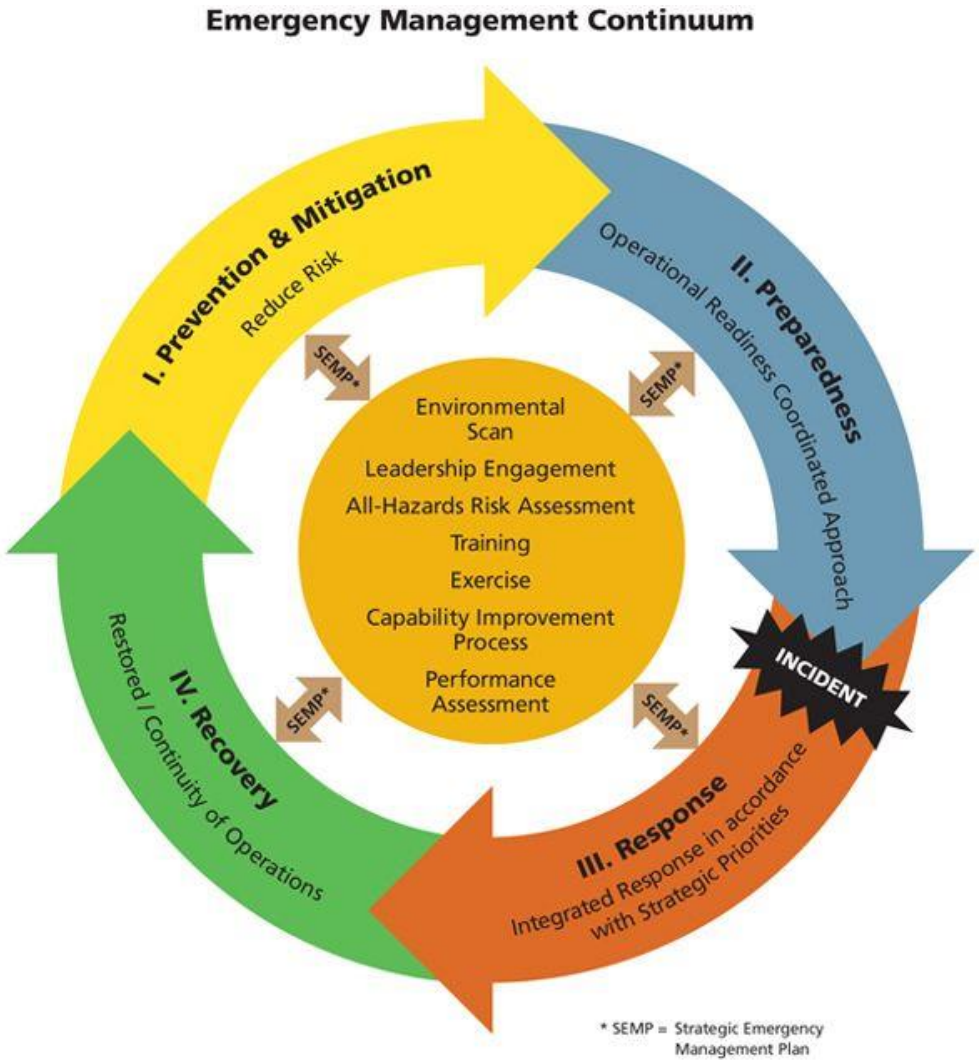
Unit 4

Disaster Management

Components of Disaster

- **Preparedness**.
- Disastrous Impact.
- **Response**.
- Recovery.
- Development.
- Mitigation.



Disaster Preparedness

- It involves measures to ensure that Communities and Services are capable of coping with the effect of disaster.
- Ways for Disaster Preparedness
    1. Hazard, risk and vulnerability assessments
    2. Response mechanisms and strategies
    3. Preparedness plans
    4. Coordination
    5. Information management
    6. Early warning systems
    7. Resource mobilization
    8. Public education, training,& Drills and simulations
    9. Community-Based disaster preparedness

DISASTER IMPACT

- If any disaster will take place then, millions of people are effected by natural disaster every year, and the impact can be calamitous.

