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Q15

**The frequency of urban floods due to high intensity rainfall is increasing over the years. Discussing the reasons for urban floods, highlight the mechanisms for preparedness to reduce the risk during such events.**

UPSC Civil Services Mains 2016 · GS III · 12 marks · Environment and Conservation

Conservation, environmental pollution and degradation, environmental impact assessment.

**Core demand of the question**

- Give reasons why intense rain now floods Indian cities more often
- Separate climate, drainage, and planning causes
- Highlight preparedness mechanisms that cut risk when such rain falls

**Revision summary**

Heavier rain bursts, sealed soil, lost lakes, and undersized, clogged drains explain more frequent urban floods.

Coastal tides and split civic agencies make outfall and response worse.

NDMA urban-flooding guidelines ask for drainage maps, early warning, and pre-monsoon works.

Preparedness is desilting, pumps, land-use rules, and a joint control room, not only boats.

Community alerts and protected wetlands cut loss more cheaply than post-flood compensation.

**Introduction**

Urban floods are not only a river leaving its bank. They are **streets that become channels** because rain cannot sink or drain. **Mumbai (2005)** and **Chennai (2015)** showed that a few hours of extreme rain can stop a metro economy. Frequency is rising because **heavier bursts, sealed ground, and blocked drains** now meet in the same hour. Preparedness is the set of actions **before** that hour.

**Body****Reasons for urban floods**

- **High-intensity rainfall:** climate change and urban heat can raise the chance of short, violent showers that exceed the design storm of old drains.
- **Concretisation:** parking lots, compounds, and flyovers cut infiltration; every millimetre becomes runoff.
- **Encroachment of lakes, wetlands, floodplains, and storm channels:** Chennai's wetlands and Mumbai's Mithi are textbook losses of natural storage.

- **Drains designed for a milder city:** sections are too small, too flat, or mixed with sewer; **solid waste** and construction debris silt the remaining capacity.
- **Unplanned growth** on low-lying reclaimed land without raising plinths or leaving waterways.
- **Tidal lock:** in coastal cities, rain at high tide cannot outfall to the sea.
- **Broken institutions:** storm water, sewer, roads, railways, and the development authority do not share one map; a metro wall or a gated layout can dam a ward.
- **Loss of tanks and palas** in peninsular cities that once buffered the monsoon.

### Mechanisms for preparedness to reduce risk

- **Hazard and drainage mapping:** a ward-level map of low spots, outfalls, and encroachments, updated after each monsoon, as asked in the **NDMA Guidelines on Urban Flooding (2010)**.
- **Early warning:** India Meteorological Department nowcasts and Doppler radar, plus **mobile alerts** to ward officers and the public a few hours ahead.
- **Operation of pumps and gates:** pre-monsoon desilting, tested pumps at outfalls, and tidal-gate drills - not a first switch-on during the storm.
- **Land-use and building rules:** no construction on storm drains; compulsory **rainwater harvesting**, permeable parking, and **minimum recharge**; raised plinths in marked zones.
- **Restore storage:** protect remaining lakes and floodplains; **sponge** parks and detention basins in new layouts.
- **Solid-waste discipline** before the monsoon so plastic does not plug grates; fines that are actually collected.
- **Integrated command:** municipal commissioner, police, fire, power, and railways in one flood-control room with a common radio and a list of shelters.
- **Critical infrastructure:** hospitals, substations, and telecom on high ground or with backup power and sandbag drills.
- **Community preparedness:** resident welfare associations know the ward shelter, the boat or tractor owner, and the disabled neighbours; school mock drills.
- **Insurance and relief Standard Operating Procedures** so shopkeepers are not wiped out twice - once by water and once by delay.
- **After-action:** every major flood must change the drain drawing, not only the compensation list.

### What "preparedness" is not

- It is not only NDRF boats after the water is chest-high.
- It is not a flyover that becomes a new dam.
- It is a **pre-monsoon calendar** with named officers and a published drain-cleaning audit.

### Flow diagram

High-intensity rain -> Urban flood  
Concrete encroach silted drains -> Urban flood  
Maps nowcast desilt pumps -> Lower risk  
Protect wetlands sponge rules -> Lower risk  
One flood control room -> Lower risk

## Conclusion

Urban floods rise because intense rain hits sealed, encroached, and poorly drained cities. Reasons are climatic and, even more, planning failure. Preparedness is NDMA-style mapping, nowcasts, desilting and pumps, lake protection, building rules, one command room, and community drills. Reduce risk in the dry months; rescue is what remains when those months were wasted.

## Facts & figures

### NDMA Urban Flooding 2010

National guidelines that treat urban flood as a distinct hazard and ask cities to map drains, warn, and prepare before the monsoon.

### Mumbai 2005

26 July deluge that exposed Mithi encroachment, drainage failure, and the cost of a stalled megacity.

### Chennai 2015

December floods linked to extreme rain and loss of wetlands and storm-water paths.

### Nowcast

Very short-range IMD warning of intense rain, useful only if it reaches ward staff and the public in time.

### Sponge measures

Parks, tanks, permeable surfaces, and rainwater harvesting that store or sink water instead of sending it all to a pipe.

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