

Community Risk Assessment and Vulnerability Analysis

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Climate Change : Adaptation & Mitigation in CRA



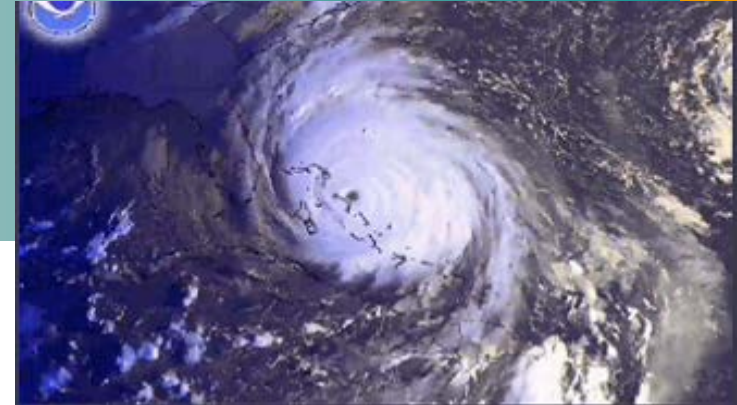
Adaptation to climate change is all planning for the future :

- Floods - frequency, depth, speed, damage
- More storms - ditto
- Sea-level rise
- More mudslides & avalanches
- Drought frequency, duration & intensity
- More malaria, dengue, etc. Insect -borne diseases
- More and different (new) pests
- Water table depth



Armero – Colombia - 1985

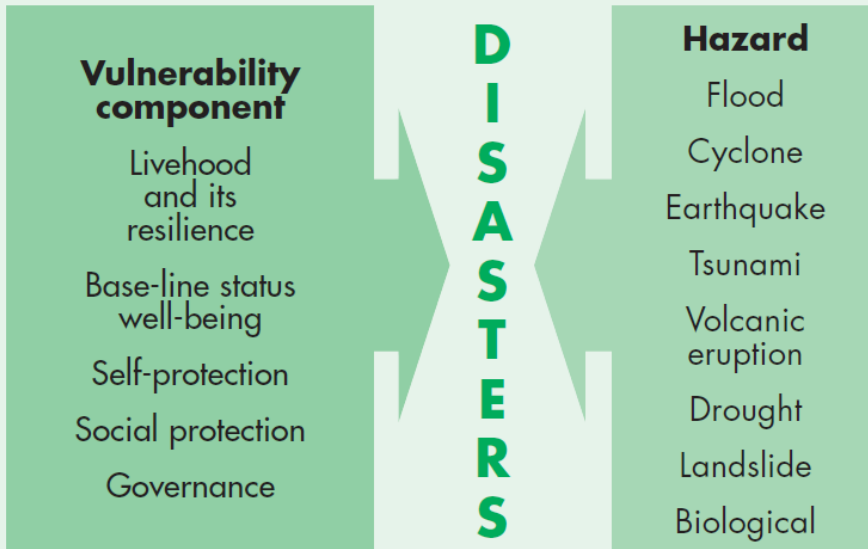
Risk
= f (
{Flood} Hazard
+
Vulnerable
Context
-
Coping
Capacity)



Choluteca – Honduras - 1998

 economic loss and social **dislocation** = **disaster**

Graciela Peters



likelihood of a hazard and the greater the vulnerability of the population, as a function of their capacity.

$$\text{Risk} = \frac{\text{Hazard} \times \text{Vulnerability}}{\text{Capacity}}$$

This formula is not mathematical in nature. It is used by the International Federation to assess the potential impact of a hazard on a community, as a means of determining the root causes of vulnerability and identifying needs while implementing a VCA.



Hazards, Risks



Hazard - potential to cause damage, human, economic, social, etc

Actual or potential hazards

Risk = hazard x vulnerability / coping capacity

Hazard becomes a risk if a building, community or individual is vulnerable.

