

# RSTV

## PERSPECTIVE: URBANISATION & FLOODS



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### Context

- As **urbanisation is intrinsic to development**, India is in transitioning phase where people are migrating from rural to urban areas. However, the recent examples of the 2015 floods in Chennai, the 2020 floods in Hyderabad and the 2022 floods in Bengaluru reflect that India's urban machinery has not evolved at the pace of urbanisation and technological achievements.
- Inundated roads, waterlogged streets, tractors ploughing through **flooded localities** ferrying people, such kind of mayhem caused by heavy rains in Bengaluru. This was the highest rainfall in the last 42 years, leading to all 164 tanks in Bengaluru being filled to the brim.
- This ponders the question of the management and planning of the state government concerning land use, sewage system, solid waste management, etc in the urban areas.

### Urban Flooding

- Urban flooding is the **accumulation of floodwaters** that results when the inflow of stormwater exceeds the capacity of a drainage system to infiltrate water into the soil or to carry it away.
- When a natural landscape is transformed by urban development, its **drainage pattern is disturbed**.

### Causes of Urban Flooding in India

- **Metrological Factors:** India being a tropical country, has very heavy rainfall throughout the monsoon season. Changing climate and increased precipitation had a huge role to play in the devastating floods that happened across central Indian states, including the 2006 and 2017 Mumbai floods.
- **Hydrological Factors:** Flood risk arises when the surface runoff is more than the infiltration rate during precipitation. The infiltration rates depend upon the type of soil and their respective water retention capacity. Topography plays a major role in carrying the runoff water outside urban areas. Usually, a combination of two or more of the following factors: extreme climate-related events, unplanned development in the catchment area and under-capacity natural drainage blocked stormwater drainage system, is the major cause of the urban flooding
- **Human Factors:** Human intervention in the natural environment has increased the urban flood risk. These anthropogenic factors can be a direct result of Urbanization coupled with encroachments, and pollution which causes interference in the smooth flow of water in the drainage channels.

### Impact of Urban Flooding

- **Tangible Losses:** The losses that can be measured physically and can be assigned an economic value. These losses can be direct or indirect. Direct - Structural damage to buildings, property damage, damage to infrastructure. Indirect - Economic losses, Traffic disruption, and emergency costs.
- **Intangible Losses:** Intangible losses include loss of life, secondary health effects, and infections or damages to the environment which are difficult to assess in monetary terms since they are not traded. Direct - casualties, Health effects, ecological losses. The indirect – post-flood recovery process, mental damage to the people.

Every year during monsoon season, India witnesses the problem of urban flooding in one or two metro cities. The authorities usually blame it on the unprecedented rainfall pattern i.e., extreme weather events. This unprecedented rainfall has caused mayhem which is not just causing inconvenience for the community but also taking away lives of people.

### What factors are aggravating this crisis?

- Cities are the engine of happiness and economic activities unfortunately many cities in the country are facing such kinds of situations like flooding during heavy rains and so on. On the other hand, this very water can become a boon to the city if properly allowed to flow and stored systematically.
- Since, state governments have not been able to manage either the **planning** or the **maintenance** aspect of the rainwater flow and this is what causing this havoc.
  - **Drainage:** The regular clearing of the drainage system is required for metro cities like Bengaluru. This low maintenance is one of the factors causing such problems.
  - **Solid waste:** Although with the prolonged campaigns from the union government, many cities are yet not able to manage solid waste disposal. This waste clogs the drain pipes and causes floods in urban areas.
  - **Water bodies:** A city like Bengaluru with water bodies like a lake needs the maintenance of a natural drainage network for the flow of water into and out of the lake.

- **Regional planning:** The lack of medium-term regional level drainage planning for flooding or drainage.
- **Expansion:** The metro cities are expanding vertically and not horizontally this is another reason for increasing floods in urban areas.

The rate of urbanization that India currently is witnessing is in a state of transition. Wherein urbanization perhaps is at a very fast pace, the infrastructure upgradation is not able to keep pace with this rapid pace of urbanization.

#### The increasing urbanisation will further increase this problem

- The cities are the engine of growth and will certainly grow more in the coming times.
- Many experts called urban flooding a **manmade disaster** not because it is caused by humans but because it can be prevented with efficient management and planning.
- Hence, the responsibility is over municipal corporations for appropriate waste management systems.

The events of urban flooding have become an increasingly regular phenomenon worldwide. There is a need to design or reinvent management and maintenance systems in a way to be able to cope with the changing climate patterns.

#### How challenging it would be for the urban planners in India?

- The major challenge in India is the approach. At present, Indian cities in response to disasters like urban flooding are more about **post-disaster response** rather than **building resiliency** in the urban system and the transportation system.
- By such approach least focus is given to improving the **adaptability** to this ever-growing situation of extreme rainfall events.

Currently, India has the second largest urban system and, in the years, to come, half of India's population is going to be living in cities therefore this problem requires immediate attention. Unfortunately, this was not reflected in NITI Aayog's report released in 2021 – which says, 65% of the urban settlements in India do not have a master plan and perhaps urban planning has not received the kind of attention that it requires for India to become a developed nation by 2047.

#### What should be the way ahead?

- There is a need to develop a master plan or **revisit the existing master plans** by taking note of climate change.
- Cities like Bengaluru also known as the hub of economic activity is well known for their achievements in term of IT. Planners and architects of such cities will have to come together and exchange ideas and find a solution.

#### How technology should be used in addressing challenges like urban flooding?

- There are **two aspects of the preventive approach** to urban flooding mitigation:
  - One, how to reduce the risk of flooding: Metro city like Bengaluru faces major challenge like **land use**. There are significant studies on this aspect but the authorities could not able to utilise them to their fullest.
  - Second, accepting that despite the best-efforts disasters can take place: Urban flooding can take place, and there is a need to gear up and prepare to manage.
- **Using artificial intelligence (AI)** to reduce urban flooding: **CENTAUR™** is one such example where its intelligent autonomous system for local urban flood risk reduction, is installed in combined sewer systems in flood-prone areas. Combined sewer systems not only collect waste but are designed to drain excess rainwater. Urban

flooding occurs when the sewer overflows during short periods of intense rainfall because the capacity in that area is full.

keeping the risks in mind and the challenges of limited land, and the fast-increasing population in India, these are problems that it will continue to face.

#### What more needs to be done?

- The important understanding a state should develop through scientific study is the **urban capacity** in terms of the population it can hold, the available space, water & power supply, and traffic carrying capacity on road.
- Another thing to understand is the **scientific infrastructure development**. For example, the construction of a white-top road in Bengaluru by laying the concrete slab on the existing black-top road has increased the level of the road but by such raising the level of the adjoining properties goes down.
- The above two factors should take into consideration by the state governments in controlling this menace.

Incidents like urban flooding not just impact life but also livelihoods. As per the reports, the IT companies in Bengaluru lose Rs. 225 crores per day because of incidents like urban flooding. So, all of this accumulates an impact on economic growth. That is why permanent and immediate solutions are that all stakeholders must have to think about.

<https://sansadtv.nic.in/episode/perspective-unplanned-urbanization-and-flood-impacts-6-september-2022>



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