Flood Management – Part I

Why in news?

Recently, North India including Delhi witnessed heavy rainfall resulting in flood.

What is flood?

- Flooding is an *overflowing of water* onto land that is normally dry.
- **Types of Flood**
  - **Flash floods -** It is caused by rapid and excessive rainfall that raises water heights quickly, and rivers, streams, channels or roads may be overtaken.
  - **River floods -** It is caused when consistent rain or snow melt forces a river to exceed capacity.
  - **Coastal floods** - It is caused by storm surges associated with tropical cyclones and tsunami.

> *Urban flooding refers to the inundation of property in a built environment, particularly in more densely populated areas, caused by rain falling on increased amounts of impervious surfaces and overwhelming the capacity of drainage systems.*

What are the causes of flooding?

- Flood is often caused by
  - **Natural causes -** Heavy rainfall, rapid snowmelt, storm surge from a tropical cyclone, tsunami in coastal areas, etc.
  - **Manmade causes** - Factors such as population growth, rapid urbanisation, increased developmental and economic activities in flood plains.

Meteorological Factors

- **Extreme rainfall -** It results in flash flood which is a cause of concern in low lying areas and urban cities where the damage inflicted is huge.
- **Sea surge -** Storm surge is caused by tropical cyclones where it causes sea water to overflow into coastal regions.
  - As per the Intergovernmental Panel on Climate Change (IPCC), it is estimated that before 2030, large parts of Kolkata could face immense flooding, causing the city to submerge.
- **Cloud Burst** - It occurs due to intense precipitation in a short duration which can sometimes be accompanied by hail and storm and can cause a flood.
  - **Example** - In 2022, several people were killed in the cloud burst and flash flood

incident in Himachal Pradesh and Uttarakhand.

- **Global Warming** - Due to the increased rise in global temperature, glaciers of the Himalayan range start to melt.
- As a result, the seawater level also rises, causing floods in surrounding years.
- **Earthquakes and Landslides** - A shift in tectonic plates can lead to alteration in the volume and course of surface water resulting in flood hazard.
    - **Example** - In 2013, heavy rain in Uttarakhand caused flood due to landslide and flash flood.

Physical Factors

- **Insufficient drainage management -** Due to this, areas are flooded by accumulation of water from heavy rainfall.
- **Change in river course** - Due to erosion of the banks, rivers change course and causes flood.
    - **Example** - Recent Yamuna flooding in Delhi 2023 one of the reason is change in river course.
- **Catchment area -** During monsoon, when excess water exceeds the limit of holding capacity of the catchment area (area from where the rainfall water flows into a river), it leads to floods.

Human Factors

- **Siltation -** As particles remain suspended in the river and accumulated in the riverbed, it disrupts the flow of the river, causing a flood.
- **Improper Agricultural Practices -** Excessive irrigation applied to command areas and increase in ground water levels due to seepage from canals and irrigated fields lead to floods.
- **Deforestation -** Trees act like a sponge that helps to hold soil and water and prevent flooding.
- As trees are being cut down at a fast pace, more water runs towards a river during heavy rainfall and causes flood.
- **Collapse of Dams -** Dams are built to store water and provide water to people. As dams are human-made, these can be worn out and subsequently collapse causing floods.
    - **Example -** In 2018, Kerala flood is due to opening dam floodgate which is the worst flooding episode.
- **Floodplain encroachment -** This reduces the water carrying capacity of rivers which is brought from upper catchment areas and cause flooding.
    - **Example** - In 2015, Chennai was worst hit by floods, one of the reason is encroachment.

What zones in India are prone to flood?

- According to the estimate of the National Commission on Floods, the area prone to floods in the country is of the order of 400 lakh hectares.
- As per the Geological Survey of India (GSI), the major flood prone areas of India cover

almost *12.5% area* of the country.

- The states falling within the periphery of "*India Flood Prone Areas*" are West Bengal, Orissa, Andhra Pradesh, Kerala, Assam, Bihar, Gujrat, Uttar Pradesh, Haryana and Punjab.
- The intense monsoon rains from southwest causes rivers like Brahmaputra, Ganga, Yamuna etc. to swell their banks, which in turn floods the adjacent areas.



To Know about Part-II - Click Here.

References

1. Indian Express| Prevent disruptions by flood
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