the Loan Officer should introduce in the system and the calculations will be performed by an application developed to comply with the purpose.

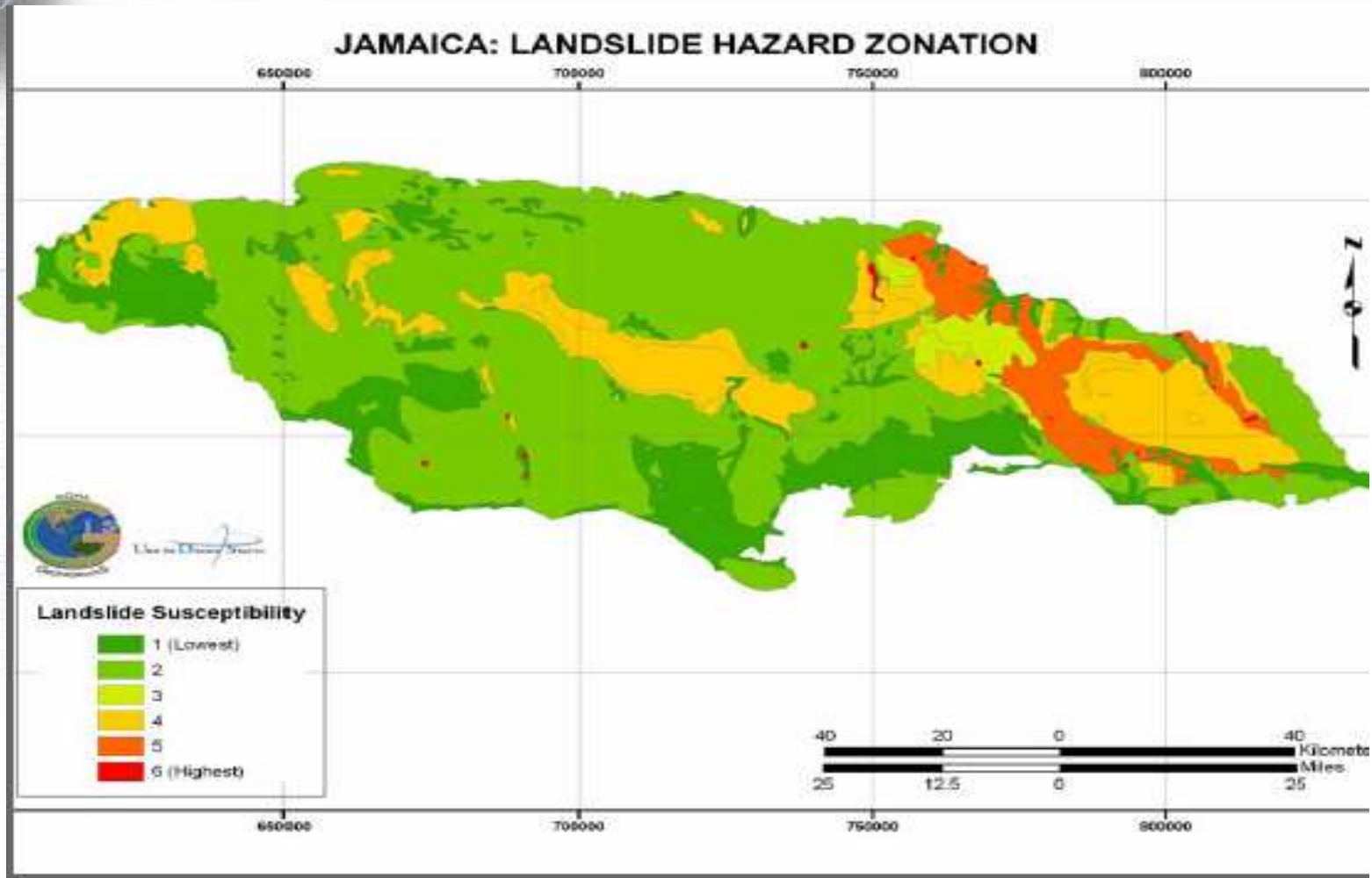
- DECISION MAKING GUIDELINES:**

When the level of vulnerability of the client is high, this will be indicating that it becomes necessary for MFI to:

- Consider credit approval if mitigation measures are incorporated.
- Reserve loans in accordance with level of risk.
- Consider not providing the loan if risk is high and cannot be mitigated, unless it is part of a well diversified credit growth strategy.
- Apply measures to increase financial safety.



