

DISASTER MANAGEMENT

FLOODS

Impact of climate change on cyclones in India

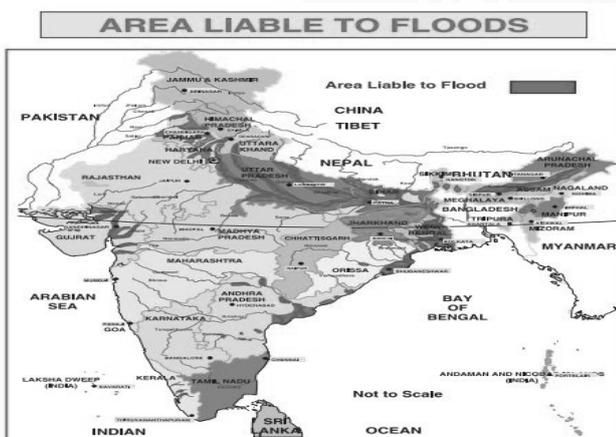
- In 2019, the Arabian Sea witnessed five cyclones as compared to its normal count of three, and the year 2019 corresponds to a positive IOD (Indian Ocean dipole) phase. Hence, under favourable natural climate modes, warming of Arabian Sea can increase the frequency and intensity of tropical cyclones in the North Indian Ocean

Floods in India

- India is highly vulnerable to floods. Out of the total geographical area of 329 million hectares (mha), more than 40 mha is flood prone.
- Floods are a recurrent phenomenon, which cause huge loss of lives and damage to livelihood systems, property, infrastructure and public utilities.
- India is the world's worst flood-affected country after Bangladesh, accounting for one fifth of global death count due to floods.
- Between 1953 and 2011, floods in India caused the deaths of 1,653 people on average each year.
- In 2023, floods have caused extensive damage to several landmarks in Delhi, such as the Red Fort and the Supreme Court.
- In 2010, 965 people died from floods, the highest number of deaths due to floods across the country over the last decade. In 2021, 656 people died from floods

Multiple Factors and types

- ✓ Floods due to Rivers
- ✓ Flood due to Rains
- ✓ Glacial Lake Outburst flood
- ✓ Flash Flood
- ✓ Urban Flood
- ✓ Areas Liable to Flood



- Frequency: India experiences floods almost every year, primarily during the monsoon season from June to September.

- Affected Population: Millions of people are affected by floods annually. According to government estimates, over 30 million hectares of land are prone to flooding in India.
- Economic Impact: Floods cause significant economic losses through damage to crops, infrastructure, housing, and disruption of livelihoods. The economic impact varies from year to year but can run into billions of dollars.
- Humanitarian Impact: Floods result in loss of lives and displacement of people. The impact on vulnerable populations, such as children, the elderly, and the economically disadvantaged, is particularly severe.
- Infrastructure Damage: Floods damage roads, bridges, railways, power lines, and other critical infrastructure, hampering relief and rescue efforts.
- To mitigate the menace of floods, the Indian government has taken various steps, including:
 - Early Warning Systems: Implementing advanced flood forecasting and early warning systems to alert vulnerable communities and enable timely evacuation. For example, the Central Water Commission (CWC) and the India Meteorological Department (IMD) provide flood forecasts and warnings.
 - Flood Control Measures: Constructing and maintaining dams, embankments, and reservoirs to regulate water flow, reduce flood risk, and store excess water during heavy rains. The Dam Rehabilitation and Improvement Project (DRIP) is one such initiative aimed at enhancing the safety and operational efficiency of dams.
 - River Management: Adopting integrated river basin management approaches to balance water utilization, flood control, and ecological conservation. Projects like the National River Conservation Plan (NRCP) and the National Mission for Clean Ganga (Namami Gange) focus on rejuvenating river systems and reducing pollution.
 - Community Resilience: Promoting community-based disaster management strategies, including training local authorities, communities, and first responders in flood preparedness, response, and recovery. Initiatives like the National Disaster Management Authority (NDMA) and State Disaster Management Authorities (SDMAs) work on building resilience at the grassroots level.
 - Infrastructure Resilience: Incorporating climate-resilient infrastructure designs and construction practices to withstand floods and minimize damage. This includes retrofitting critical infrastructure and buildings in flood-prone areas.
 - Awareness and Education: Conducting public awareness campaigns, educational programs, and drills to increase understanding of flood risks and promote adaptive behaviors among the population.

Guidelines of NDMA

- The National Disaster Management Agency has come out with two specific measures structural and non-structural, which can be effective in managing or controlling floods.

Structural Measures

- Regular construction of check dams and reservoirs to keep a check on excess water during heavy rainfall.
- Regular desilting and dredging of water channels to increase their carrying capacity and at the same time avoid spillover to other areas.
- Aggressive afforestation drive in catchment areas of major rivers. More the number of trees in these areas will go a long way in tackling floods by reducing surface runoff and retaining water in the soil.
- Ensure proper maintenance and repair of embankments along river banks to ensure that water does not move into human habitation.

Non-Structural Measures

- Undertake floodplain zoning measures and regulate land use in these areas.
- Complete prohibition on developing human settlements in low lying and flood risk areas.
- Demarcation of area based on risk level and steps should be taken to evacuate people from high risk areas first.
- Floodproofing- Under this plan, there should be flood shelters in the highlands, availability of food and medical supplies, and proper communication channels between people providing services and those availing of such services.
- NDMA have raised more than 200 Apda Mitras which would provide flood relief services in India's top 30 flood prone districts.