Hazards and Risks



Natural and human resources

- Earthquakes, landslides, volcanoes, Tsunamis; hurricanes-typhoons / twisters
 - Floods, Inundation,
 - Fire
 - Drought, Pests, Contamination, Animal disease,
 - Land degradation, Human Disease epidemics
 - Morbidity/mortality/disability
-
- **Actions of the State**
 - Land or other asset redistribution; Redistribution and confiscation; Compulsory procurement
 - Villagisation
 - Tax changes - relative increases
 - Declining public health expenditures capacity; Introduction of user charges (health, education, etc.)
 - Restrictions on labour migration
 - Cessation of services, subsidies, price support

Hazards and Risks



Actions by the market

- Price shocks of commodities
- Rapid inflation
- Unemployment
- Falling real wages
- Rises in interest rates
- Changes in borrowing capacity

Actions by the Community

- Appropriation and loss of Common Property resources
- Breakdown of sharing mechanisms; Breakdown of labour reciprocity
- Destruction of infrastructure
- Disruption of marketing channels
- Embargoes, Persecution

Hazard: Angry and hungry lion



Hazard: a. Angry and hungry lion. Up to now, this is not a hazard.

- b. Angry and hungry lion has escaped in the zoo. This becomes a hazard.

Identify the risk: a. There is no way for the lion to escape from the zoo or to attack other animals and/or people, because the event occurs at 6:00, the alarm is already on and the response plan has been activated. Up to now, there is no major risk.

- b. The lion has escaped during visiting hours. A group of 52 school-children is in the zoo. A group of 20 disabled people, and 20 individual elderly people are visiting the zoo. Members of the city's soccer team, with their families, also in the zoo. What are the risks?

Vulnerability: a. People exposed to the hazard b. People close to the hazard.

Capacities: a. Warning system available

- b. Response plan in existence
- c. Activation procedures followed
- d. Security measures to avoid affecting other animals (contingency).

IFRC 2009

Vulnerability



Vulnerability - conditions: physical, social, economic, & environmental factors or processes, which increase the susceptibility of a community to impact of hazards.

Vulnerability Stages



Baseline vulnerability, (chronic, static or normal vulnerability), the enduring level over time whether there is a recognised threat or not,

- and

Current vulnerability, (acute, transitory, dynamic or emergency vulnerability), which relates to an emergency.

'Silent' and *'Loud'* emergencies.

(even after disaster assistance meets immediate needs, baseline vulnerability may remain)

Measuring Vulnerability

- Contextual information: incl. population characteristics, external shocks and stresses (e.g., climate), health (morbidity and mortality), previous disasters' impact
- Physical and environmental features (including hazards), land use, resources and infrastructure, location of populations and vulnerable sub-groups
- Information about environmental conditions and concerns, relationship between vulnerable people and their environment and resilience?
- Dimensions of vulnerability (e.g., education, employment, health, nutritional status, household economies)



Coping Capacity



Coping Capacity - combination of all strengths & resources within community, society or organization that can reduce the level of risk, or the effects of a disaster.

include physical, institutional, social economic means; skills, personal or collective attributes, leadership.

Coping capacity



The means by which people or organizations use available resources and abilities to face adverse consequences that could lead to a disaster.

Involves managing resources in normal times, as well as immediately before, during, and subsequent to crises.

Strengthening coping capacities builds resilience to natural and human-induced hazards.

Coping strategies

- traditional vulnerability reduction



Coping Strategies

e.g. Social community, family, savings, using stock, borrowing, mortgaging, illegal methods,

Coping strategies sequence :

- i. non-erosive activities, (risk minimising and loss management) then
- ii. disposal of productive assets (erosive coping), leading to
- iii. the final stage of destitution of total non coping.

