

Floods and Preventive Measure

Why in News?

After the landfall of Cyclone Michuung, there is a need to take preventive measures to avoid urban flooding in India.

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Floods and a 'preventive measure' that needs review

It has been many days since Cyclone Michuung passed, but every resident of Chennai still experiences the consequences of a slew of decisions taken for them, or on behalf of them, by an army of people.

All these choices had consequences. And so these decisions should be accounted for. Some consequences were visible and obvious, while others were hidden and subtle.

In the rains in 2015, many believed that the choice to hold off the release of water from a nearly full reservoir — until later events forced an urgent decision to do it without due warning or precautions — was what led to the most tragic outcomes of the flooding then.

Dangers in a home without power

The choice to stop electricity supply to areas where cyclonic winds can damage power cables and cause live wires to drop into flooded streets appears logical and sensible. But there is another side to this, especially when the practice is carried out as a 'preventive measure', extended across a wide area, and continued well after the natural event has passed or an accident has been reported. Homes and neighbourhoods plunged in darkness can be dangerous by themselves.

That an elderly relative can trip, fall, and break a hip is a worry as it can be as life-threatening as suffering a heart attack.

In 2021, Tamil Nadu had 13.8 crore people over the age of 60 years. Of Chennai metropolitan area's estimated 12 million-plus million population, 5,00,000 people are above this age, and over 50,000 are aged 80 or above. Many live alone, or with limited assistance. An area-wide power disruption is a significant hazard.

There are also the security and safety concerns of having no electricity in domestic households. Accidents and injuries are more likely to happen in the dark. Simple tasks become fraught, and even dangerous. Reptiles and insects could crawl into the house. So could miscreants.

The choice to turn off the electricity supply during a cyclone, and to keep it that way even



Dr. Mani Sivasubramanian is a heart surgeon, author and social entrepreneur

after the rain stops, has to be looked at in the backdrop of the facts given above. There is no objectively "safe" choice here. It is a constantly evolving, dynamic balance. And, that is why decision-makers should be held accountable for the choices they make.

Decision-making in any crisis can be emotionally challenging and psychologically stressful. When the scale of these decisions is large, and the nature of a disaster is cataclysmic, the process also becomes an extreme test of intellectual and analytical judgement, as well as that of personal strength and confidence.

The potential cost of mistakes looms large in a decision-maker's mind, which tends more often towards conservative options being preferred. And, yet, the dangers from inadequately considering the 'flip side' can lead to equally serious (even if less dramatic) complications due to inaction. Shutting off the electric supply in the event of a storm can be life-saving. But, restoring supply promptly afterwards is also vital to save lives and safeguard against terrible individual consequences.

The yardstick must be justification

A bureaucrat or government employee who has been granted executive power to decide to turn off the electricity supply power to a region, neighbourhood, street, or small area/home should be able to justify the decision and document the reasons, in real-time, in the event of a review. Just as premature restoration of power to areas with damaged cables carries the risks of electrocution and infrastructure damage, the unjustifiable extension of a power cut also has a real, and significant mortality risk for thousands of people in their own homes. However, this is not a reductionist argument.

Making tough choices in a phenomenally complex, poly-dimensional, multivariable scenario such as a natural disaster is a challenge that can be mind-numbing. And the experts tasked with making them deserve unstinted appreciation, gratitude and respect.

Some people make the disingenuous argument for more public transparency to these complicated decision-making processes. But clearly, in view of their specialised (and even confidential) nature, any such review should remain in the realm of specialists and subject-matter experts. A complex calculus should not ever be allowed to become a contest of cheap populism. The consequences of going that route during the floods in 2015 are still fresh in our memories.

Think of shared responsibility

And yet, this is not a case for elitist exclusivity either, where all decisions are from the top. In a healthy democratic system, no individual or group ought to have unfettered, unquestioned power over such choices, or be permitted to make them based on little more than a whim and fancy. It is time to hold the decision-makers accountable for their choices, especially when their choices impact the lives of millions. An 'ideal solution' may never be feasible, but we should strive towards one.

A hierarchy-based approach, with scaled levels of responsibility based on impact area or 'target population size', may work. The decision-making cell should be more granular and definitely faster, quickly developed and implemented to meet rapidly changing circumstances. Perhaps more than one person should be involved when it comes to making major decisions. In an evolving crisis, periodic review, done every few hours, by an oversight team, might help challenge and reverse questionable choices.

Regardless of the specifics, the principle at play is that a decision-maker's rationale and evidence in support of a choice or preference should be subject to review. If found indefensible or unsupported, such decisions must be overturned or modified at the earliest. And, responsibility is fixed squarely on the individual(s) who make such sub-optimal moves, even banning them from such decision-making positions in the future.

