**How environmental conditions affect where and how human populations choose to live.**

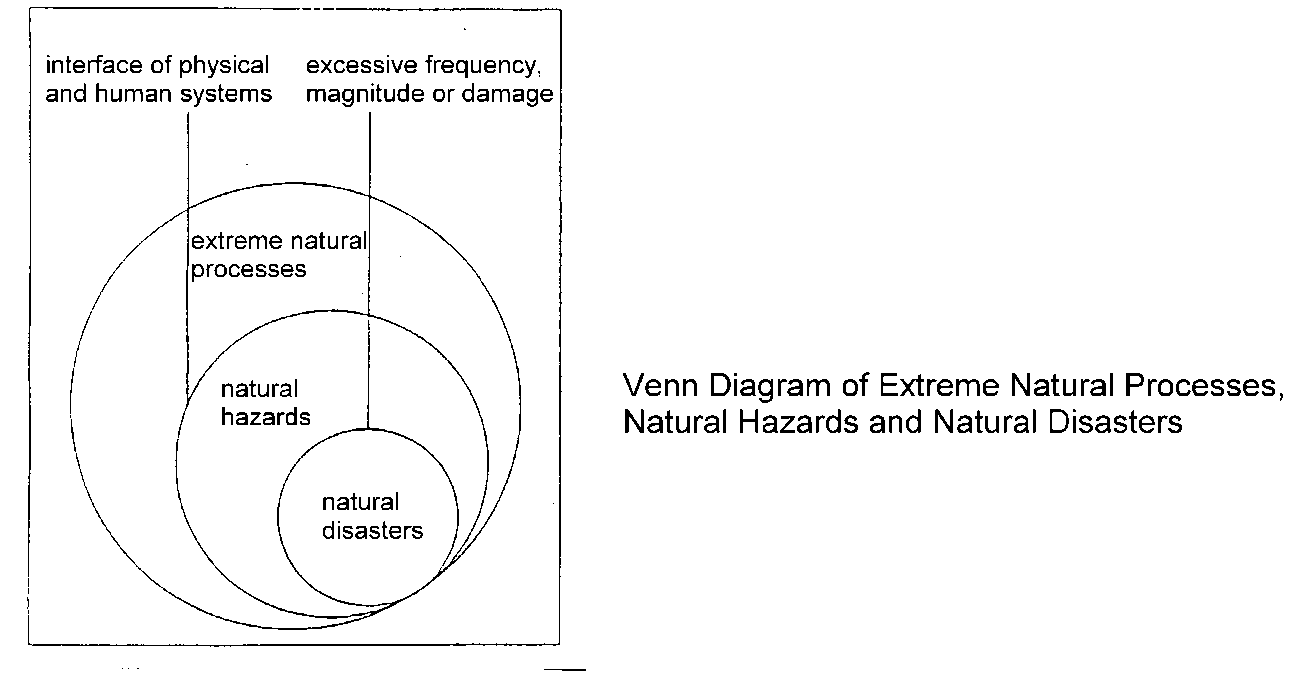
**Natural environment**

* Natural environment has provided man with useful resources.
* Natural environment may be classified into four categories:
  + Physical: energy, mineral and soil resources;
  + Biotic: forest, fish, animal and other life resources
  + Geomorphic: flat plains and others
  + Locational: good location for transport, communication and defense.

**What are Natural Hazards?**

* The natural environment is unstable.
* People have been learning to deal with the environmental risks and changes produced by the unstable environment.
* Extreme natural process (flood, earthquake or landslide…..)has the potential to be a natural hazard if it occurs where people live or have their property (buildings or animals…).
* Natural disaster when it exceeds normal expectations of frequency or involved.

**Venn Diagram of Natural Hazards and Natural Disasters**



* Responding to those hazards, society may seek to modify the natural events system and the human use system of locations, livelihoods, and social organization.

**Six Indicators**

|  |  |
| --- | --- |
| * Magnitude   + It is the most important indicator.   + Magnitude rate as ‘extreme’ happenings and pose sufficient threats to the human system to be considered natural hazards.   + Example:     - The Richter Scale | * Speed of onset   + It refers to the length of time between the first appearance or warning of an event and its peak.   + Example:     - Slow-onset hazards (drought and soil erosion)     - Rapid-onset hazards (floods and earthquakes) |
| * Duration   + It refers to the period of time over which it occurs.   + Example:     - Droughts: seasons or years     - Floods: days or weeks     - Tornados: minutes or hours | * Frequency   + It refers to how often an event of a given magnitude may be expected to re-occur.   + ‘Return period’: a recurrence interval of 10 years is to say it has in any year a 10% chance of occurring. |
| * Areal reliability   + Predictability of an natural hazards occur in an given area.   + Predictable and possible for planning.   + Example:     - Volcanic eruptions: fixed point (volcano)     - Floods: channels and flood plains     - Tropical cyclones: several erratic paths     - Earthquakes: unknown | * Areal extent   + The area of natural hazards affect.   + Example:     - Avalanche: short and narrow belt of the landscape.     - Drought or flood: several thousand km. |

**Impacts of natural hazards and level of economic development**

* About 95% of disaster related deaths occur among the two thirds of the world's population that occupy developing countries.
* In contrast to (these) ... differences in death rate, economic loss from natural disaster is commensurate with income distribution.
  + About three-quarters of absolute global loss occurs in the wealthy countries... (However) the ratio of loss to income is much higher in the developing countries ...
  + In developing countries, disasters may be less frequent but are more catastrophic and more costly in lives and relative wealth, whereas they are increasingly costly in absolute wealth in industrial nations."

