



KAMARAJ IAS ACADEMY
Only IAS Academy by Grandson of "Perunthalaivar Kamarajar"

FLASH FLOODS - 2025

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Definition:

A flash flood is a rapid, intense flood of water that happens within a very short period, typically less than six hours, following a heavy rain event or a sudden release of water. It's characterized by its incredible speed and destructive power, often giving little to no warning.

Factors causing flash floods:

Intense Rainfall : This is the most common cause. A large amount of rain falls in a very short period, overwhelming the ground's ability to absorb water.

Topography : Steep terrain and mountainous areas cause water to flow downhill rapidly, accumulating in valleys and low-lying areas with great force.

Urbanization : Cities have vast areas of impervious surfaces like concrete and asphalt, which prevent water from soaking into the ground, leading to increased and rapid runoff.

Saturated Ground : When soil is already saturated from previous rainfall, it cannot absorb any more water. This leads to almost all new rainfall becoming runoff.

Dam or Levee Failure : The sudden breach of a man-made dam or a natural levee releases a massive wall of water downstream with little to no warning.

Ice or Debris Jams : A blockage of ice, logs, or other debris in a river can cause water to back up. When the jam suddenly breaks, a powerful surge of water is released.

Glacial Lake Outburst Floods (GLOFs) : A natural dam of a glacial lake, often made of ice and rock, can fail suddenly, releasing a large volume of water.

How Climate Change Intensifies Flash Floods ?

More Intense Rainfall: For every 1°C increase in temperature, the atmosphere can hold about 7% more moisture. This leads to extreme precipitation events where a huge amount of rain falls in a short time, overpowering drainage systems and the ground's ability to absorb water.

Glacial Lake Outburst Floods (GLOFs): Rising temperatures in the Himalayas are causing glaciers to melt at an accelerated rate. This melting forms unstable glacial lakes dammed by fragile moraine. When these natural dams fail, a massive volume of water, ice, and debris is released in a flash flood.

Changes in Monsoons: Climate change is disrupting the traditional monsoon season. Some areas that were once not prone to flooding are now seeing an increase in rainfall, while others are experiencing more "wet hours" or shifts in the timing of rain. This changing pattern can catch communities off guard, especially in regions with **inadequate infrastructure**.

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Impacts of flashfloods in india:

Loss of Life and Injury

Flash floods are the number one weather-related killer in many parts of the world. The rapid rise of water and its powerful force can sweep away people and vehicles, causing drowning, serious injuries, and fatalities.

Destruction of Property and Infrastructure

The high-velocity water, often mixed with large debris like boulders, trees, and mud, can destroy homes, businesses, and critical infrastructure. Bridges can collapse, roads are washed away, and buildings are left uninhabitable.

Economic Losses

The financial impact of flash floods is immense. This includes the direct costs of repairing or rebuilding damaged homes and businesses, the loss of inventory and possessions, and the disruption of local economies as businesses are forced to close and supply chains are broken.

Displacement and Homelessness

Flash floods can force thousands of people from their homes, leading to displacement and homelessness. This creates a need for temporary shelters and humanitarian aid, putting a strain on local and national resources.

Environmental Damage

Flash floods can cause severe environmental degradation. The forceful water flow can lead to massive soil erosion, uprooting trees and damaging vegetation. It can also disrupt habitats, introduce pollutants into ecosystems, and alter river courses, with long-term consequences for local flora and fauna.

Increased Vulnerability for Marginalized Communities

Lower-income individuals and communities often suffer the most from flash floods. They may live in less-safe housing or in areas more prone to flooding, and they are less likely to have insurance or the financial means to recover from the disaster.

Measures taken to prevent flash floods:

India has implemented both structural and non-structural measures to address flash floods, focusing on a multi-pronged strategy of prevention, preparedness, and response. The approach is managed by various governmental bodies, including the National Disaster Management Authority (NDMA) and state-level agencies.

structural Measures

Structural measures involve building or modifying physical infrastructure to control water flow and reduce the impact of floods.

Construction of Dams and Reservoirs: These structures are built to hold back large volumes of water, regulating river flow and mitigating the impact of heavy rainfall.

Embankments and Levees: These raised earthen walls are constructed along riverbanks to prevent water from spilling into nearby areas during floods.

Diversion Channels: These are artificial channels created to divert floodwaters away from populated areas or to less vulnerable regions

Non-Structural Measures:

Non-structural measures focus on policies, planning, and information systems to reduce the impact of flash floods.

Early Warning Systems: These systems are crucial for providing timely alerts to communities. India has been developing advanced systems for this purpose.

Floodplain Zoning: This is a land-use planning strategy that involves demarcating areas prone to flooding and regulating development in those zones.

Community-Based Disaster Management: This involves training and empowering local communities to prepare for, respond to, and recover from flash floods.

Watershed Management: This approach involves managing the entire drainage basin to control runoff and erosion. It includes afforestation (planting trees) and building check dams to slow water flow and promote absorption into the soil.

Conclusion:

Ultimately, the future of flash flood mitigation rests on a combination of robust infrastructure, sophisticated technology, and a well-informed, resilient populace. With climate change intensifying the frequency and severity of extreme weather events, adapting to and preparing for flash floods is not just a matter of safety, but a critical imperative for sustainable development.