

DEFINITION OF DISASTER

'Disaster is a crisis situation that far exceeds the capabilities'.

- Quarentelly, 1985.

'Disaster' is defined as a crisis situation causing wide spread damage which *far exceeds our ability to recover*. Thus, by definition, there cannot be a perfect ideal system that prevents damage, because then it would not be a disaster. It has to suffocate our ability to recover. Only then it can be called as 'disaster'.

Disasters are not totally discrete events. Their possibility of occurrence, time, place and severity of the strike can be reasonably and in some cases accurately predicted by technological and scientific advances. It has been established there is a definite pattern in their occurrences and hence we can to some extent *reduce the impact of damage* though we cannot reduce the extent of damage itself.

Types of Disaster

Disasters are mainly of 2 types,

1. Natural disasters. Example – earthquakes, floods, landslides, etc.
2. Man made disasters. Example – war, bomb blasts, chemical leaks, etc.

The phases of all disasters, be it natural or man made, are the same. The disasters often differ in quantity of damage caused or in quality of the type of medical consequences. For example earthquakes cause a lot of physical injury and fractures, floods cause drowning deaths and infections, chemical leaks cause toxic manifestations, etc.

Business Definition for: Disaster Management

"...the actions taken by an organization in response to unexpected events that are adversely affecting people or resources and threatening the continued operation of the organization."

Disaster management includes:

- the development of disaster recovery plans,(for minimizing the risk of disasters and for handling them when they do occur,) and the implementation of such plans.

Disaster management usually refers to the management of natural catastrophes such as fire, flooding, or earthquakes. Related techniques include crisis management, contingency management, and risk management.

Disaster/emergency management is the discipline of dealing with and avoiding risks. It involves preparing for a disaster before it happens, disaster response (e.g. emergency evacuation, quarantine, mass decontamination, etc.), as well as supporting, and rebuilding society after natural or human-made disasters have occurred.

In general, any Emergency management is the continuous process by which all individuals, groups, and communities manage hazards in an effort to avoid or ameliorate the impact of disasters resulting from the hazards.

Actions taken depend in part on perceptions of risk of those exposed.

Effective emergency management relies on thorough integration of emergency plans at all levels of government and non-government involvement. Activities at each level (individual, group, community) affect the other levels. It is common to place the responsibility for governmental emergency management with the institutions for civil defense or within the conventional structure of the emergency services. In the private sector, emergency management is sometimes referred to as business continuity planning.

Other terms used for disaster management include:

-*Emergency Management* which has replaced *Civil defense*, can be seen as a more general intent to protect the civilian population in times of peace as well as in times of war.

-*Civil Protection* is widely used within the European Union and refers to government-approved systems and resources whose task is to protect the civilian population, primarily in the event of natural and human-made disasters.

-*Crisis Management* is the term widely used in EU countries and it emphasizes the political and security dimension rather than measures to satisfy the immediate needs of the civilian population.

-*Disaster risk reduction* An academic trend is towards using the term is growing, particularly for emergency management in a development management context. This focuses on the mitigation and preparedness aspects of the emergency cycle (see below).

DISASTER MANAGEMENT CYCLE- GENERAL

Disaster management cycle includes the following stages/ phases

1. Disaster phase
2. Response phase
3. Recovery/ Rehabilitation phase
4. Risk Reduction/ Mitigation phase
5. Preparedness phase

*¹**Disaster phase** – The phase during which the event of the disaster takes place. This phase is characterized by profound damage to the human society. This damage / loss may be that of human life, loss of property, loss of environment, loss of health or anything else. In this phase, the population is taken by profound shock.

¹ Not generally considered as phase, but the incident that promotes the actual 4 phases

Response phase – This is the period that immediately follows the occurrence of the disaster. In a way, all individuals respond to the disaster, but in their own ways

Recovery phase – When the immediate needs of the population are met, when all medical help has arrived and people have settled from the hustle – bustle of the event, they begin to enter the next phase, the recovery phase which is the most significant, in terms of long term outcome. It is during this time that the victims actually *realize the impact* of disaster. It is now that they *perceive the meaning of the loss* that they have suffered.