  - ✓Displaced population.
  - ✓Health risks.
  - ✓Food Scarcity.
  - ✓Emotional Aftershocks.

Disaster Response

- It involves measures taken in Anticipation of, During and Immediately after a disaster to ensure that the effects are minimized.
- Examples for Disaster Response
  - ✓Implementing the Disaster Management Plan
  - ✓Setting up Medical Camps and Mobilizing resources
  - ✓Providing Adequate Shelter and Sanitary Facilities
  - ✓Development of Search and Rescue Team

DISASTER RECOVERY

- It involves measures, which support emergency affected areas in Reconstruction of the Physical Infrastructure and Restoration of Economic and Emotional well being.
- Examples for Disaster Recovery
  - ✓ Counseling programme for those who lost the near ones.
  - ✓ Restoring services like roads, communication link.
  - ✓ Providing financial support employment.
  - ✓ Reconstructing damaged buildings.

DISASTER DEVELOPMENT NETWORK

- The Disaster and Development Network (DDN) aims to develop through Research, Teaching and Learning, the Knowledge and Skills to address hazards, disasters and complex Emergencies from the perspective of different Development Debates and Experience.

Reduction & Mitigation

- It involves measures to Eliminate or Reduce the Incidence of Severity of disasters.
- Mitigation is the effort to reduce loss of life and property by lessening the impact of disasters. In order for mitigation to be effective we need to take action now—before the next disaster—to reduce human and financial consequences later (analyzing risk, reducing risk, and insuring against risk). It is important to know that disasters can happen at any time and any place and if we are not prepared, consequences can be fatal.

FLOOD AND ITS MANAGEMENT

- The Adverse Effect of Floods every year in many Regions of India.
- Anthropogenic activities, such as Deforestation and Shifting Cultivation, mainly Contribute to floods.
- Floods will, therefore, be a Recurring Phenomenon in our country.

STRUCTURAL AND NON-STRUCTURAL MEASURES OF FLOODS

both comes under the Mitigation measures:

Structural Measures:-

- Improvement of Flow Conditions in the Channel and Anti-Erosion measures.
- Construction of Embarkments and Floodwalls to prevent the Over-Bank spilling of Rivers.
- Reservoirs for Impounding monsoon flows.

NON-STRUCTURAL MEASURES

- Flood-plain management such as Flood-Plain Zoning and flood Proofing, including Disaster Preparedness.
- Preserving and Maintaining Wetlands, flood Forecasting and Warning services.
- Disaster Relief, flood Fighting and Public Health measures.

EARTHQUAKE AND ITS MANAGEMENT

- It is considered to be one of the most destructive natural hazards.
- Important earthquake management steps are:
  - ✓Earthquake Resistant Structures.
  - ✓Public Awareness.
  - ✓Training to Engineer and Architects.
  - ✓Training to Rural Masons.
  - ✓Retrofitting Lifeline Buildings.

CYCLONES AND ITS MANAGEMENT

- Cyclone is the general term for a Variety of low pressure System types, such as Tropical cyclones, extra tropical cyclones and Tornadoes.
- EFFECTIVE AND EFFICIENT MITIGATION POLICIES AND STRATEGIES:
- Installation of Early Warning Systems. • Developing Communication Infrastructure. • Developing Shelter Belts. • Developing Community cyclone Shelters. • Construction of Permanent Houses • Training and Education • Landuse Control and Settlement Planning

LANDSLIDES AND ITS MANAGEMENT

- Landslides occur as a result of change on a slope, sudden or gradual, either in its composition, structure, hydrology or vegetation.
- Developmental Programs that involve Modification of the Topography, Exploitation, Natural resources and Change in the balance Load on the ground should Not be permitted.
- Some Critical measures, that could be undertaken to Prevent further landslides are Drainage measures, Erosion-control, preventing Deforestation and Improving Aforestation.