Categories of Coping Strategies

Drought example



Stage 1: Insurance Mechanisms (risk minimising and loss management practices)

- - Changes in cropping and planting practices
- - Sale of small stock
- - Reduction of current consumption levels, - Collection of wild foods
- - Use of inter-household transfers and loans
- - Increased petty commodity production
- - Migration in search of employment (by individuals, not family units)
- - Sale of possessions (i.e. jewellery)

Stage II: Disposal of Productive Assets

- - Sale of livestock
- - Sale of agricultural tools
- - Sale or mortgage of land
- - Credit from merchants or money lenders
- - Reduction of current consumption levels

Stage III: Destitution

- - Distress Migration (by entire family units, with no options remaining)

Resilience, Preparedness, Prevention, Mitigation



Resilience

Capacity of a system, community or society potentially exposed to hazards to adapt, by resisting, or by changing to reach and maintain an acceptable level of functioning.

determined by the degree to which the social system is capable of organizing & increasing capacity to learn from past disasters for better protection and risk reduction measures.

Preparedness

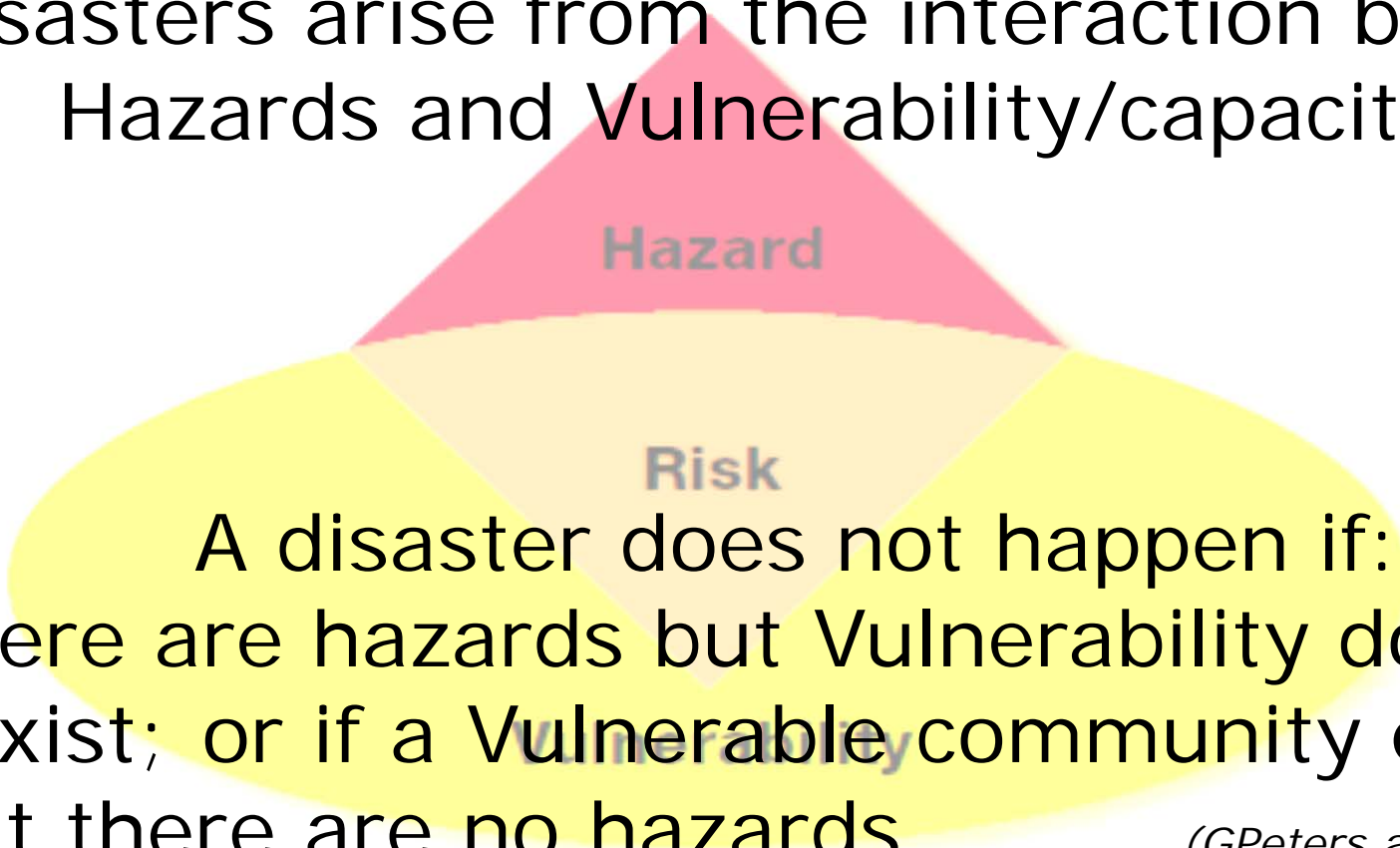
Activities and measures taken in advance to ensure effective response to the impact of hazards, including effective early warnings and temporary evacuation from threatened locations.