Risk reduction phase – During this phase, the population has returned to predisaster standards of living. But, they recognize the need for *certain measures which may be needed to reduce the extent or impact of damage during the next similar disaster*. For example, after an earthquake which caused a lot of damages to improperly built houses, the population begins to rebuild stronger houses and buildings that give away less easily to earthquakes. Or, in the case of tsunami, to avoid housings very close to the shore and the development of a ‘green belt’ - a thick stretch of trees adjacent to the coast line in order to reduce the impact of the tsunami waves on the land. This process of *making the impact less severe* is called *Mitigation*.

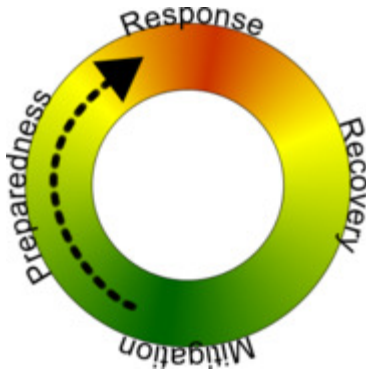
Preparedness phase – This phase involves the *development of awareness* among the population on the general aspects of disaster and on how to behave in the face of a future disaster. This includes *education* on warning signs of disasters, methods of safe and successful evacuation and first aid measures.

It is worth to note that the time period for each phase may depend on the type and severity of the disaster.

Phases and professional activities

The nature of emergency management is highly dependent on economic and social conditions local to the emergency, or disaster. Experts have long noted that the cycle of emergency management must include long-term work on infrastructure, public awareness, and even human justice issues. This is particularly important in developing nations.

The process of disaster management involves four phases: **mitigation, preparedness, response, and recovery.**



A graphic Representation of the Four Phases in Disaster Management

1-Mitigation

Mitigation efforts attempt to prevent hazards from developing into disasters altogether, or to reduce the effects of disasters when they occur. The mitigation phase differs from the other phases because it focuses on long-term measures for reducing or eliminating risk. The implementation of mitigation strategies can be considered a part of the recovery process if applied after a disaster occurs. However, even if applied as part of recovery efforts, actions that reduce or eliminate risk over time are still considered mitigation efforts.

Mitigative measures can be structural or non-structural. Structural measures use technological solutions, like flood levees. Non-structural measures include legislation, land-use planning (e.g. the designation of nonessential land like parks to be used as flood zones), and insurance. Mitigation is the most cost-efficient method for reducing the impact of hazards. However, mitigation is not always suitable and structural mitigation in particular may have adverse effects on the ecosystem.

A precursor activity to the mitigation is the identification of risks. Physical risk assessment refers to the process of identifying and evaluating hazards. In risk assessment, various hazards (e.g. earthquakes, floods, riots) within a certain area are identified. Each hazard poses a risk to the population within the area assessed. The hazard-specific risk (R_h) combines both the probability and the level of impact of a specific hazard. The equation below gives that the hazard times the populations' vulnerability to that hazard produce a risk. The higher the risk, the more urgent that the hazard specific vulnerabilities are targeted by mitigation and preparedness efforts. However, if there is no vulnerability there will be no risk, e.g. an earthquake occurring in a desert where nobody lives.

$$R_h = H \times V_h$$

Components of Risk Management

$$\text{Risk} = f(\text{Hazard}, \text{Vulnerability})$$

(natural event) (social factors)

Risk Factors

- Hazards
 - potentially damaging exogenous events whose probable characteristics and frequency of occurrence can be estimated
- Vulnerability
 - intrinsic characteristics of the elements at risk that determine how damaged they would be if they experienced a hazard event of some level

Dimensions of vulnerability assessment

- Physical vulnerability-analyze impacts of events on assets such as building, infrastructure, agriculture
- Social Vulnerability- estimate impacts of events on highly vulnerable groups such as the poor, coping capacity, status institutional structure designed to help coping, awareness of risk
- **Economic vulnerability**-potential impacts of hazards on economic assets and processes (business interruption, secondary effects)
- **Environmental vulnerability**-Degraded environmental quality limits the natural resilience to hazard effects and reduces environmental buffering of effects

Elements at risk: examples

- people (communities, countries, the poor)
- infrastructure
- economic activities/assets
- plant/animal species
- environmental services . . .