TSUNAMI AND ITS MANAGEMENT

- A Tsunami is a sea wave that may become one or more massive waves of water that hits the shore with killing speed and force.
- Tsunami Mitigation
  - ✓Construction of Seawalls and Break waters.
  - ✓Protecting Coastal forests and Planting Tree Belts.
  - ✓Protecting Coral Reefs.
  - ✓Installation of Tsunami Warning Systems.
  - ✓Regulation of Coastal Zone.

History

❖On June 2013 Uttarakhand received heavy rainfall, massive Landslides due to the large flashfloods, it suffered maximum damage of houses and structures, killing more than 1000 people, sources claimed the death toll could be rise up to 5000. Uttarakhand Flash Floods is the most disastrous floods in the history of India.

❖The 2005 Maharashtra floods was occurred just one month after the June 2005 Gujarat floods, Mumbai the capital city was most badly affected and witnessed one of its worst catastrophes in the history of India, killing at least 5,000 people.

❖ The 2010 Eastern Indian storm was a severe storm struck parts of eastern Indian states, spanning for 30–40 minutes. At least 91 people died in Indian states and Over 91,000 dwellings were destroyed and partially damaged.

❖The massive earthquake occurred on India's 51st Republic Day on January 26, 2001 at Bhachau Taluka of Kutch District of Gujarat. Gujarat earthquake had a magnitude of between 7.6 and 7.7 and killed around 20,000 people.

Principles of Disaster Management

- Minimize casualties
- Prevent further casualties
- Rescue the victims
- First aid
- Evacuate
- Medical care
- Reconstruction

Preparing hazard zonation maps

- The main purpose of Multiple Hazard Mapping (MHM) is to gather together in one map the different hazard-related information for a study area to convey a composite picture of the natural hazards of varying magnitude, frequency, and area of effect.
- A MHM may also be referred to as a "composite," "synthesized," and "overlay" hazard map. One area may suffer the presence of a number of natural hazards. Using individual maps to convey information on each hazard can be cumbersome and confusing for planners and decision-makers because of their number and their possible differences in area covered, scales, and detail.

Hazard zonation mapping

- Many natural hazards can be caused by the same natural event. The inducing or triggering mechanism which can interconnect several hazards can more easily be seen through the use of a MHM.
- Characteristics of the natural phenomenon and its trigger mechanisms are synthesized from different sources and placed on a single map.

PREPARING MULTIPLE HAZARD MAPS

- **Translated Information**
- **Sources and Compiling Information**
- **Timing**

Translated Information

- Much hazard information will be in the form of scientific investigations into the process and prediction of a potentially hazardous event and observations of the impact of past events (Du Bois, 1985), such as volcano inventories and records of flood crest elevations.
- It is often in forms other than maps. This information, although a prerequisite to an MHM, is not readily understood by the layman.
- It must be "translated" for planners and decision-makers and placed on maps.

Sources and Compiling Information

- There is a vast array of sources of hazard information, including various public and private libraries, offices and reference centers at international, national, regional, and community levels. These entities may be concerned with infrastructure, community facilities, economic development, resource exploration, land use planning, emergency preparedness, geotechnical studies, disaster response, and many other activities. Sometimes these sources coordinate their compiling of hazard information, but it cannot always be expected. Tinsley and Hollander (1984) have compiled a list of governmental earth-science agencies and selected major international organizations whose functions are similar to those of the U.S. Geological Survey.
- Some hazard information can be extracted or inferred from photographic, topographic, geologic, hydrologic, climatologic, and soils information already prepared for settled regions.
- The Organization of American States (1969) in its casebook on physical resource investigation for environmental development cites suggestions for obtaining information on hazards. These include existing resource surveys; aerial photography; personal reconnaissance; exploratory, reconnaissance, semi-detailed, and detailed surveys; aerial photography, orthophotos, and photogrammetric mapping; geologic surveys; flood studies; and soil erosion surveys.

Timing

- During the preliminary mission, hazard information collection can be accomplished by:

- Undertaking field travel and "overflights" of the study area.
- Contacting local officials and community leaders.
- Maintaining contact with appropriate national planning officers.
- "Brainstorming" with national counterparts.
- Using experienced staff members or consultants to get an overview.
- Determining the availability of existing data.

