URBAN FLOODS: GEOGRAPHY

NEWS: Why the city witnesses flooding and waterlogging almost every year

WHAT'S IN THE NEWS?

Bengaluru's recent flooding highlights the failure of outdated drainage systems amid rapid urbanization and increasing rainfall. Effective solutions require modern infrastructure, green urban planning, and community-driven flood resilience strategies.

Context: Urban Flooding in Bengaluru

- Bengaluru experienced severe waterlogging and traffic disruption due to heavy rains.

- Environmentalists highlighted the failure of the city's outdated and under-capacity drainage systems.

- The intensity of rainfall and the city's growing population have overwhelmed existing infrastructure.

What are Floods?

- Floods are natural disasters caused when water submerges land that is usually dry.

- They are the most common type of natural disaster globally.

Types of Floods

- *Flash Floods*: Sudden, intense rainfall causes rapid water level rise, affecting roads, streams, and small rivers.

- *River Floods*: Result from prolonged rainfall or snowmelt, causing rivers to overflow.

- *Coastal Floods*: Caused by storm surges from cyclones or tsunamis, submerging coastal regions.

- *Urban Flooding*: Triggered by development that replaces natural soil with impermeable surfaces, increasing runoff and water stagnation.

Causes of Urban Flooding

- Sudden heavy rainfall within a short span leading to rapid water accumulation.

- Obstructed or inadequately sized stormwater drains unable to discharge water efficiently.

- Encroachment upon natural drainage channels, lakes, and wetlands.

- Deforestation and shrinking green spaces reduce natural water absorption.

- Unplanned urbanization without considering topography and drainage needs.

- Aging and unmaintained infrastructure, unsuited for present-day urban pressures.

Solutions to Mitigate Urban Flooding

- *Infrastructure Upgrade*: Modernize and regularly maintain drainage systems for better stormwater management.

- *Wetland and Lake Protection*: Conserve and revive water bodies that act as natural sponges.

- *Green Infrastructure*: Promote urban solutions like rain gardens, green rooftops, and permeable pavements.

- *Urban Zoning*: Prohibit or regulate construction in low-lying and flood-prone areas.

- *Rainwater Harvesting*: Encourage water collection systems to reduce surface runoff.

- *Solid Waste Management*: Prevent waste from clogging drains and facilitating water stagnation.

Government Initiatives

- *Swachh Bharat Mission (Urban)*: Tackles solid waste management and sanitation to reduce urban waterlogging.

- *Smart Cities Mission*: Encourages cities to adopt rainwater harvesting, green spaces, and efficient drainage.

- *AMRUT*: Focuses on upgrading urban water supply, sewerage, and stormwater systems.

- *Regulatory Guidelines*: Promote sustainable urban planning with eco-friendly features like permeable pavements and retention ponds.

Global Best Practices and Models

- *Singapore*: A global benchmark for integrated urban water management and flood control despite high rainfall.

- *China's Sponge Cities Initiative*:

    - Cities are restructured to absorb and reuse rainwater.

    - Utilizes permeable pavements, green belts, and rain gardens.

- *New York City – The Big U Project*:

    - Coastal flood protection with raised parks, floodwalls, and berms.

    - Dual-use public spaces serve as recreational areas and flood barriers.

- *Tokyo, Japan – Underground Floodwater System*:

    - World's largest flood diversion system with vast underground tunnels.

    - Designed to manage typhoon rains and river overflows.

Conclusion

- Urban flooding in India needs a multi-pronged approach combining:

    - Engineering solutions (like drainage upgrades and underground storage),

    - Smart and sustainable urban planning,

    - Integration of real-time monitoring and predictive technologies,

    - Active participation from local communities and stakeholders.

- This integrated strategy is essential to develop flood-resilient cities in the face of climate change and rapid urbanization.

Source: https://indianexpress.com/article/explained/bengaluru-rains-frequent-flooding-waterlogging-10019529/