2- Preparedness

In the preparedness phase, emergency managers develop plans of action for when the disaster strikes. Common preparedness measures include the

- communication plans with easily understandable terminology and chain of command
- development and practice of multi-agency coordination and incident command
- proper maintenance and training of emergency services
- development and exercise of emergency population warning methods combined with emergency shelters and evacuation plans
- stockpiling, inventory, and maintenance of supplies and equipment

An efficient preparedness measure is an emergency operations center (EOC) combined with a practiced region-wide doctrine for managing emergencies. Another preparedness measure is to develop a volunteer response capability among civilian populations. Since, volunteer response is not as predictable and planable as professional response, volunteers are most effectively deployed on the periphery of an emergency.

Another aspect of preparedness is casualty prediction, the study of how many deaths or injuries to expect for a given kind of event. This gives planners an idea of what resources need to be in place to respond to a particular kind of event.

3- Response

The response phase includes the mobilization of the necessary emergency services and first responders in the disaster area. This is likely to include a first wave of core emergency services, such as firefighters, police and ambulance crews. They may be supported by a number of secondary emergency services, such as specialist rescue teams.

In addition volunteers and non-governmental organizations (NGOs) such as the local Red Cross branch may provide immediate practical assistance, from first aid provision to providing food and counseling. A well rehearsed emergency plan developed as part of the preparedness phase enables efficient coordination of rescue efforts. Emergency plan rehearsal is essential to achieve optimal output with limited resources. In the response phase, medical assets will be used in accordance with the appropriate triage of the affected victims.

Where required, search and rescue efforts commence at an early stage. Depending on injuries sustained by the victim, outside temperature, and victim access to air and water, the vast majority of those affected by a disaster will die within 72 hours after impact.

Individuals are often compelled to volunteer directly after a disaster. Volunteers can be both a help and a hindrance to emergency management and other relief agencies.

4-Recovery

The aim of the recovery phase is to restore the affected area to its previous state. It differs from the response phase in its focus; recovery efforts are concerned with issues and decisions that must be made after immediate needs are addressed. Recovery efforts are primarily concerned with actions that involve rebuilding destroyed property, re-employment, and the repair of other essential infrastructure. An important aspect of effective recovery efforts is taking advantage of a 'window of opportunity' for the implementation of mitigative measures that might otherwise be unpopular. Citizens of the affected area are more likely to accept more mitigative changes when a recent disaster is in fresh memory.

Phases and personal activities

1- Mitigation

Personal mitigation is mainly about knowing and avoiding unnecessary risks. This includes an assessment of possible risks to personal/family health and to personal property.

One example of mitigation would be to avoid buying property that is exposed to hazards, e.g. in a flood plain, in areas of subsidence or landslides. Homeowners may not be aware of a property being exposed to a hazard until it strikes. However, specialists can be hired to conduct risk identification and assessment surveys. Purchase of insurance covering the most prominent identified risks is a common measure.

Personal structural mitigation in earthquake prone areas includes installation of an Earthquake Valve to instantly shut off the natural gas supply to a property, seismic retrofits of property and the securing of items inside a building to enhance household seismic safety. The latter may include the mounting of furniture, refrigerators, water heaters and breakables to the walls, and the addition of cabinet latches. In flood prone areas houses can be built on poles, as in much of southern Asia. In areas prone to prolonged electricity black-outs installation of a generator would be an example of an optimal structural mitigation measure. The construction of storm cellars and fallout shelters are further examples of personal mitigative actions.

Mitigation involves Structural and Non-structural measures taken to limit the impact of disasters.

Structural Mitigation:-

This involves proper layout of building, particularly to make it resistant to disasters.

Non Structural Mitigation:-

This involves measures taken other than improving the structure of building.

2-Preparedness

Unlike mitigation activities, which are aimed at preventing a disaster from occurring, personal preparedness focuses on preparing equipment and procedures for use *when* a disaster occurs, i.e. planning. Preparedness measures can take many forms including the construction of shelters, installation of warning devices, creation of back-up life-line services (e.g. power, water, sewage), and rehearsing evacuation plans. Two simple measures can help prepare the individual for sitting out the event or evacuating, as necessary. For evacuation, a disaster supplies kit may be prepared and for sheltering purposes a stockpile of supplies may be created. The preparation of a survival kit, commonly referred to as a "72-hour kit", is often advocated by authorities. These kits may include food, medicine, flashlights, candles and money.