While shutting off electricity supply in an extreme weather event can be life-saving, restoring power without delay can also help avert problems for many

தமிழ்நாட்டில் கடந்த சில நாட்களாக பெய்து வரும் மழை காரணமாக சில இடங்களில் வெள்ளம் வெளியாகி உள்ளது. இதனால் சில இடங்களில் மின்சாரம் துண்டிப்பதால் மக்கள் சில சமயங்களில் பாதிக்கப்பட்டுள்ளனர். மின்சாரம் துண்டிப்பதால் மக்கள் சில சமயங்களில் பாதிக்கப்பட்டுள்ளனர். மின்சாரம் துண்டிப்பதால் மக்கள் சில சமயங்களில் பாதிக்கப்பட்டுள்ளனர்.

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Dangers In A Home Without Power

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- Simple tasks become fraught and even dangerous. Reptiles and insects could crawl into the house. So could miscreants.
- The choice to turn off the electricity supply during a cyclone, and to keep it that way even after the rain stops, has to be looked at in the backdrop of the facts given above.
- There is no objectively “safe” choice here. It is a constantly evolving, dynamic balance. And, that is why decision-makers should be held accountable for the choices they make.
- Decision-making in any crisis can be emotionally challenging and psychologically stressful.
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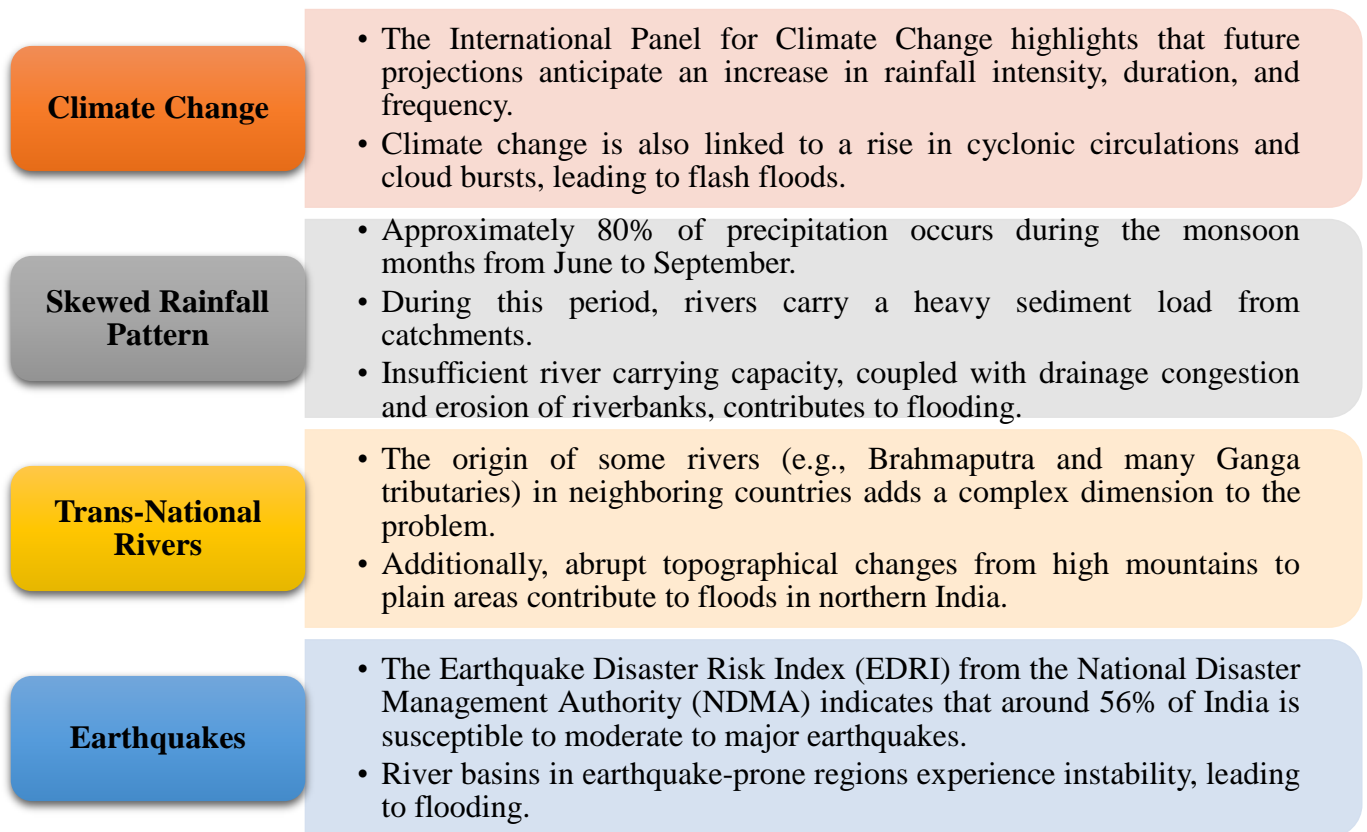
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Factors Contributing to the Rise in Floods