Timing

- During subsequent study stages, the general criteria for data collection should emphasize:

  - Striving for the same level of detail.
  - Answering specific questions about development problems.
  - Using national institutions as sources.
  - Drawing on local practice experience.-
  - Identifying project ideas (or mitigation techniques).
  - Using local research institutions and universities.
  - Keeping descriptions to a minimum and emphasizing analysis.

TYPES OF INFORMATION NEEDED TO ASSESS THE HAZARD POTENTIAL OF NATURAL PHENOMENA

	EARTHQUAKE	LANDSLIDE	HURRICANES	RIVER FLOODS
LOCATION	Epicenters	Inventories	Landfall	Channel
	Geologic formations	Geologic formations	Path	Floodway
		Slope		Floodplain
				Elevation
SEVERITY	Intensity	Velocity	Wind velocity	Volume
	Magnitude	Displacement	Rainfall	Velocity
	Acceleration			Rate of rise
	Displacement			
LIKELIHOOD OF OCCURRENCE	Recurrence interval	Earthquake recurrence	Historical occurrence	Historical return periods
	Slip rates			Flood of record
	Historical seismicity	Rainfall patterns		Design event
		Bank cutting rates		

COMPILING INFORMATION ON MULTIPLE HAZARDS

- Collecting base maps and appropriate hazard information from the various sources identified in this book
- Evaluating the uniformity, accuracy, and completeness of such information-areal coverage, detail, content, elements (likelihood, location, and severity), format, and symbols.
- Selecting the most appropriate base map and scale to be used, hazards to be shown, and symbols to portray those hazards.
- Combining the selected individual hazard information onto the MHM in an accurate, clear, and convenient way.

BENEFITS OF MULTIPLE HAZARD MAPPING

- A more concise focus on the effects and impacts of natural phenomena on a particular area is possible during early planning stages.
- Many hazards and the trigger mechanism of each can be viewed at the same time. Common reduction or mitigation techniques can be recommended for the same portion of the study area. Inadequate or missing hazard information (location, severity, or frequency) can be more easily identified.
- A study area or a sub-area can be expanded, reduced, or deleted. Study areas can be divided into sub-areas requiring more information, additional assessments, or specific reduction techniques.
- More realistic evaluation of risks to new development are possible.
- Appropriate hazard reduction techniques can be more easily built into the investment project formulation.
- Selection of appropriate land uses can become more rational.

PREDICTION AND WARNING

- Predictions and warnings can also reduce damage and economic losses. When notice of an impending disaster can be issued well in advance, as it can for some riverine floods, wildfires, and hurricanes, property and natural resources can be protected.
- Scientific and technological advances in recent decades have greatly improved the nation's capability to predict most natural hazards and disseminate warnings based on those predictions. However, prediction accuracy and lead times vary with the type of hazard. Prediction capabilities for atmospheric and hydrologic events are generally more advanced and specific than those for their geologic counterparts.

Goal of Prediction Systems

- The upgrading of natural hazard prediction and warning systems through application of state-of-the art science and technology;
- Augmentation of research programs on the basic physical and biological processes of natural hazards, models to predict their occurrence, and technology to detect and monitor them and to disseminate warnings; and
- Expansion of research on the social aspects of effective warning messages.

