

# Describing Vulnerability and Capacity



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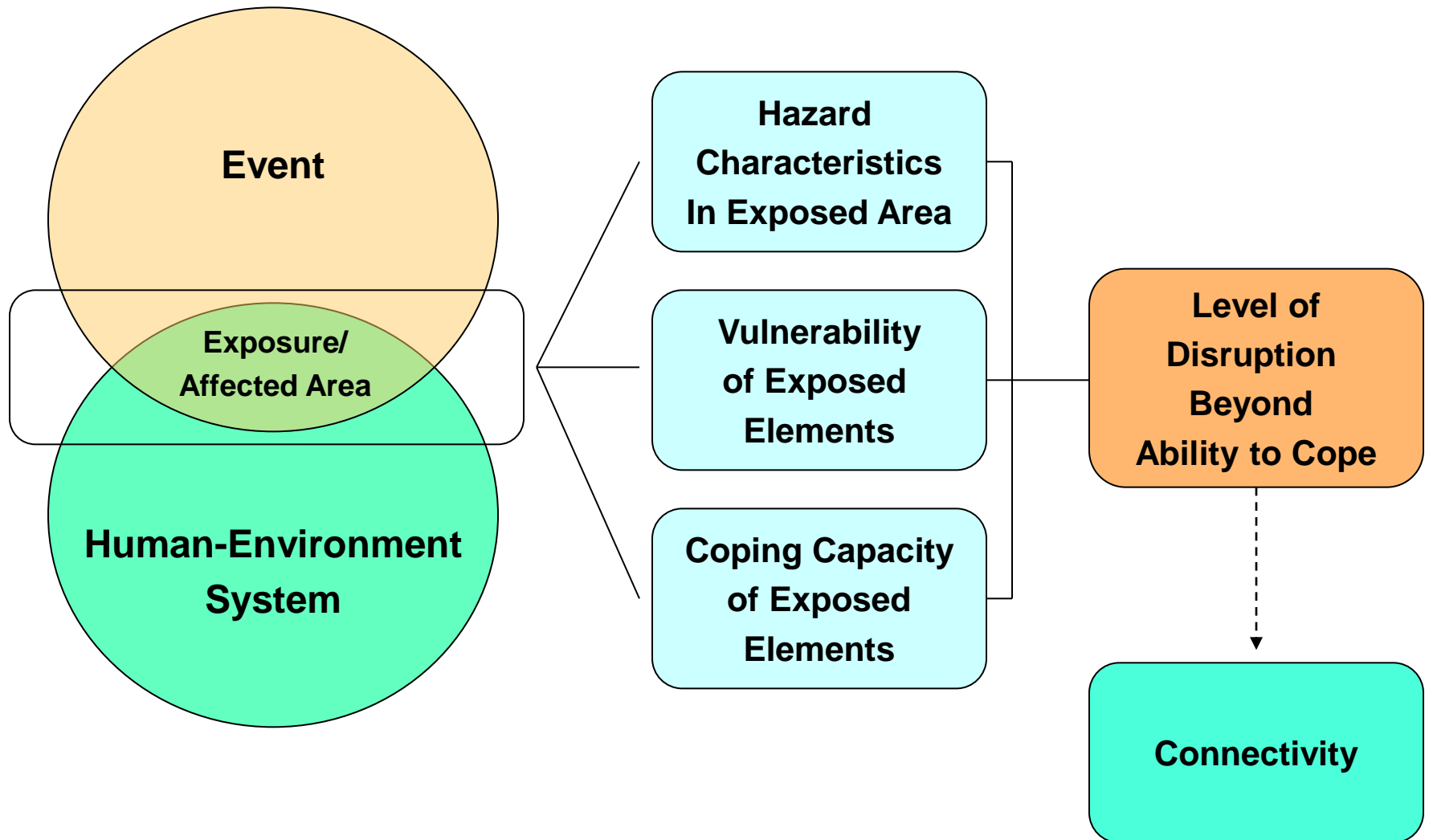


Asia-Pacific  
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# Components of Disaster Risk





# DESCRIBING VULNERABILITY AND CAPACITY

# Vulnerability and Scale

## **Vulnerability**

**The characteristics and circumstances of a community, system or asset that make it susceptible to the damaging effects of a hazard**

- Individuals
- Households
- Assets
- Systems
- Communities
- Do we describe vulnerability the same way for each?

