

# DPPM

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## CHAPTER-5

# Disasters, Environment & Development





## CONTENTS

Factors affecting vulnerability such as:

- Impact of developmental projects and environmental modifications (including of dams, land-use changes, urbanization etc.),
- Sustainable and Environmental friendly recovery;
- Reconstruction and Development methods.





## VULNERABILITY:

- Vulnerability refers to the inability (of a system or a unit) to withstand the effects of a hostile environment. A window of vulnerability (WOV) is a time frame within which defensive measures are diminished, compromised or lacking.
- Natural resource depletion and resource degradation are key aspects of environmental vulnerability. Example : Wetlands, such as the Caroni Swamp, are sensitive to increasing salinity from sea water, and pollution from stormwater runoff containing agricultural chemicals, eroded soils, etc.
- There are four basic and major vulnerabilities:
  - Physical vulnerability
  - Economic vulnerability
  - Social vulnerability
  - Attitudinal vulnerability





## Types of Vulnerability:

### 1. Physical Vulnerability:

- The physical vulnerability of an area also depends on its geographic proximity to the source and origin of the disasters e.g. if an area lies near the coast lines, fault lines, unstable hills etc. it makes the area more vulnerable to disasters as compared to an area that is far away from the origin of the disaster.
- Physical vulnerability includes the difficulty in access to water resources, means of communications, hospitals, police stations, fire brigades, roads, bridges and exits of a building or/an area, in case of disasters.
- Furthermore, the lack of proper planning and implementation in construction of residential and commercial buildings results in buildings that are weaker and vulnerable in earthquakes, floods, landslides and other hazards.





## Types of Vulnerability:

### 2. Economic Vulnerability

- Economic vulnerability of a community can be assessed by determining how varied its sources of income are, the ease of access and control over means of production (e.g. farmland, livestock, irrigation, capital etc.), adequacy of economic fall back mechanisms and the availability of natural resources in the area.

### 3. Social Vulnerability

- A socially vulnerable community has weak family structures, lack of leadership for decision making and conflict resolution, unequal participation in decision making, weak or no community organizations, and the one in which people are discriminated on racial, ethnic, linguistic or religious basis.
- Other social factors such as culture, tradition, religion, local norms and values, economic standard, and political accountability also play a vital role determining the social vulnerability of a community.





## Types of Vulnerability:

- Social vulnerability to natural phenomena is greatest among the poorest people in developing countries owing to a lack of information and resources with which to take the appropriate measures.
- Within this group, children, women and the elderly are considered to be the most vulnerable.
- To reduce social vulnerability, all of the above factors must be addressed but this requires knowledge and understanding of the local conditions, which can – in most cases – only be provided by local actors.

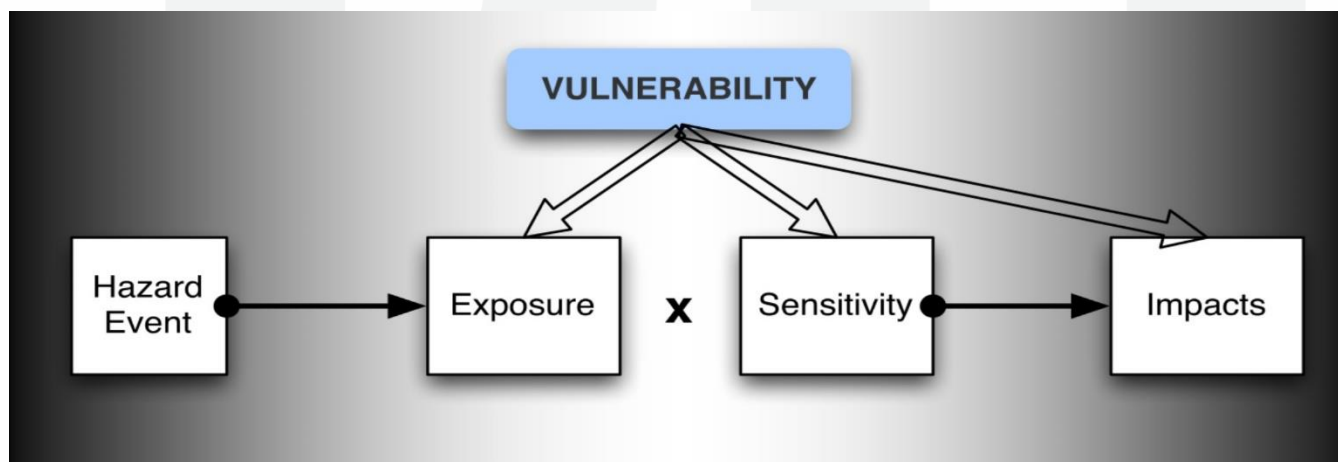
### 4. Attitudinal Vulnerability

- A community which has negative attitude towards change and lacks initiative in life resultantly become more and more dependent on external support. They cannot act independently.