3-Response

The response phase of an emergency may commence with search and rescue but in all cases the focus will quickly turn to fulfilling the basic humanitarian needs of the affected population. This assistance may be provided by national or international agencies and organisations. Effective coordination of disaster assistance is often crucial, particularly when many organisations respond and local emergency management agency (LEMA) capacity has been exceeded by the demand or diminished by the disaster itself.

On a personal level the response can take the shape either of a *home confinement* or an *evacuation*. In a home confinement a family would be prepared to fend for themselves in their home for many days without any form of outside support. In an *evacuation*, a family leaves the area by automobile (or other mode of transportation) taking with them the maximum amount of supplies they can carry, possibly including a tent for shelter. If mechanical transportation is not available, evacuation on foot would ideally include carrying at least three days of supplies and rain-tight bedding, a tarpaulin and a bedroll of blankets being the minimum.

4-Recovery

The recovery phase starts after the immediate threat to human life has subsided. During reconstruction it is recommended to consider the location or construction material of the property.

The most extreme home confinement scenarios include war, famine and severe epidemics and may last a year or more. Then recovery will take place inside the home. Planners for these events usually buy bulk foods and appropriate storage and preparation equipment, and eat the food as part of normal life. A simple balanced diet can be constructed from vitamin pills, whole-meal wheat, beans, dried milk, corn, and cooking oil. One should add vegetables, fruits, spices and meats, both prepared and fresh-gardened, when possible.