# Individual Vulnerability



cs.rochester.edu

dfas.mil

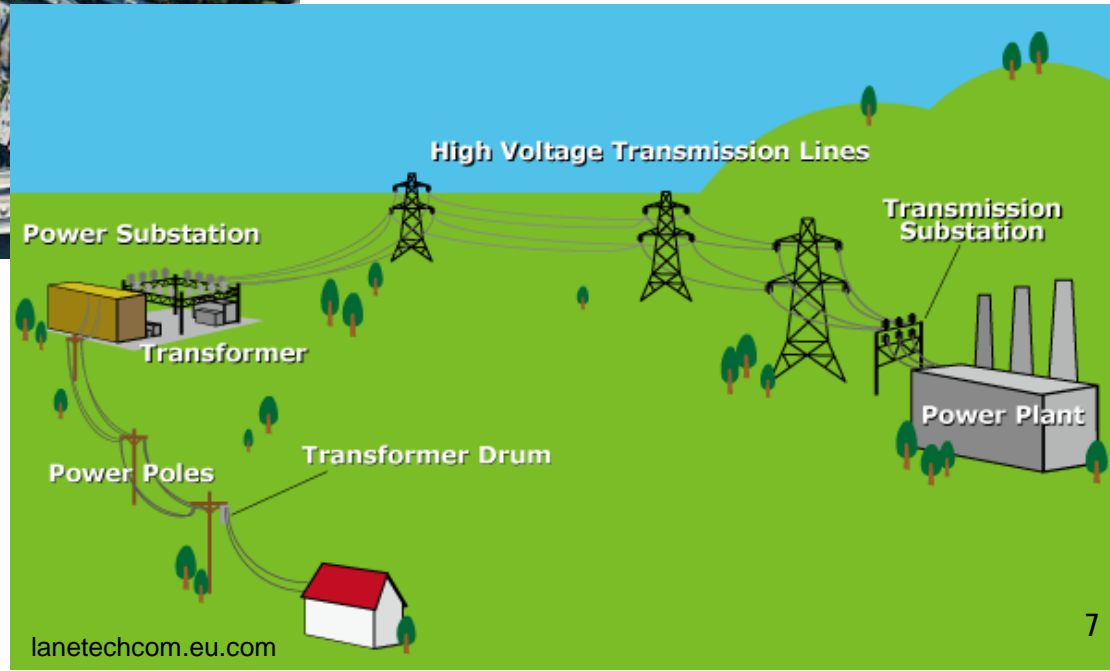
# Household Vulnerability



# Asset Vulnerability



# System Vulnerability





# Community Vulnerability



# Types of Vulnerability

- Physical
- Environmental
- Economic
- Socio-cultural

# Physical Vulnerability

- Exposure...
  - Raw Exposure
  - Relative Exposure
- Location
- Structural Aspects of Objects
  - Materials
  - Design
- What about People?

# Environmental Vulnerability

- Depletion or Degradation of Resources and/or Services
  - Soil
  - Water
  - Air
  - Vegetation
  - Biodiversity



**Why do these things matter?**

# Economic Vulnerability

- Economic Status
- Debt
- Dependence
- Access to Economic Resources and Networks



**Why do these things matter?**

# Socio-Cultural Vulnerability

- Access to Food and Water
- Health Status and Access to Services
- Education, Literacy and Access to Info
- Age Structure
- Culture and Language
- Governance and Policy
- Population Movement



**Why do these things matter?**

# Socio-Cultural Vulnerability

- Social Equity and Marginalization
  - Class
  - Race
  - Ethnicity
  - Gender



**Why does  
marginalization  
matter?**

# Collecting Data



How Would You Gather Information about:

- Physical Vulnerability
- Environmental Vulnerability
- Economic Vulnerability
- Socio-cultural Vulnerability



# Coping Capacity

## **Coping Capacity**

**The ability of people, organizations and systems, using available skills and resources, to face and manage adverse conditions, emergencies or disasters**

- People
- Organizations
- Systems
- Communities
  
- What characteristics help us handle adversity?