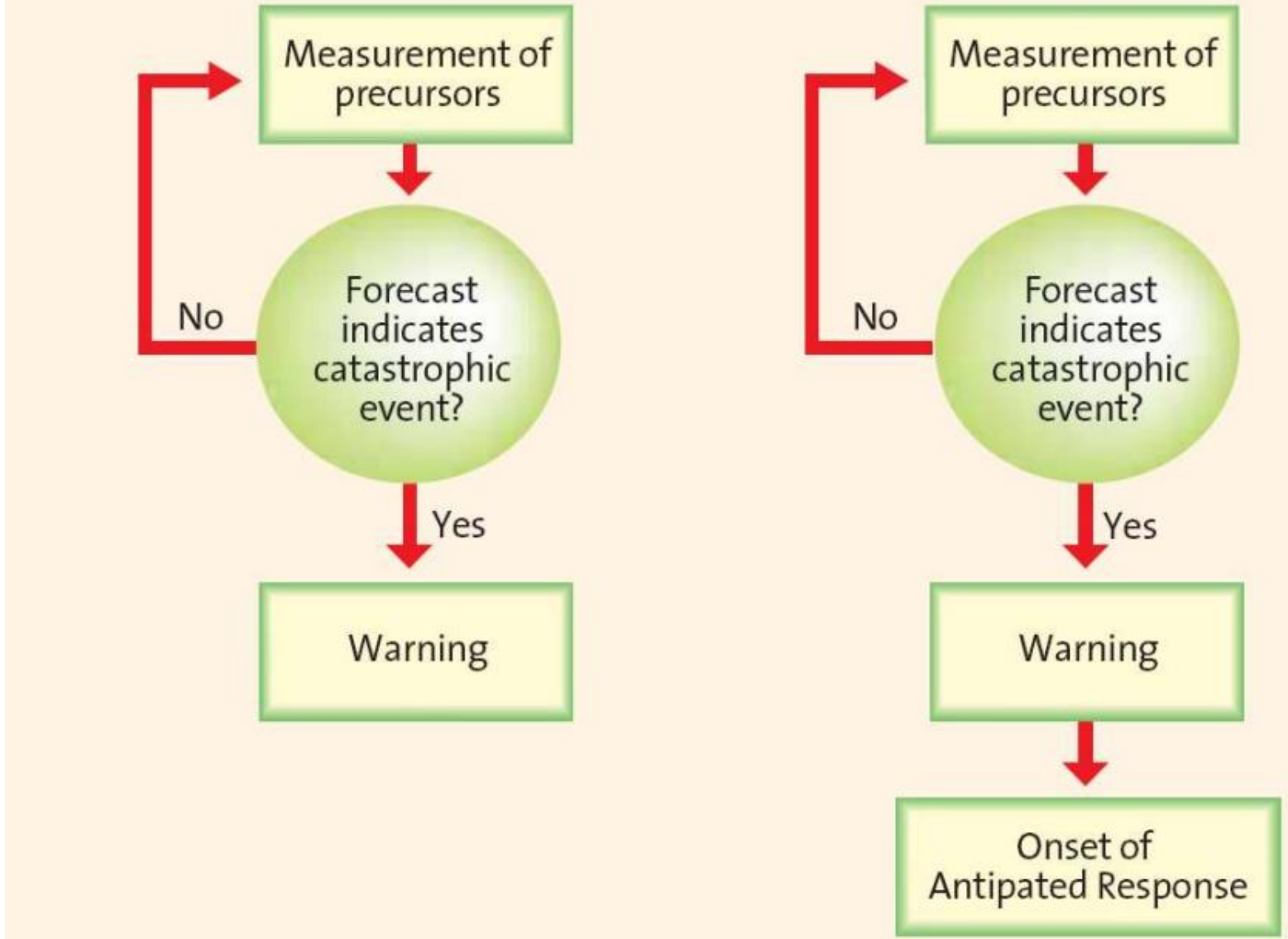
EARLY WARNING SYSTEM

- An **Early Warning System** (EWS) can be defined as a set of capacities needed to generate and disseminate timely and meaningful warning information of the possible extreme events or disasters (e.g. floods, drought, fire, earthquake and tsunamis) that threatens people's lives.
- The purpose of this information is to enable individuals, communities and organizations threatened to prepare and act appropriately and in sufficient time to reduce the possibility of harm, loss or risk.

CHARACTERISTICS OF EWS

- Effective early warning systems require strong technical foundations and good knowledge of the risks.
- But they must be strongly people centered – with clear messages, dissemination systems.
- Public awareness and education are critical; in addition, many sectors must be involved.
- Effective early warning systems must be embedded in an understandable manner and relevant to the communities which they serve.

Three phases of early warning systems



AGENCIES FOR FORECASTING

Disasters	Agencies
Cyclone	Indian Meteorological Department
Tsunami	Indian national centre for oceanic information services
Floods	Central water commission
Earthquakes	Indian Meteorological Department