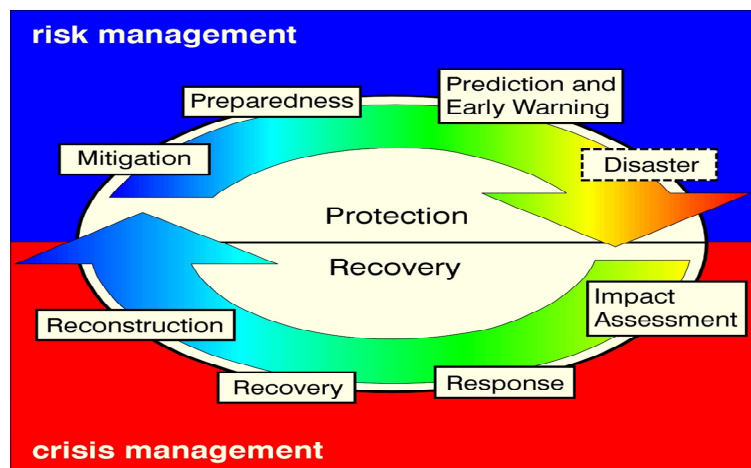
EXTRA READING

CLIMATE CHANGE ADAPTATION AND RISK MANAGEMENT

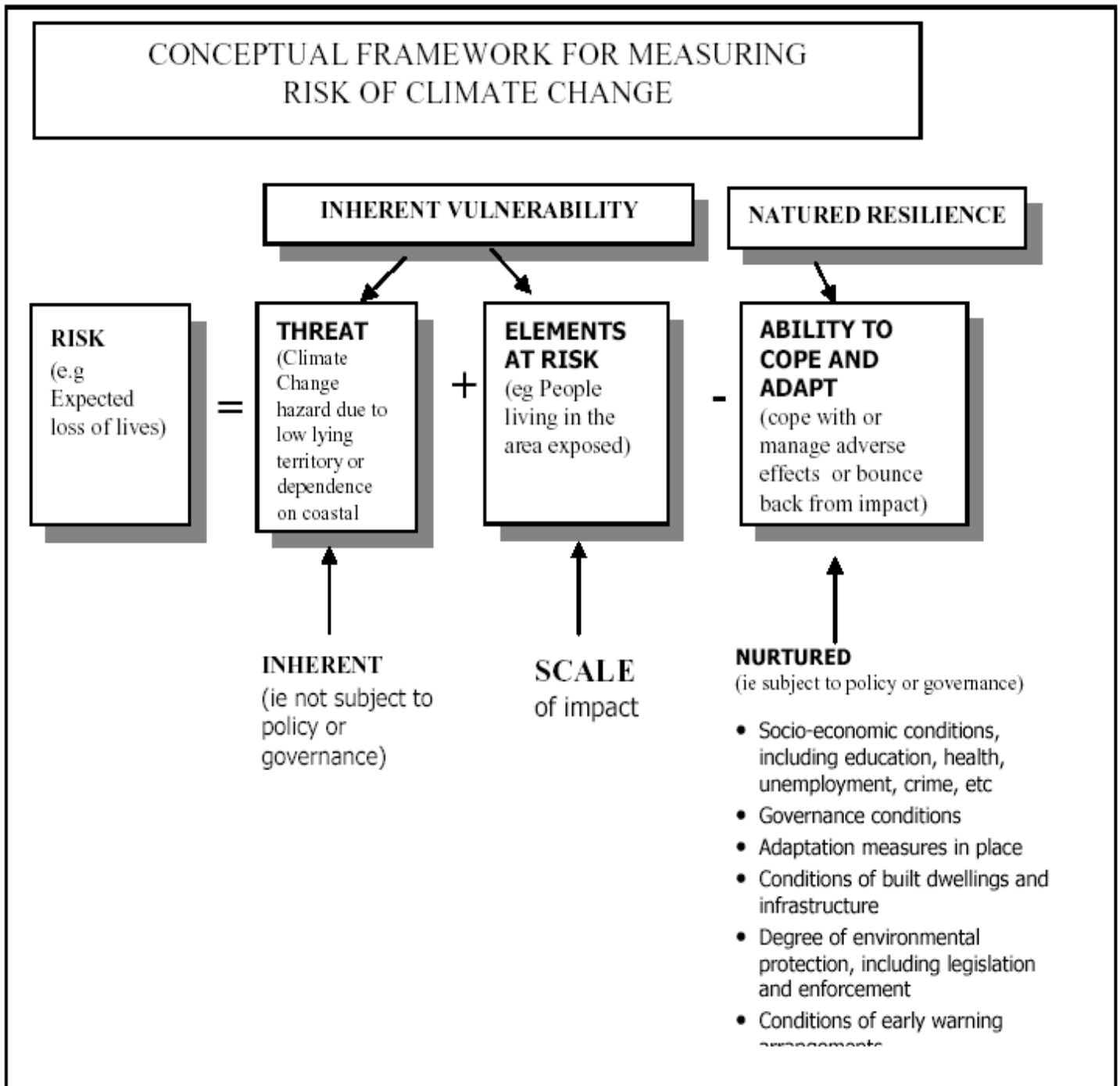
Terminology

- **Hazard-** A potentially damaging physical event, phenomenon and/or human activity which may cause the loss of life, injury, property damage, social and economic disruption and environmental degradation
- **Vulnerability-**Set of conditions and processes resulting from physical, social, economic, environmental factors (and development decisions) which increase the susceptibility of community (or project) to the impact of hazards
- **Risk-**Probability of harmful consequences and expected loss resulting from interaction between natural or human hazards and vulnerable conditions.
- **Physical vulnerability-**analyze impacts of events on assets such as building, infrastructure, agriculture
- **Social Vulnerability-** estimate impacts of events on highly vulnerable groups such as the poor, coping capacity, status institutional structure designed to help coping, awareness of risk
- **Economic vulnerability-**potential impacts of hazards on economic assets and processes (business interruption, secondary effects)
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The Cycle of Disaster Management