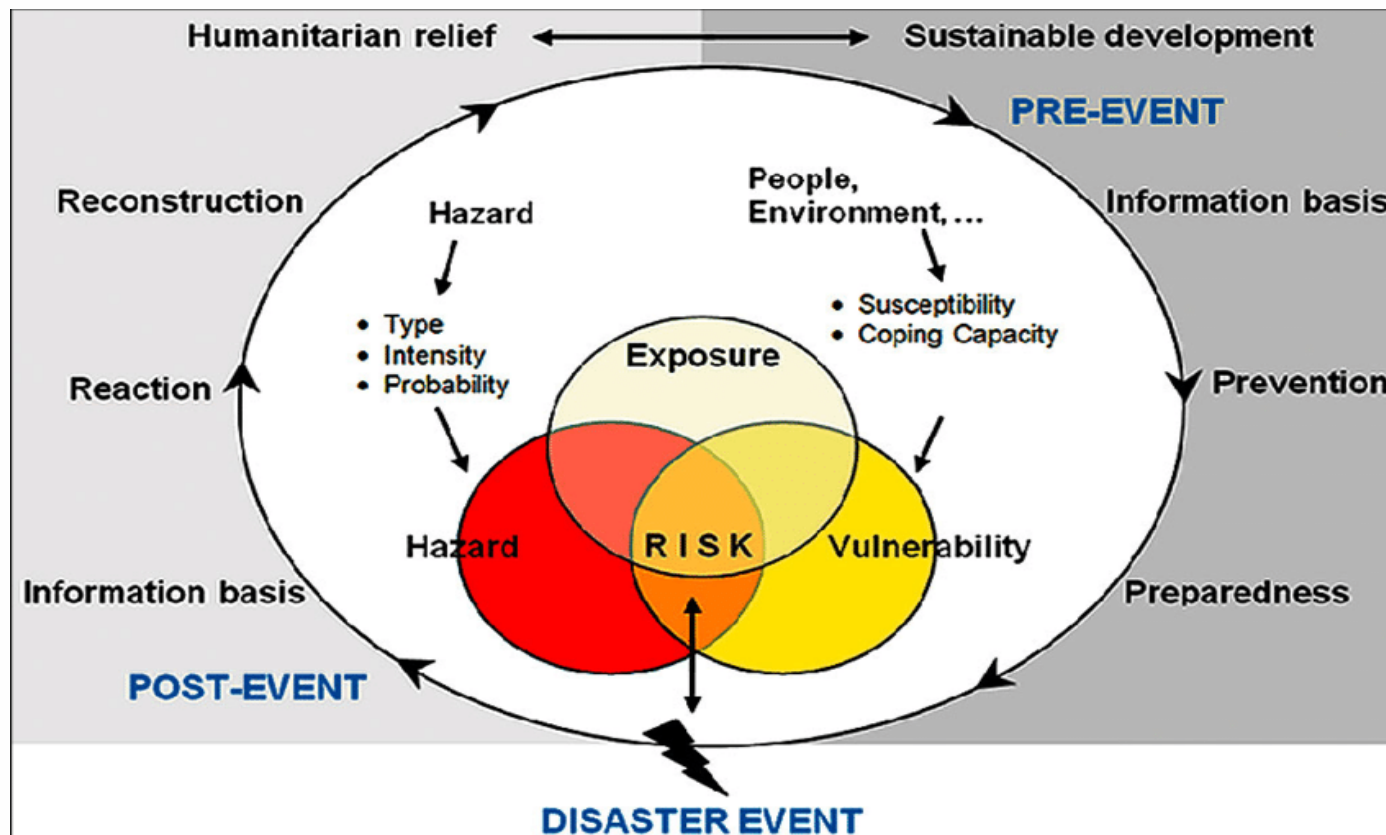
## Types of Vulnerability:

- Their sources of livelihood do not have variety, lacks entrepreneurship and do not possess the concept of collectivism.
- This brings about disunity and individualism in the society. Thus, they become victims of conflicts, hopelessness and pessimism which reduces their capacity of coping with a disaster.





# Vulnerability Disaster:



## Factors affecting Vulnerability:

### 1. POVERTY:

- The widening gap between rich and poor, rural and urban incomes and hence the disparity in living standards can be witnessed in the flood plains of developing countries. landowners with marginal, degraded land, frequent flooding can decrease the returns from cultivating the land, thus reducing food security.
- The rural poor who depend on incomes from farming or other agricultural activities, with no savings to help them get back on their feet after a disturbance or pay for basic needs, are often obliged to migrate to the cities and are driven into debt.
- Newcomers to an urban setting, not being able to afford safe locations in the city, are obliged to settle in makeshift dwellings in informal settlements on marginal lands near the river or other drainages that are extremely vulnerable to flooding.



