

Urban Flooding

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

For Mains: Urban Flooding, Causes and Curtailment.

Source: PIB

Why in News?

There has been an increased incidence of high intensity <u>Rainfall</u> in short duration, causing <u>Urban</u> <u>Flooding</u> 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 <u>Rural floods</u> (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, <u>Wetlands</u> 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 <u>Change</u> 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 <u>sudden release of water</u> 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 <u>riverbank</u> <u>erosion</u> is caused by high-speed flood water.

■ Impact on Animal and Human Health:

- Stagnation of stormwater in the localities, and <u>Contamination of consumable water</u> leads to various health problems resulting in plagues/epidemics.
- The <u>sewage and solid waste</u> 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 floodprone 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 <u>Early Warning Systems</u> to alert residents about impending floods. Timely warnings can help people evacuate and take necessary precautions.

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