Sample Landslide hazard map of Jamaica – to be used in conjunction with Annex 4





**ANNEX 6.2
SITUATION OF STAFF MEMBERS OF MICROFINANCE INSTITUTION
(DETAILED)**

Post disaster Forms prepared for use by the MFI

Date: _____							
Summary: ___ Total number of staff member ___ Number of staff members killed ___ Number of staff members with light injuries (can get back to work) ___ Number of staff members with severe injuries (unfit to work) ___ Number of staff members with relatives killed or injured Relief needs for staff members and their families: Housing/lodging: for ___ families (number) Food and water: for ___ families (number); ___ individuals (number) Clothing: for ___ families (number); ___ individuals (number) Beds: for ___ families (number); ___ individuals (number) Financial aid: for ___ staff members (number) Other:					Comments:		
Detailed information for each staff member of the offices that suffered damages:							
Name	Position	Degree of damage suffered by the staff member			Number of relatives injured or killed	Other damages	Needs
		Light injuries	Severe injuries	Killed			

**ANNEX 6.1
SUMMARY OF SITUATION OF STAFF MEMBERS OF THE MICROFINANCE INSTITUTION**

Total number of staff members	Number of staff members killed	Number of staff members with light injuries (can reintegrate to work immediately)	Number of staff members with severe injuries (unfit to work)	Number of staff members with relatives killed or injured



Post disaster Forms prepared for use by the MFI

ANNEX 7 SUMMARY OF PHYSICAL DAMAGE TO FACILITIES AND ASSETS OF MICROFINANCE INSTITUTION

Type of good or infrastructure	Scope of damage			Required action	Estimated investment to recover goods or infrastructure to the original state (EC\$)
	Light	Medium	Severe		
Physical structure (walls, ceilings, etc)					
Public services supply (potable water, electricity, sanitation)					
Vehicles					
Communications (telephone, fax, mobile phones, data transmission networks))					
Computing systems					

ANNEX 8 IMPACT ON MICROFINANCE INSTITUTION'S OPERATION FOR DEATH OR INCAPACITY OF STAFF MEMBERS

A. Managerial, administrative or back office staff

In this format each office must inform the impact of any damage to employees (excluding Project Officers) on the operation of the departments they belong to. A list of affected employees that cannot fulfill the functions they have been assigned must be prepared.

Name of the employee	Seriousness of the damage suffered	Department	Impact on the department's operation	Recommended actions
Summary of the impact on MFI				



Concluding Remarks

- Inherent vulnerability profile of Caribbean SIDS renders/demands disaster recovery planning, as a highly specific and critically important sub-facet of the suite of disaster risk management measures that should be nationally available and practiced;
- Our region:
 - Geographic location & natural proclivity to natural hazards
 - Increased probability of exposure to high frequency, high intensity natural hazard events
 - High levels of indebtedness



Concluding Remarks

- Pressure of servicing high debt loads
- Limited resources to invest in human and infrastructural development
- High recurrent and forecasted recurrent costs of recovery
- Insufficiency of external aid for recovery & reconstruction
- Potentiality for debilitated governance post major and/or catastrophic events
- Decline in goodwill/recurrent bailout by international community to consistently contribute to recovering and rebuilding Caribbean states, post disasters



THE END

THANK YOU FOR PARTICIPATING

**THANK
YOU**