## Factors affecting Vulnerability:

### 2. LIVELIHOOD

- The principal livelihoods of communities living in rural flood plains are mainly farming and fishing.
- However, recurring floods threaten their stability of the their livelihoods owing to the loss of farm products or limited access to the markets for their products in the absence of adequate transport infrastructure.
- The landless poor, working as hired labourers, particularly during long flood seasons, have trouble finding jobs to meet their basic needs.

### 3. CULTURAL BELIEFS:

- Some cultural beliefs and fatalistic attitudes contribute to a community's vulnerability.





## Factors affecting Vulnerability:

- In some societies, natural disasters are considered to be acts of God and taken as if there is nothing human beings could do to prevent hazards from turning into disasters.
- Lack of faith in the social system and lack of confidence in the ability to manage flood risks manifests itself in resistance to any such change

### 4. EQUITY:

- Unequal distribution of resources and access to human rights can lead to conflicts and discontent, and in turn, the deterioration of social systems.
- For example, individuals who are denied the right to freedom of association and access to information may be precluded from discussing issues related to flood preparedness and mitigation planning, receiving essential fundamental services and taking preventive measures to protect themselves from flood hazards.





## Factors affecting Vulnerability:

- In areas where flood diversion works are in place it may so happen that flood water are redirected into areas where poorer sections of the society with less political influence settle.

### 5. GENDER

- In societies where the decision-making power resides solely with the men of the family, ignoring the wisdom and experience of women and denying or limiting them the adequate access to knowledge and capacity development schemes, which otherwise may be available to men, can deny the society the use of such human resources and contribute to women's vulnerability in terms of personal security, health and well being, economic security and livelihoods.

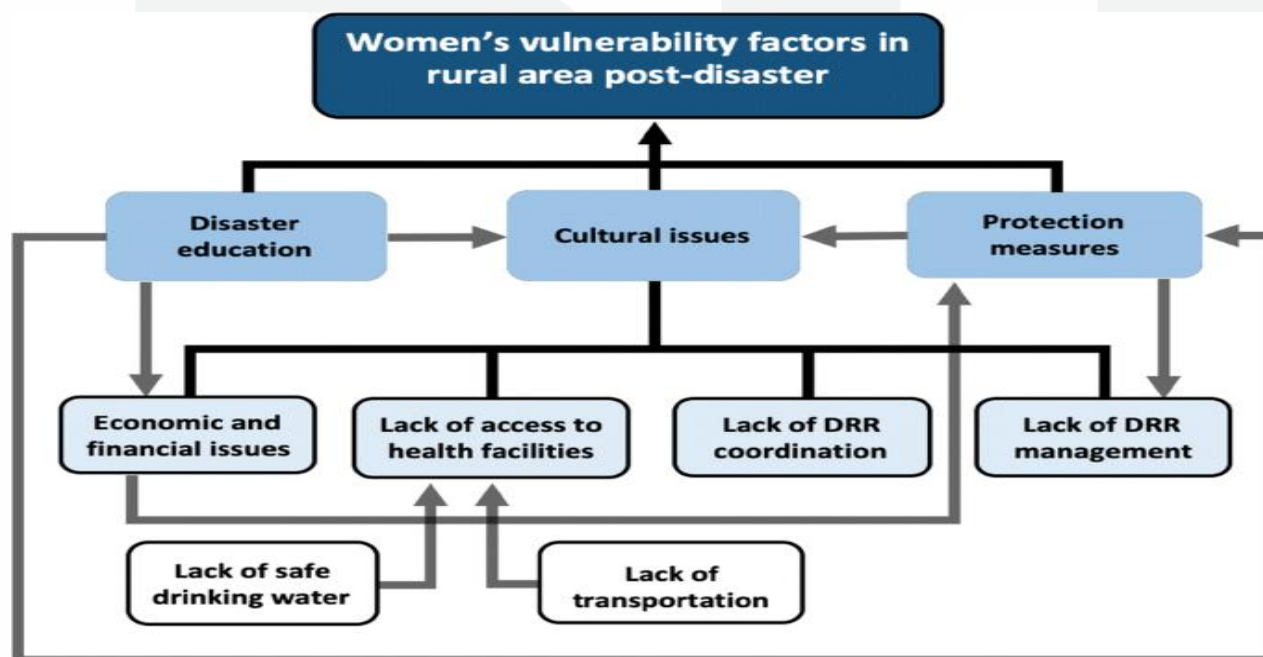
### 6. WEAKER SOCIAL GROUPS

- In a society made up of various social groups, the needs of each group differ.