**What is Flooding?**

* Flood:
  + Coastal flooding: (above average sea level)
    - Unusual atmospheric conditions (eg. Onshore hurricane, tornado…)
    - Earthquake or volcanic eruption that set up huge tidal surges.
  + River flooding (flow exceeds bank-full capacity)
    - It is a common hazard and occur anywhere in a river channel at lower course
    - May be caused by
      * Heavy rain
      * Rapidly melting snow
      * Natural or man-made dams collapse
      * others

**Nature of flood**

* Floods are the most common of all natural hazards
  + Covers the largest spatial area
  + Causes the greatest loss of life and property
  + Human beings settle on flood plains
    - Abundant water supply
    - Fertile soil for farming
    - Flat relief for development
    - Navigator (transportation)
  + Damage of floods
    - Water inundating (flooding) land, utilities, buildings, crops, communication and transport facilities.
    - After flooding, debris block streets, reservoirs and cover fields.
    - Disrupt normal supply of water, food, shelter and medicine, which cause health and pollution problems.

**People’s perception**

|  |  |
| --- | --- |
| **Hazard Perception**  1. Deny the hazard exists at all  2. Accept the hazard as a natural and inevitable event  3. Hazards are inevitable, but controllable. | **Common Responses**   1. Do noting 2. Do noting 3. Modify the causes of flooding |

**People’s perception – cont’d**

* Perception is influenced by the following:
  + The past record of hazards (magnitude and frequency)
  + The strength of traditional cultures (attitudes to the environment)
  + Education standard of the community
  + Wealth and economic development
  + Community awareness and preparations
  + Willingness of local and national government to spend money on
    - Long-term hazard prevention and damage reduction schemes, or
    - Short-term emergency relief after a disaster
* These factors emphasized the social or cultural framework in which people live.
* In fact, the range of choices open to people is very limited and controlled by the social, economic and political conditions and pressures.
* From this perspective, it can explain why people often do seemingly irrational things.
* Bounded rationality vs Satisfying behavior

|  |  |
| --- | --- |
| * **Bounded rationality**   + People like to make a rational choice of responses.   + However,     - Few people have access to full information     - Many are just not aware of all the alternative responses available     - People differ in their ability     - Few like to forget previous painful history | * **Satisfying behavior**   + People make choices that help them achieve a satisfactory level of reward, but   + Stop short of striving for the highest possible level.   + Satisfier     - Accept ‘tolerable’ levels of hazard     - Avoid the worst of the impact     - Their property is insured anyway. |
| * **Behavioral**   + Accepting loss (Third World)   + Public relief funds   + Flood insurance   + Flood forecasting and warning | * **Structural**   + Reservoirs (dams building)   + Channel enlargement   + Channel straightening   + Embankments   + Flood relief channels   + Barrages   + Flood plain zoning   + Reforestation |

**What is drought?**

* More than 1/3 of land is dry or very dry.
* Desert: annual rainfall < 250 mm
* Definition of Drought:
  + “a period of unusually or unexpectedly low rainfall, which upsets the ecological balance.”
  + A condition in which the amount of water needed for transpiration and direct evaporation exceeds the amount available in the soil.
  + In term of the water need of a particular crop growing under a specific combination of environmental conditions.

**Problems to man**

* Effects of droughts:
  + People themselves and their way of life
  + Crops and livestock
  + Natural vegetation and wildlife
  + Soil
  + Population size and population redistribution

**Role of man in causing the drought hazard**

* The human context in which hazards offer is more important than the geophysical causes of the event.
* Some factors influencing the human impact of natural hazards
  + Population density in the area affected,
  + Prior experiences of hazards in the area,
  + Traditional methods of coping with hazards
  + The degree of accuracy in predicting the hazards,
  + The effects of any warning, preparation and /or evacuation procedures,
  + The overall level of economic development in the area affected

**Population Growth Effects**

* Population growth has put increasing pressure on the environment.
* This pressure increases the risk of human-induced hazards and disasters.
* For examples
  + The hazards of disturbing natural ecosystems and food webs by the clearance of vegetation, the use of chemicals in the atmosphere, and pollution.
  + The hazard of increasing the risk of drought, floods and soil erosion by farming marginal areas particularly in semi-arid regions.