Natural Causes



Human Causes



- **Unplanned Development:** Factors such as unplanned development, encroachments in riparian zones, failure of flood control structures, haphazard reservoir operations, inadequate drainage infrastructure, deforestation, land-use changes, and sedimentation in riverbeds worsen floods. Heavy rainfall can breach embankments, destroying settlements along riverbanks and sandbars.
- **Urban Flooding:** Recent urban flooding results from intensified heavy rainfall in short periods.
 - This issue is exacerbated by unchecked encroachment on waterways and wetlands, insufficient drain capacity, and poor maintenance of drainage infrastructure.
 - Inadequate waste management further compounds the problem by blocking drains, canals, and lakes, while poorly planned road projects disrupt flood flows.

- **Neglect of Pre-Disaster Planning:** Historical flood management has primarily focused on post-flood recovery and relief.
 - Many reservoirs and hydroelectric plants lack sufficient gauging stations for measuring flood levels, a crucial element in flood prediction and forecasting.

What precautions do we take during floods in urban areas?



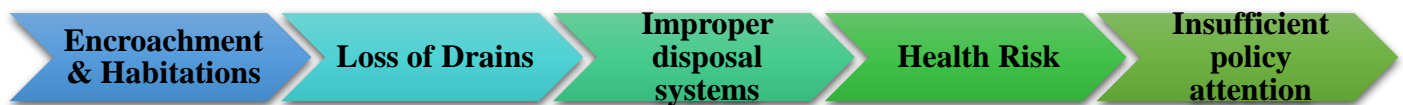
Impacts of Floods in India



- **Loss of Life:** Floods in India can lead to fatalities resulting from drowning, injuries, infections, or electrocution.
 - The National Disaster Management Authority (NDMA) identifies floods as one of the most frequent and lethal natural disasters in the country.
 - On average, 1,600 lives are lost annually due to floods.
 - By mid-2023, North India alone has confirmed at least 60 deaths caused by floods, though the actual toll might be higher.
- **Damage to Property:** Floods have the potential to damage or destroy various infrastructures, including houses, buildings, roads, bridges, railways, power lines, and communication networks.
 - Additionally, floods can harm or wash away crops, livestock, vehicles, and other assets.
 - NDMA reports that floods affect approximately 75 lakh hectares of land, causing damage amounting to Rs 1,805 crore to crops, houses, and public utilities each year in India.
 - In 2023, floods have extensively damaged prominent landmarks in Delhi, such as the Red Fort and the Supreme Court.
- **Displacement of People:** Floods force people to evacuate their homes, seeking shelter in safer locations, disrupting their normal lives and livelihoods.
 - This displacement can lead to humanitarian crises, affecting access to food, water, sanitation, healthcare, and education.
 - According to the Internal Displacement Monitoring Centre, floods displaced about 5.4 million people in India in 2020.
 - In 2023, floods have displaced thousands of individuals in North India, particularly in Himachal Pradesh and Punjab.
- **Environmental Degradation:** Floods can have adverse effects on the environment by eroding soil, altering natural habitats for flora and fauna, polluting water sources, and increasing the risk of landslides and epidemics.

- Additionally, floods can impact the ecological balance of rivers and wetlands, changing their hydrology and biodiversity.
- For instance, floods can pose a threat to the survival of endangered species like the Gangetic dolphin and the gharial in the Yamuna River.
- **Economic Losses:** Floods can significantly impact India's economic growth and development by reducing agricultural output, disrupting industrial production, affecting trade and commerce, and increasing expenditures on relief and rehabilitation.
 - The tourism sector is also susceptible to damage, with floods harming cultural heritage and natural attractions. According to a World Bank study, floods cost India approximately \$14 billion annually in direct losses.

Urban Challenges & Floods in India



- **Encroachment & Habitations:** The issue of encroachment is prevalent in numerous cities and towns. Over thousands of years, natural streams and watercourses have evolved in their respective watersheds due to the forces of flowing water.
- **Loss of Drains:** Ideally, the natural drains should have been expanded, similar to widening roads for increased traffic, to accommodate higher flows of stormwater.
- **Improper disposal systems:** A significant contribution to the reduction of drain capacities comes from improper disposal of solid waste, encompassing domestic, commercial, and industrial waste. Dumping construction debris into the drains also plays a significant role.
- **Health Risk:** Floods heighten the potential for infectious disease outbreaks. Areas affected by floods become more susceptible to disease outbreaks, particularly after the floodwater recedes. The surge in diseases occurs as floodwater mixes with sewage water and various contaminants.
- **Insufficient policy attention:** Despite decades of experiencing urban flooding in India, there has been a lack of adequate attention to planning specific efforts to address this issue.