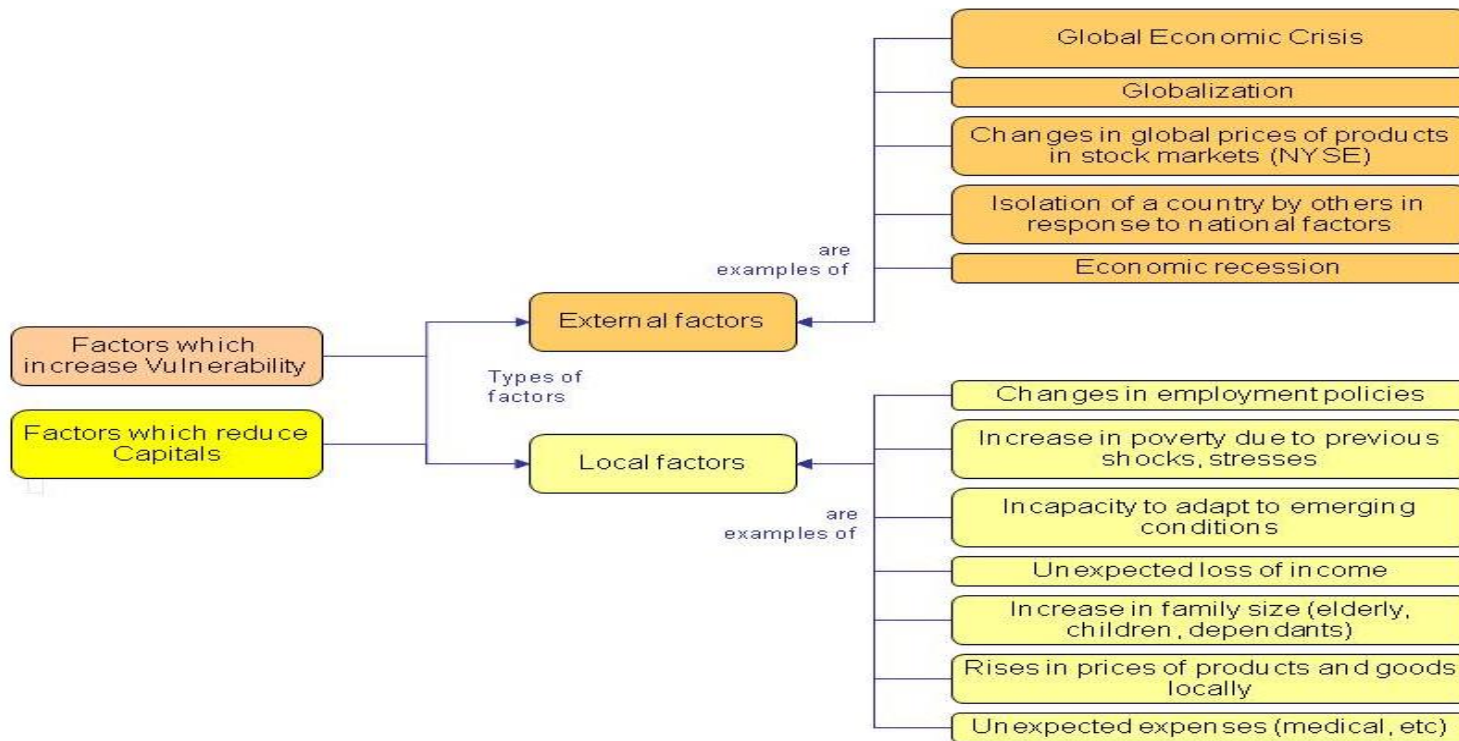


## Factors affecting Vulnerability:

- Children, women, elderly and disabled people have unique group features that may add to their vulnerabilities in particular situations, such as during evacuation, sheltering, relief distribution and the rehabilitation process.



# Tsunami Disaster







## Impact of Developmental Projects:

- Disaster risk is a potential factor in many development projects.
- Environmental hazards can affect a project area, with socio-economic consequences for the project's target populations.
- Development projects can increase or reduce the risk of natural disaster, through their impact on social resilience and the natural environment.
- The impacts of Developmental Projects are:

### 1. IMPACT ON DAMS:

- The drive for economic growth has exposed populations to increased risk.
- Destruction has been exacerbated by the development of dams in fragile ecosystems. Hence, disasters reveal boundaries and limits to development.
- All countries suffer from disasters but their impact is felt to the maximum extent in poor countries.





## Impact of Developmental Projects:

- In case of development project involved in construction of dams, the disasters like flash floods, earthquakes and landslides can delay the project and adversely affect the finances allocated to the project as additional expenditure will be required in operations like clearing of debris, redesigning the project to suit the changed landscape, salvaging the usable construction material and disposal of incomplete structure.
- The ongoing progress of the project is pushed back and the project is delayed considerably.

### 2. IMPACT ON EMBANKMENTS:

- An embankment is a wall of brick or stone built to prevent flooding.
- The natural disasters that can affect its development are Earthquakes, landslides, floods as all these disasters result in affecting the surface of the Earth.





## Impact of Developmental Projects:

- Earthquakes destabilize the foundation of the embankment causing it to collapse.
- Floods may weaken the bonds between the bricks and stones by dissolving the cement or water may act as a lubricant between stones causing the stones to slide against each other leading to collapse of the structure.
- Flood water may be absorbed into bricks and swelling of bricks may lead to cracking and ultimately collapse of the structure.
- Earthquakes cause embankments to collapse as the entire structure is built on land.
- Landslides cause a section of land to slide over another and this disturbance of land also collapses the embankments.