Mitigation Structural and non-structural measures undertaken to limit the adverse impact of natural hazards, environmental degradation and technological hazards

What makes a Disaster?



Disasters arise from the interaction between Hazards and Vulnerability/capacities.



A disaster does not happen if:
there are hazards but Vulnerability does not exist; or if a Vulnerable community exists, but there are no hazards

(GPeters after Blaikie et

al, 2004)

Why DRR needs to be **Participatory**?

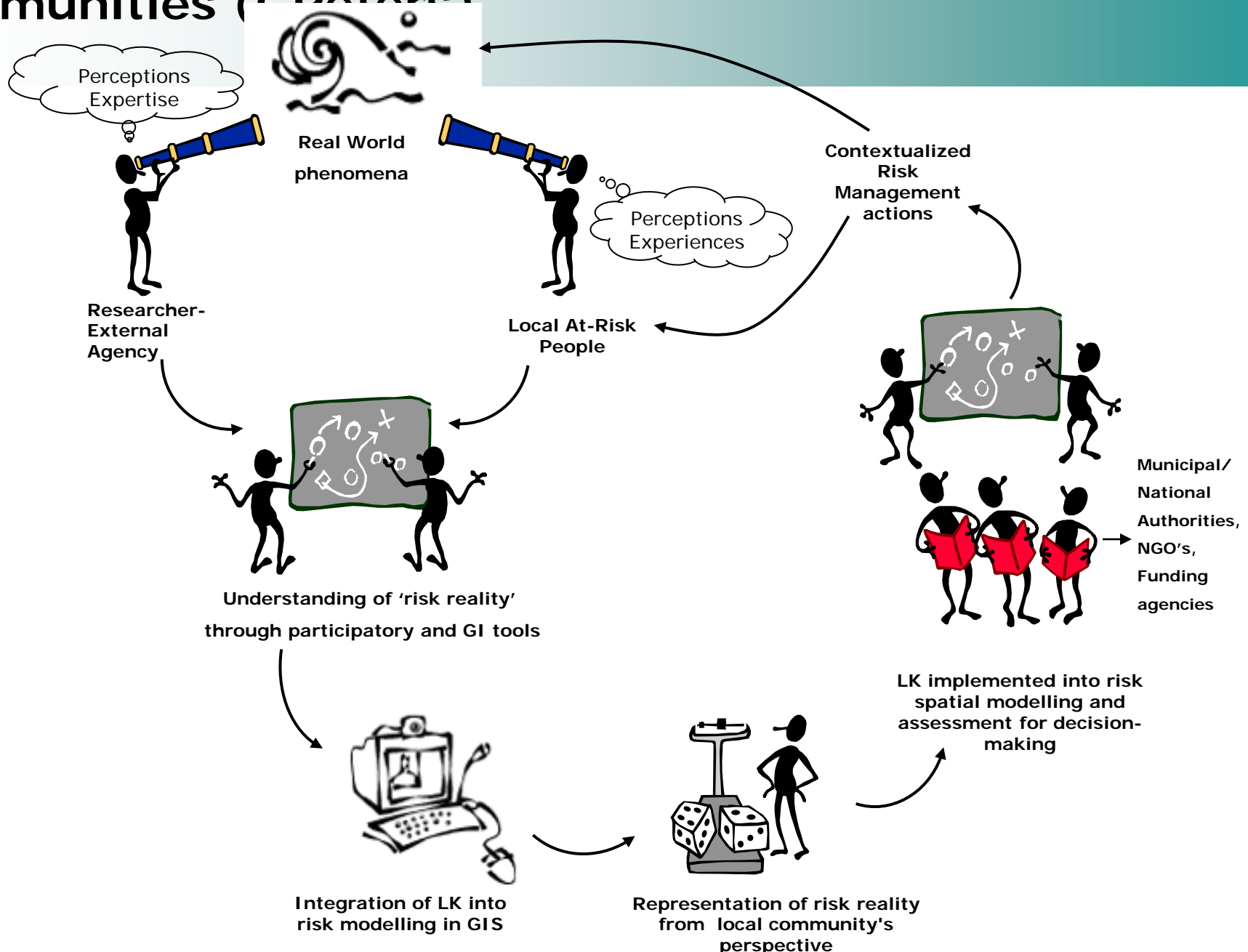
The goal of participation is to give at-risk communities the ability to express themselves, to **learn from them**, and ultimately to empower them through the **acknowledgement** of their knowledge, skills, and abilities.