Decision-Making

Importance of decision-making during natural disasters was highlighted by the aftermath of the 2015 floods in Chennai. Delayed release of water without adequate warning exacerbated flooding. Need for a meticulous evaluation of preventive measures to avoid repeating past mistakes. Vulnerabilities in communication and preparedness exposed, emphasizing the importance of a comprehensive and proactive strategy. Continuous learning process required for effective crisis management.

Unintended Consequences of Power Disruption

- Decision to cut electricity in cyclone-prone areas seems reasonable but raises concerns when extended as a preventive measure.
- Prolonged power outages pose significant risks beyond immediate safety.
- Considerable elderly population in Tamil Nadu, making power disruptions hazardous.
- Potential for accidents, injuries, and security concerns necessitates a nuanced decision-making process.
- Addressing mental health aspects associated with disrupted daily life integral to overall community well-being.

Balancing the Need for Safety

- Decision-making during a crisis demands a delicate balancing act between safety measures and timely restoration of essential services.

- Striking a balance crucial for effective crisis management.
- Pressure to make decisions under extreme circumstances requires consideration of immediate and long-term repercussions.
- Decision-making process evolves with changing dynamics of a crisis.
- Importance of adaptability, openness to feedback, and adjustment of strategies in real-time.

Accountability in Decision-Making

- Bureaucrats or government officials granted executive power should justify and document decisions in real-time.
- Accountability extends beyond individual decision-makers to organizational structures and systems.
- Regular audits, transparent reporting mechanisms, and public disclosure contribute to a culture of accountability.
- Lessons learned from past events inform continuous improvement initiatives.
- Accountability integral to decision-making processes reinforces public trust.

Challenges in Decision-Making

- Decision-making in crisis situations is emotionally and psychologically challenging.
- Striking a balance between caution and necessary action imperative.
- Communication, coordination, and resource allocation present additional complexities.
- Public expectations add pressure on decision-makers.
- Training programs, psychological support mechanisms, and collaborative efforts crucial for robust decision-making framework.

Transparency vs. Specialized Decision-Making

- Calls for transparency met with resistance due to the specialized and confidential nature of crisis management.
- Balance between public transparency and expert judgment crucial to prevent decision-making from devolving into cheap populism.
- Clear guidelines and communication strategies required for maintaining the right balance.
- Transparency viewed as a tool for accountability and public understanding.
- Safeguarding integrity of the decision-making process while providing accurate and timely information.

Shared Responsibility and Democratic Accountability

- Decision-making process should involve collaboration and shared responsibility.
- Inclusivity, periodic reviews by oversight teams, and accountability mechanisms integral to the decision-making process.
- Involvement of local communities, NGOs, and government agencies enhances effectiveness of preventive measures and response strategies.
- Democratic accountability requires a balance between expert judgment and community involvement.
- Collaborative decision-making framework establishes democratic process as a driving force for resilience and inclusivity in crisis management.

Way Forward



Disaster Preparedness Plan

- Comprehensive flood management plan incorporating disaster preparedness needed.
- Strengthening components like Flood Hotspot Mapping at local and regional scales.
- Managing and regulating riparian zones to prevent spilling and erosion.
- Implementing river flood modeling for incidents like reservoir breach and emergency water release.
- Utilizing advanced techniques such as satellite imagery and Geographic Information Systems for flood early warning systems.

Integrated Approach

- Implementing watershed management through an integrated approach.
- Combining hard engineering solutions (dams, culverts, dykes, channel widening) with ecologically sustainable soft solutions.
- Hard solutions involving civil engineering constructions to store and divert water, increasing lag time downstream.
- Ecological soft solutions including riparian zone restoration and afforestation along river channels to retain rainwater and reduce river discharge.
- Understanding river patterns, especially during monsoon, for an integrated flood management approach.

Prioritising Buffers, Flexibility, and Adaptability

- Reviewing safety criteria of dams and canals.
- Rebuilding with higher safety factors and creating new intermediate storages.
- Introducing dynamic reservoir management for improved flood control.
- Reducing Disaster Risk Reduction:
- Efficient implementation of Sendai Framework for Disaster Risk Reduction.
- Aiming to reduce vulnerability to disasters through strategic planning and action.

Focusing on Urban Flood Management

- Addressing the increasing severity of urban flooding and escalating losses annually.
- Exclusive attention to the subject of urban flooding is crucial.
- Proper implementation of NDMA guidelines on Urban Flooding 2016 is essential for effective urban flood management.