## Impact of Developmental Projects:

### 3. IMPACT ON CHANGES IN LAND-USE:

- Land-use refers to a particular purpose for which a parcel of land is used. Change in land-use refers to using a particular area of land for a different purpose than which it was being used. Examples of this are:  
Clearing a forest area for residential purpose
- Clearing a forest area for agriculture
- Clearing a residential area for industries
- Clearing agricultural land for industries etc
- Disasters will have a profound impact on any change in land-use. This happens primarily because the local community will have experienced the area and will have the knowledge regarding the do's and don'ts in specific areas as a result of previous experience.





## Impact of Developmental Projects:

- When ever there is a change in land-use pattern as listed above takes place activities of the new community might not be in synchronicity with the ecological cycle of resource withdrawal.
- This might result in disasters. Change in land-use has been the most common factor in recent natural disasters. Few examples are listed below: Mangroves in coastal areas act as natural barriers to strong winds and storm surge associated with land falling tropical cyclones. Cutting these mangroves for agriculture removes the natural barrier and thereby increases the intensity of land falling cyclones.
- Mangrove ecosystems along the Mithi river and Mahim creek in Mumbai were destroyed and replaced with haphazard construction. Sewage and garbage dump also destroyed the mangroves. The Mumbai floods of July 26, 2005 is a classic example of modifying land-use contributing to a major disaster where more than 1000 lives were lost.



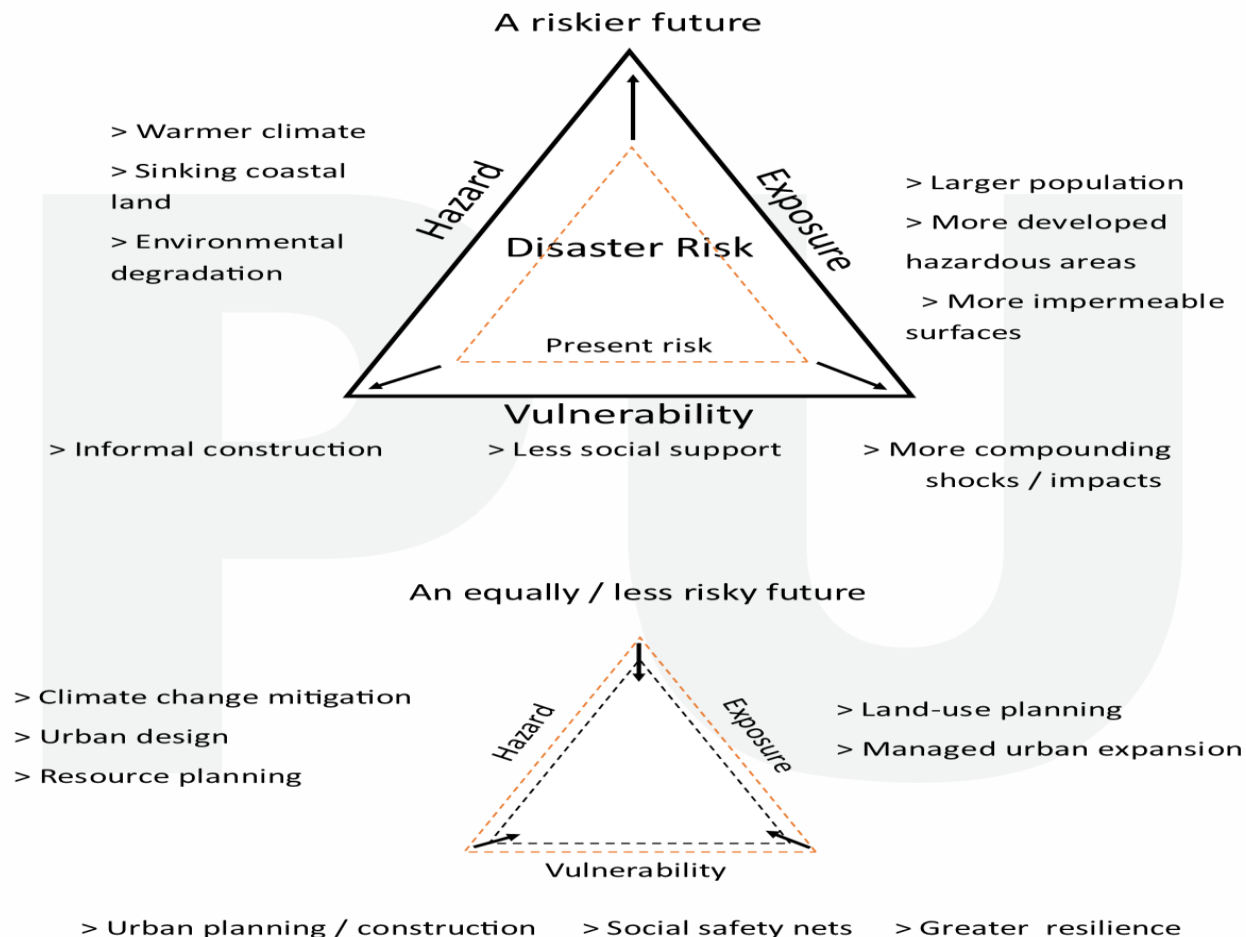
## Impact of Developmental Projects:

- Chennai floods of 2015 and floods in Bengaluru and Hyderabad have demonstrated that haphazard change in land-use has become a major source of disasters caused by natural hazards
- Major floods in Uttarakhand in 2014 and Kashmir have shown that land-use change and unplanned development have been the real cause of large-scale disasters.





# Impact of Developmental Projects:







## Impact of Environmental Modifications:

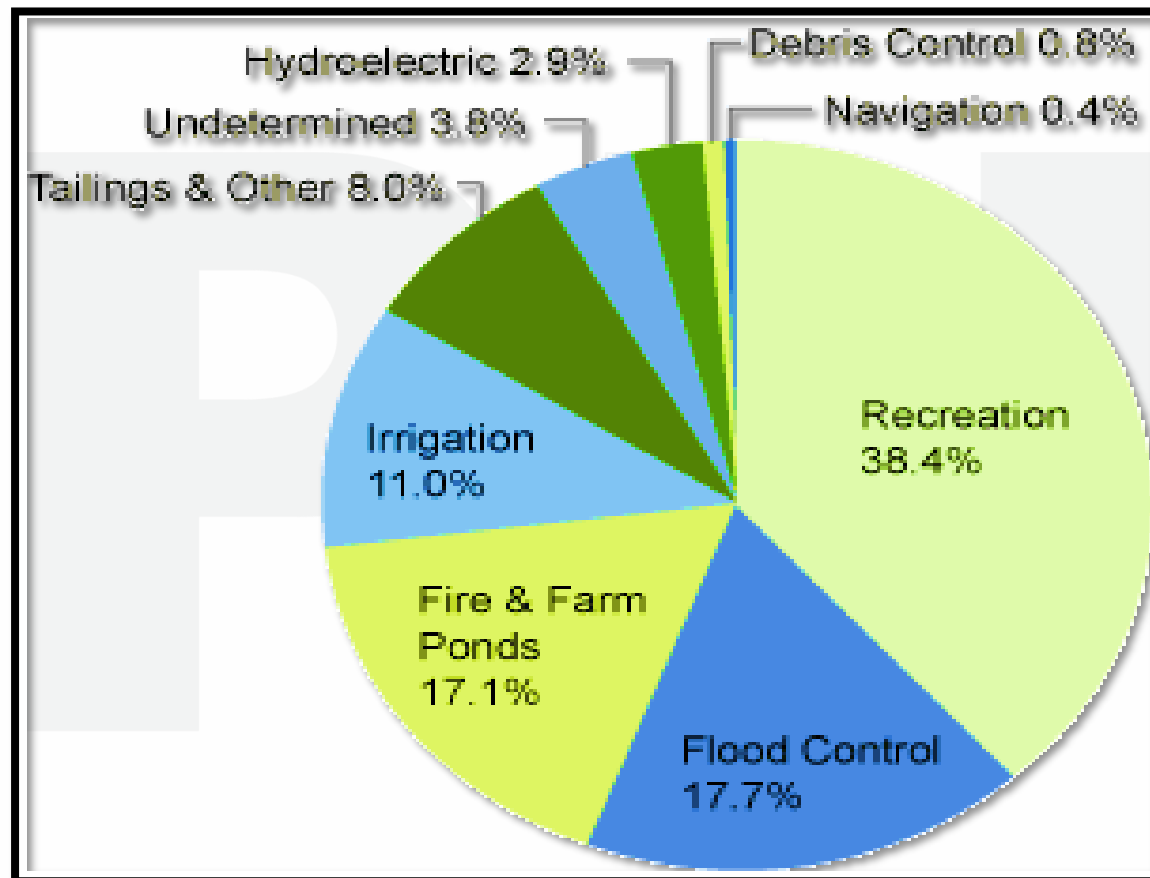
- Environmental Modifications (E-mods) are internal and external physical adaptations to the home, which are necessary to ensure the health, welfare and safety of the waiver participant.
- These modifications enable the waiver participant to function with greater independence and prevent institutionalization.
- The impacts of Environmental modifications:

### 1. IMPACT ON DAMS:

- Dam is a barrier built across a river to hold back river water for safe retention and storage of water or control the water flow. Dams allow to divert the river flow into a pipeline, a canal or channel.
- Dams results in substantially raising water levels in the river over a large area, thus create a storage space. Purposes of dams are described as further.