# Community Coping Capacity

- Infrastructure
- Personnel
- Plans
- Financial Reserves
- Insurance
- Governance and Policy
- Networks
- Residents



**Why do  
these  
things  
matter?**

# Data Collection



How Would You Gather  
Information about Coping  
Capacity?



ANALYZING AND  
REPRESENTING  
VULNERABILITY AND  
CAPACITY

# Quantitative Approach: Fragility Curves

- Hazard Specific
- Generally Applied to Structures
- Relate damage states to hazard intensity for specific asset and asset component types
- Based on:
  - Expert Opinion
  - Historical Information
  - Simulation

# Quantitative Approach: Indices of Manifest Vulnerability and Capacity

- Based on Historical Losses
  - Deaths, Economic Losses
- Usually Based on Hazard Type
- Represented by Normalized Losses
- Encompasses Known and Unknown Factors, but Does Not Identify Them
- Disaster Risk Index
- Hotspots Project

# Data Collection



How Would You Gather  
Information about Losses?

# DesInventar

★ Favorites DesConsultar on-line - Disaster DataCard

DesInventar  
Disaster Information Management System

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English Data

Query View data View map Charts Statistics Reports Thematic Crosstab

Region: Orissa (India) - [or] DataCard: << < > >> Find serial: Back to Search Results

Serial: 102 Date (YMD): 1975 3 14 Duration (d): 0 Source: Newspaper-Dharitri

State: Orissa District: Bhadrak Block: Bhadrak

Event: HALSTORM Location: Bhadrak locality GLIDENumber:

Cause: OTHER Description of Cause:

**EFFECTS**

Deaths: 0  Missing: 0  Injured: 2  Magnitude:

Affected: 0  Relocated: 0  Houses Damaged: 0  Losses \$Local: 0.0

Evacuated: 0  Victims: 0  Houses Destroyed: 0  Losses \$USD: 0.0

**Affected Sectors**

Transportation  Communications  Relief

Agriculture  Water supply  Sewerage

Power and Energy  Industries  Education

Other sectors  Health sector

Damages in roads Mts: 0.0 Damages in crops Ha: 2000.0

Lost Cattle: 0

Education centers: 0

Hospitals: 0

OTHER LOSSES: Latitude: 0 Longitude: 0

**Comments:**

60% kaccha houses have been partialy damaged.

By: Date:

Extension



# Qualitative Approaches: VCAs

- Often Community Based and Participatory
- Generally Requires Fieldwork
- Often Focuses on “Why” to Identify Solutions
- Can Be Hazard Specific or General
- VCA Matrix, Problem Tree, Wall Method, Venn Diagrams, etc.
- IFRC VCA Toolbox Available at:
  - <http://www.ifrc.org/Docs/pubs/disasters/resources/preparing-disasters/vca/vca-toolbox-en.pdf>

# Quantitative Approach: Inductive Indices of Vulnerability and Capacity

- Often Hazard Independent
- Make Multiple Aspects of Vulnerability and Capacity “Visible”
- Enable Identification and Representation of “Drivers” through Space and Time
- Results Dependent on Variable Choice

# Representing Vulnerability and Capacity Information Spatially

- Mapping more detailed characteristics of hazards, assets and resources enables disaster managers to ask more specific questions, such as:
  - How might your community be impacted by an impending event?
  - Where are the highest economic losses likely to occur?
  - Which areas are least likely to be able to cope with the impacts of an event?
  - Where might translations of warnings and outreach materials be required?
  - What areas might require more assistance during an evacuation?
  - What is the best route to take to reach a recently impacted area?

QUESTIONS?



# Group Activity

# What Do You See?



# What Do You See?





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