Urban Flooding

For Prelims: Urban Flooding, Rainfall, Rural floods, **Drainage System,** Wetlands, Climate Change, Sewage and solid waste, Illegal Mining, **Riverbank Erosion.**

For Mains: Urban Flooding, Causes and Curtailment.

Source: PIB

Why in News?

There has been an increased incidence of high intensity **Rainfall** in short duration, causing **Urban Flooding** which is further compounded by **unplanned growth, encroachment of natural water bodies**, and Poor Drainage System.

What is Urban Flooding?

- **About:**
  - Urban flooding is the **inundation of land or property in a built environment,** particularly in more densely populated areas (like cities), caused by rainfall overwhelming the capacity of drainage systems.
  - Unlike **Rural floods** (Heavy rain over a flat or low-lying area), urban flooding is not only caused by just higher precipitation but also unplanned urbanisation (catchments) that:
    - Increases the flood peaks from 1.8 to 8 times
    - Increases the flood volumes by up to 6 times.
- **Causes:**
  - **Encroachments on Drainage Channels**: Due to **increased land prices and less availability of land** new developments have come up in low-lying areas of cities, such as encroachments **over lakes,** Wetlands and riverbeds.
    - Ideally, the natural drains should have been widened to accommodate the higher flows of stormwater.
    - But on the contrary, there have been large **scale encroachments without widening** the natural drains, leading to decrease in the capacity of the **natural drains resulting in flooding.**
  - **Climate Change:** Climate **Change** has caused an **increase in the frequency** of short duration heavy rainfall leading to higher water run-off.
    - Whenever the rain bearing clouds pass over the urban heat island, the hot air pushes the clouds up, **resulting in highly localised rainfall** which may sometimes be of high intensity.
  - **Uninformed Release of Water from Dams:** Unplanned and **sudden release of water from dams** and lakes lead to floods in an urban area, without giving the public enough time to respond.
    - Example: Chennai Floods 2015 due to release of water from Chembarambakkam Lake.
    - **The July 2023 flood in Delhi** was magnified by 2 lakh cusecs of **water**

discharged from the Hathnikund Barrage into the Yamuna river.

- **Illegal Mining:** Illegal **mining** of river sand and quartzite for use in building construction **deplete the natural bed of the rivers** and lakes.
  - It causes soil erosion and reduces the water retention capacity of the waterbody increasing the speed and scale of water flow.
  - Example: Jaisamand Lake- Jodhpur, Cauvery river- Tamil Nadu.

What are the Implications of Urban Flooding?

- **Loss of Life and Property:**
  - Urban floods are often **associated with loss of life and physical injury** either directly due to the effect of floods or indirectly due to infections by water-borne diseases spreading during the inundated period.
- **Ecological and Environmental:**
  - Trees and plants are **washed away during extreme flood** events and **riverbank erosion** is caused by high-speed flood water.
- **Impact on Animal and Human Health:**
  - Stagnation of stormwater in the localities, and **Contamination of consumable water** leads to various health problems resulting in plagues/epidemics.
  - The **sewage and solid waste** washing into houses and neighborhoods also causes a variety of diseases to spread.
- **Psychological Impacts:**
  - Loss of shelter and relatives creates emotional turmoil in the mental health of the stranded. The recovery process in case of such incidents is a tiresome process and time consuming that often leads to long lasting psychological trauma.

What are the Government Initiatives to Curtail Urban Flooding?

- **Jal Shakti Abhiyan (JSA)**
- **Amrit Sarovar Mission**
- **Atal Bhujal Yojana**
- **Atal Mission for Rejuvenation and Urban Transformation (AMRUT) 2.0**
- **Model Building Bye Laws (MBBL), 2016**
- Standard Operating Procedures (SoPs) on Urban Flooding by MInistry of Housing and Urban Affairs.

Way Forward

- Implement sustainable urban planning practices that **prioritize green spaces, retention ponds,** and permeable surfaces to absorb and manage stormwater. Avoid construction in flood-prone areas and preserve natural drainage systems.
- Invest in upgrading and **expanding drainage infrastructure,** including natural drains, stormwater channels, and flood-control systems. Regular maintenance and cleaning of drains are essential to ensure effective water flow.
- Identify and map **flood-prone areas and develop appropriate floodplain** management strategies. Restrict construction and development in these vulnerable zones to reduce the risk of flooding.
- Establish and improve **Early Warning Systems** to alert residents about impending floods. Timely warnings can help people evacuate and take necessary precautions.