## Impact of Environmental Modifications:



## Impact of Environmental Modifications:

New Technologies of Dam Construction :

- Hydroelectric power
- RFC Dam Construction Technology Rock-filled concrete (RFC)
- CSG Dam Construction Technology

### 2. IMPACT ON CHANGES IN LAND-USE:

- Land use change is a process by which human activities transform the natural landscape, referring to how land has been used, usually emphasizing the functional role of land for economic activities.

How is land use change affecting the environment?

- An integrated method was used to explore the environmental effects of land-use/cover change in Southwest China Karst area. The main driver of the environmental change is the variation of forestland area.





## Impact of Environmental Modifications:

- The green land area per capita was negatively correlated with urbanization level.
- Land use changes occur constantly and at many scales, and can have specific and cumulative effects on air and water quality, watershed function, generation of waste, extent and quality of wildlife habitat, climate, and human health.

### 3. IMPACT OF URBANIZATION:

- Urbanization refers to the population shift from rural to urban areas, the corresponding decrease in the proportion of people living in rural areas, and the ways in which societies adapt to this change.
- It is predominantly the process by which towns and cities are formed and become larger as more people begin living and working in central areas.



## Impact of Environmental Modifications:

How does urbanization affect the environment in a city?

- The effects of urbanization have a major impact on the environment in the city. I have noticed a city which was so cool and clean two decades ago become warm and dusty now. This is because the city population grew ten folds in the past two decades. Urbanization damages the environment drastically as the population density becomes higher.





## Sustainable & Environmental friendly recovery:

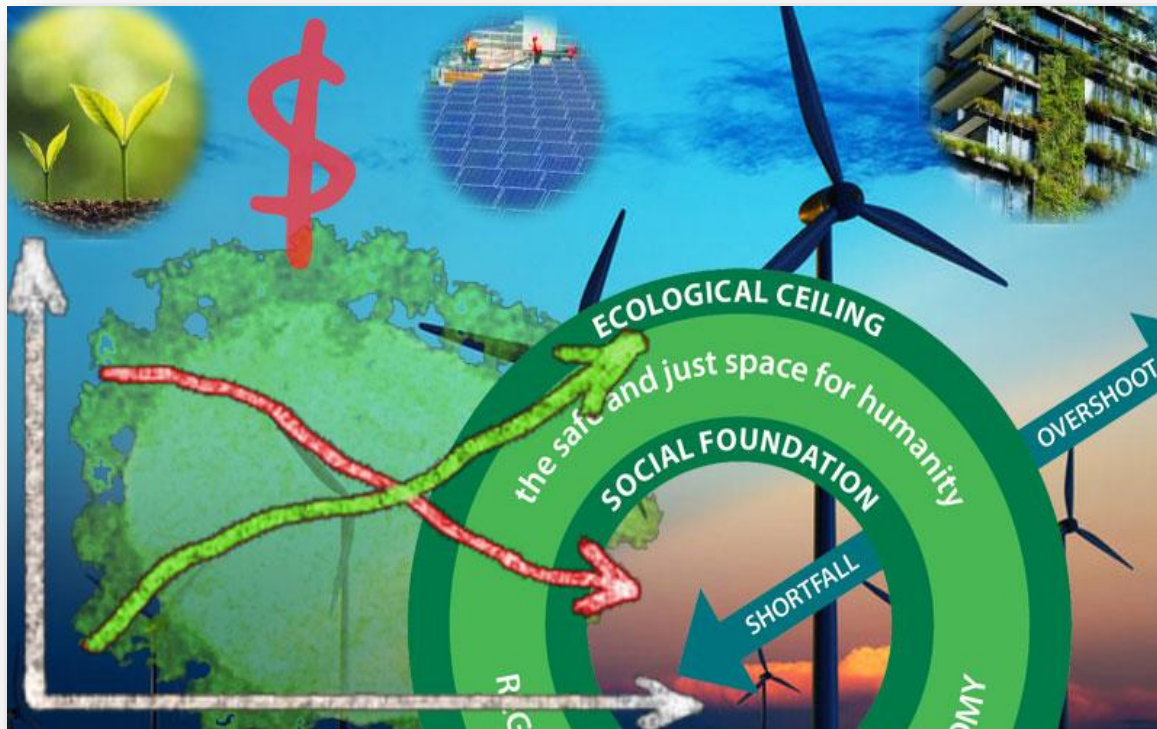
- Materials found in municipal solid waste, construction and demolition waste, commercial waste and industrial wastes can be used to recover resources for the manufacturing of new materials and products.
- Plastic, paper, aluminium, glass and metal are examples of where value can be found in waste.
- The green recovery could cut expected emissions in 2030 by up to 25 per cent, and boost the chance of keeping temperature rise to below 2-degree Celsius, up to 66 per cent, according the report.

### What are the benefits of a green recovery?

- Through a green recovery, governments have the opportunity to unleash innovation, undertake wider reaching and fundamental restructuring of critical sectors, accelerate existing environmental plans, and make use of environmentally sustainable project pipelines.