Participation improves the **self-confidence** and capacities for risk management of local communities and municipal authorities.

They become aware of local knowledge as a **resource** which they have and therefore need less **external** human, technical and economical assistance



Learning-based approaches that get 'experts' closer to communities (CDeters)



Mapping Social Vulnerability & Coping Capacity



Spatial elements are:

- Distance from sources
- Proximity to shelter, support, etc.
- Networks - transport, communications
- Networks - supporting mechanisms
- Thresholds - environmental. Social
- Land cover and land uses

Participatory Mapping and PGIS is special



- Information on local interests and priorities
- Represent social communities, as well as individuals
- Multiple processes of people's participation in information identification & selection
- Capacity-building: groups empowered by involvement in P-mapping / PGIS processes;
- Elicits, represents & validates local and indigenous knowledge.



Environmental Equity & Justice



Environmental Equity

no groups bear a disproportionate risk from environmental hazards

- distributional equity of outcomes, and equity during the planning processes.

- **Environmental justice** spatial distribution of environmental impacts



Spatial Information Tools for DRR



| SUITABLE APPLICATIONS TOOLS & METHODS | Community mapping | Environmental Hazards | Property allocations | Land use planning | Location of Hazards | Vulnerability Assessment | Risk Mapping | Safety & security |
|--|-------------------|-----------------------|----------------------|-------------------|---------------------|--------------------------|--------------|-------------------|
| RRA & PRA methods (for spatial info) | | o | | o | | o | o | o |
| P-mapping with: Sketch mapping | | | | O | | o | o | o |
| P-mapping with: Topo maps | o | | o | o | o | o | | |
| P-mapping with: aerial photos | o | o | o | o | o | o | o | o |
| P-mapping with: satellite images | o | o | | o | | o | o | o |
| P3DM | o | o | o | o | o | o | | |
| Mobile GIS, GPS, Cyber Tracker | o | | | | o | o | o | |
| GIS | o | o | o | o | | o | o | |
| Visualisation, Graphics software | | o | | o | | o | o | o |
| Digital camera, Video, Multi Media | | o | | | | o | o | o |
| Dynamic GIS (web-based GIS) | | | | o | | | o | o |
| Virtual reality | | o | | o | | | | o |
| Interactive Planning Tables | o | o | o | o | o | o | o | |

ProVention



ProVention

Measuring Mitigation. Tools for Mainstreaming Disaster Risk Reduction

Risk Assessment - hazard mapping, forecasts, economic appraisal, social appraisal

ProVention (2006) Community Risk Assessment Methodologies and Case Studies. Compiled by Maya Schaefer. Geneva: ProVention.

<http://www.proventionconsortium.org>

M.K. McCall (2008) Participatory Mapping and Participatory GIS (PGIS) for CRA, Community DRR and Hazard Assessment. Geneva: ProVention, CRA Toolkit, Participation Resources. Website:

<http://www.proventionconsortium.org/?pageid=48#action>

Working with women at risk: practical guidelines for assessing local disaster risk. International Hurricane Research Centre, Florida Intrnat,