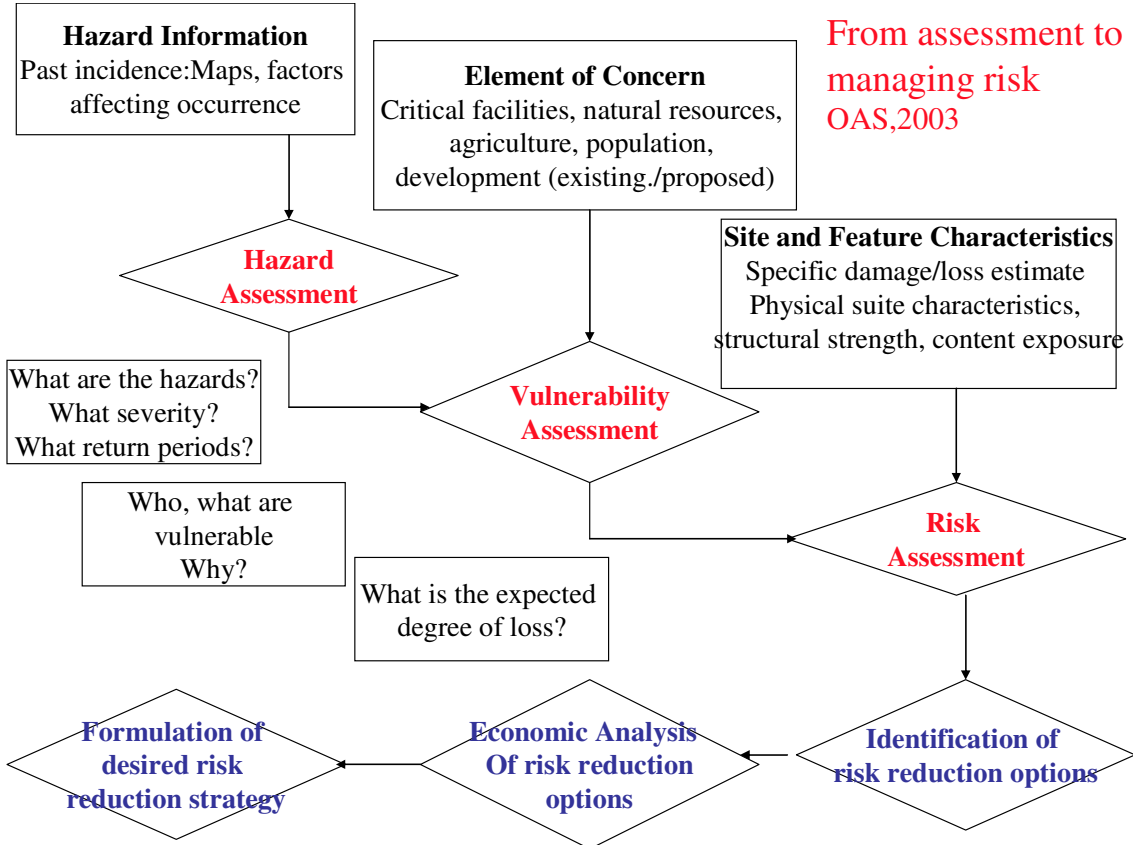
What is at risk?