## Sustainable & Environmental friendly recovery:







## Sustainable & Environmental friendly recovery:

- The World Commission on Environment and Development (also known as the “Brundtland Commission”) has defined “sustainable development” in terms of livelihood security.
- A system is sustainable if it provides all people with secure livelihoods, in ways that do not compromise the ability of future generations to achieve secure livelihoods (World Commission on Environment and Development, 1987a).
- Livelihood is defined as access to adequate food and cash to meet basic needs. Security refers to secure ownership of, or access to, resources and income-earning activities, including reserves and assets to offset risk, ease shocks and meet contingencies.
- Sustainable refers to the maintenance or enhancement of resource productivity on a longterm basis (World Commission on Environment and Development, 1987b).





## Reconstruction & Development methods :

- Rehabilitation and reconstruction operations are integral to disaster recovery. They provide a direct 'connect' between disaster response and long-term development.
- The two activities, however, do not have similar connotation. Rehabilitation involves restoring local services related to the provision of immediate needs. It implies a systematic return to predisaster status.
- It refers to actions taken in the aftermath of a disaster to enable basic services to resume functioning, assist victims' self-help efforts to repair physical damage, restore community facilities, revive economic activities and provide support for the psychological and social well-being of the survivors.
- It focuses on enabling the affected population to resume more or less normal patterns of life. It may be considered as a transitional phase between immediate relief and major long-term development.





## Reconstruction & Development methods :

- Reconstruction, on the other hand, represents long-term development assistance, which could help people in the affected areas to rebuild their lives and meet their present and future needs.
- It takes into account reduction of future disaster risks. Rehabilitation may not necessarily restore the damaged structures and resources in their previous form or location.
- It may include the replacement of temporary arrangements established as part of emergency response or the upgradation of infrastructure and systems from pre-disaster status.



## Reconstruction & Development methods :

- For instance, following a damaging hurricane, the rehabilitation of the power lines would aim to restore the system as rapidly as possible so that the essential services would continue to function, whereas, reconstruction of the power lines would aim to rebuild the rehabilitated system to a higher or safer standard than before, so that the future risks to the power lines from a similar damaging event could be reduced.
- Reconstruction must be fully integrated into long-term developmental plans, taking into account future disaster risks and possibilities to reduce them by incorporating appropriate measures.
- The term recovery is used to embrace both the rehabilitation and reconstruction activities. Both the activities may be required in the aftermath of disaster. One does not essentially exclude the other.





## Reconstruction & Development methods :

- Rehabilitation and reconstruction do not always safeguard full recovery. In the disaster aftermath, it may take longer to return to 'normalcy' or in some situations, total recovery may never be possible.
- It is, therefore, Rehabilitation and Reconstruction 285 not possible to suggest a 'model' time frame for rehabilitation, reconstruction or recovery stages.
- The distinction between rehabilitation and reconstruction is not watertight, but they have to be well-incorporated into a long-term disaster recovery plan.
- A comprehensive rehabilitation and reconstruction or a broad recovery plan should take into consideration both physical and non-physical requirements of the communities.





## Reconstruction & Development methods :

- Failing to address longterm recovery could have adverse consequences. For instance:
  - i) It may simply result in large investment in infrastructure without the necessary inputs to help the victims to become psychologically fit, socially ready and economically self-sufficient; and
  - ii) The necessary links between physical, social and psychological recovery may be ignored
- Problems underlying rehabilitation and reconstruction can even go on to stall the recovery process, that rehabilitation and reconstruction are complex processes that are determined by varied parameters.
- The nature of rehabilitation and reconstruction largely depends on the intensity of damage caused by a disaster in terms of losses to lives and infrastructure.





### Disaster-Development

	<i>Economic Development</i>	<i>Social Development</i>
<i>Disaster limits development</i>	Destruction of fixed assets. Damage to transport, communication, infrastructure. Erosion of livelihood.	Destruction of health or education infrastructure and personnel. Death, migration of key social actors leading to an erosion of social capital.
<i>Development causes disaster risk</i>	Unstable development practices that create wealth for some at the expense of unsafe working or living conditions for others or degrade the environment.	Development path generating cultural norms that promote social isolation or political exclusion.
<i>Development reduces disaster risk</i>	Access to adequate drinking water, food, waste management and a secure dwelling increases people's resilience. Trade and technology can reduce poverty. Investing in financial mechanisms and social security can cushion against vulnerability.	Building community cohesion, recognising excluded individuals or social groups, and providing opportunities for greater involvement in decision-making, enhanced educational and health capacity increases resilience.







## Reconstruction & Development methods :

- Looking at above relationship between disasters and development one can identify 'four' different dimensions to this relation:

- 1) Disasters can set back development
- 2) Disasters can provide development opportunities
- 3) Development can increase vulnerability and
- 4) Development can reduce vulnerability

The whole relationship between disaster and development depends on the development choice made by the individual, community and the nation who implement the development programmes.





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# × DIGITAL LEARNING CONTENT

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