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Sponge Cities

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Why is in news? What are China's 'sponge cities' and why aren't they stopping the floods?

China has been hit by devastating floods in recent weeks, inundating cities and causing deaths and infrastructural damage, as well as raising questions about the effectiveness of its 2015 "sponge city" initiative aimed at reducing urban flood risks.

The initiative was launched to boost flood resilience in major cities and make better use of rainwater through architectural, engineering and infrastructural tweaks.

About:

Sponge city is a **new urban construction model for flood management**, and to strengthen ecological infrastructure & drainage systems.

This concept was **proposed by Chinese researchers in 2000**.

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Sponge city

SCHEMATIC DIAGRAM OF THE SPONGE CITY CONCEPT



Rather than using concrete to channel away rainwater, you work with nature to absorb, clean and use the water in a sponge city.

This system helps in alleviating urban flooding, urban heat island effect and water resources shortage.

It also improves the ecological environment and biodiversity by absorbing & capturing rain water and using it to reduce floods.

Sponge city policies are **nature-based solutions**, which use natural landscapes for catching, storing and cleaning water.

This concept was **inspired by ancient wisdom of adaptation to climate challenges**, specifically in monsoon world.

Sponge Cities Mission – In India:

The main idea of the sponge city is to **make cities more permeable** in order to hold and use water which falls upon it.

These can all be **delivered effectively by an urban mission along the lines** of National Heritage City Development & Augmentation Yojana (HRIDAY), Atal Mission for Rejuvenation & Urban Transformation (AMRUT), and Smart Cities Mission.

Need of Sponge Cities Mission in India:

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Urban flooding has become recurring phenomenon in Indian metros.

India's Land policy has not been effective in managing or controlling the recurrence of major floods in urban areas.

Urban cities lack proper drainage network.

Concrete structures in urban cities are causing water wastage.

Key issues:

Less water available in urban and peri-urban areas.

Polluted water discharged into rivers or the sea.

Degradation of urban ecosystems and green areas due to sprawling.

Increase in the intensity and frequency of urban flooding particularly considering predicted increase in extreme weather events due to climate change.

Benefits:

Every raindrop is captured, controlled and reused in Sponge cities.

It helps in **recharging the depleted aquifers** or irrigate gardens and urban farms.

Water saved through sponge cities mission can be **used to replace the drinking water** which is used in flush toilets and for cleaning purposes.

Water can even be processed further to make it **clean enough to be used for drinking**.

Sponge cities absorb the rainwater, which is then **naturally filtered by the soil and** allowed to reach urban aquifers.

This allows for the extraction of water from the ground through urban or peri-urban wells.

Reduction in flood risk

Lower burdens on drainage systems, water treatment plant, artificial channels and natural streams.

Greener, healthier, more enjoyable urban spaces.

Enriched biodiversity around green open spaces, wetlands, urban gardens and green rooftops

China's Sponge Cities:

According to 2018 data, 641 out of 654 large- and medium-sized cities in China were **vulnerable to flooding and waterlogging**, with 180 facing flood risks every year.

China has long sought to improve the way it handles extreme weather, and make highly populated cities less vulnerable to flooding and drought.

The "sponge city" initiative was designed to make greater use of lower-impact "nature-based solutions" to better distribute water and improve drainage and storage.

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Flooding is also a huge problem. Climate change is causing heavier rainfall and storms, affecting large areas of southern China including the Yangtze basin and its tributaries.

In July 2021, the Chinese city of Zhengzhou, Henan, battled the heaviest rain in a millennia and devastating floods that killed at least 300 people and displaced 1.24 million residents.

Studies show that **many of the local pilot initiatives** launched so far have had a positive effect, with low-impact projects like green roofs and rain gardens reducing run-offs.

But implementation has so far been patchy. A **total of 30 pilot sponge cities were selected in 2015 and 2016**. By last year, only 64 of China's 654 cities had produced legislation to implement sponge city guidelines, researchers said in January.

Conclusion:

We can learn to live with nature, we can regulate human conduct through the state and we can strategically design where we build.

We need to urgently rebuild our cities such that they have the sponginess to absorb and release water without causing so much misery and so much damage to the most vulnerable of our citizens, as we have seen.