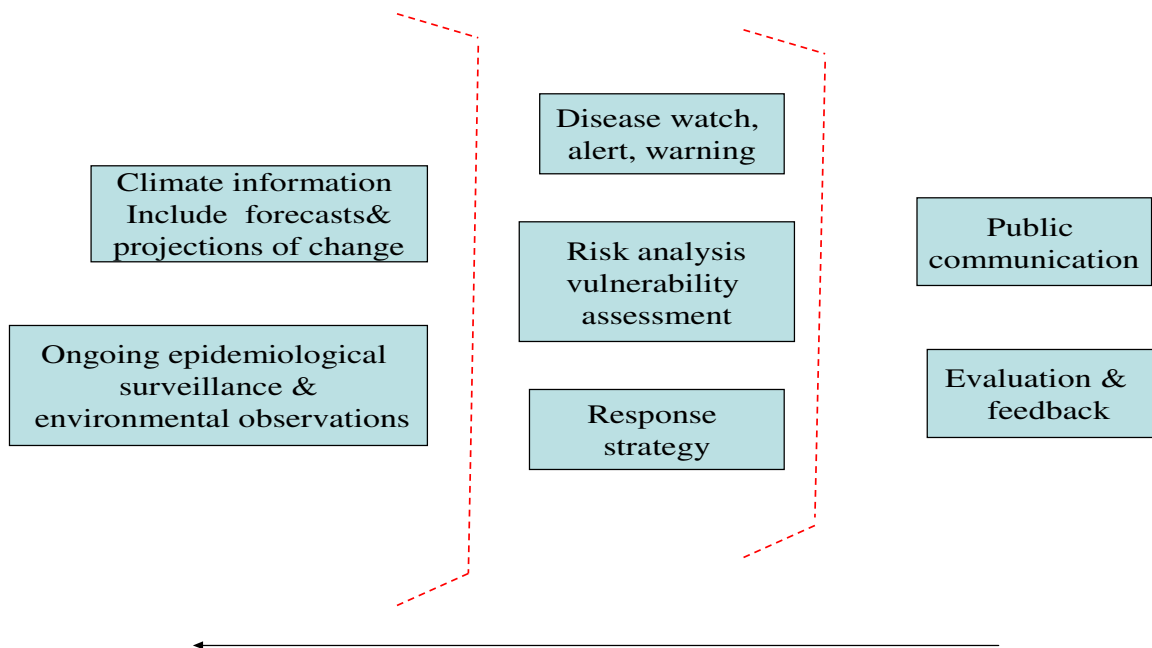


Possible Socio-Economic Scenarios Needed For Climate Change Impact and Adaptation Analyses

General	Population growth Economic growth Adaptation capacity (economic, technological, institutional)
Water resources	Water use for agriculture, domestic, industrial and energy sectors Land use (for run-off) Adaptation capacity (economic, technological, institutional) Coastal zones Population density Economic activity and investments Land use
Agriculture	Land use Water use Food demand Atmospheric composition and deposition Agricultural policies (incl. international trade) Adaptation capacity (economic, technological, institutional)
Human health	Food and water accessibility and quality Health care (incl. basic) Demographic structure Urbanisation Adaptation capacity (economic, technological, institutional)

Hazard	Vulnerability	Socio-economic Political Economy	National and International Policy
EVENT Return period,Duration Magnitude,Seasonality Uncertainty	PREPAREDNESS	STATUS	
	Self protection (location, building quality)	Income Distribution Livelihood Opportunity	Generation & allocation surplus
Hurricanes	Social Protection (Building regulations level of scientific knowledge/use)	GENDER Household Security,Nutrition	Social power&control Debt crises Environmental degradation
Flood Drought			
Earthquakes Volcanic Activity	RESILIENCE Strength of assets	ETHNICITY STATE Income,Assets Discrimination	Institutional support
Landscape	Recovery of livelihood Impacts of previous interventions	- Regional Biases, Training	- Local
Disease	HEALTH Social precaution/ Infrastructure, Individual robustness Household activities,Access to reliable potable water, treatment		





Steps in a simplified Vulnerability Assessment

Step 1. What? Identifying the event and timescales of variability/change

- Probability, Magnitude, Frequency, Scope, Duration

Step 2. Who? Identifying exposure and capacity to withstand changes

- Proximate: Individuals, groups, communities,
- Quantifying economic-property risks and opportunities

Step 3. Why? Identifying the types and sources of risk

- Complexity and interrelatedness of natural, social, and development factors
- Why does a particular risk exist? Causal factors: What happened to make vulnerability high/low?
- Whose decisions and choices are involved? Who is most affected by the decisions and choices?

Step 4. Where and When? Time and space dimensions

- Dynamic change: Reversible, irreversible, cumulative or compounding
 - Interconnected scales, beneficial outcomes

QUESTIONS

Note: Answers should not exceed 1 paragraph.

1. Explain the link between Disaster Management and Climate Change.
2. Which of the 4 phases do you consider to be the most important? Support your answer.
3. Giving examples (from your own country) state situations where Disaster Management could have been better implemented.
4. In the case of a natural disaster, both government and individuals are responsible for how citizens are affected. List 3 actions/activities/methods each for both government and individuals, which can be carried out to mitigate the effects of a known natural disaster.
5. Using Climate Change as your Hazard: Complete the following matrix.

Resources	Vulnerability	Capability
Physical/material What hazards, skills, productive resources exist?		
Social/Organizational What are the relations and organizations among people?		
Behavioral/Incentives How does the community view its ability to create change?		

Capabilities and vulnerabilities matrix

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