

Strategies for tempering urban floods in Indian cities

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Abstract :

Bangalore, like many other cities in India, has been in the news for flooding in the eastern zones, causing damage to properties, severe traffic congestion and loss for IT companies in September 2022. Even earlier, water logging has been witnessed in many other parts of the city. Urban flooding is becoming more common in Indian cities in the recent decades. The most notable amongst them chronologically from 2000 to 2019 are Hyderabad, Ahmedabad, Delhi, Chennai, Mumbai, Surat, Kolkata, Jamshedpur, Delhi and Guwahati and Delhi, (Floods, n.d.) Jaipur in 2012, Chennai in 2015, Bangalore, Hyderabad, Gurugram in 2016 and Patna in 2019. From the above data, it is evident that it is not just the coastal cities or the metro cities, but many other tier II cities also are facing the challenges of urban floods.

Keywords :

Urban floods

1.Reasons for urban floods and measures to temper

According to Dr. Kapil Gupta, Professor, IIT Bombay, urban flooding is caused by three main factors: meteorological - heavy rainfall and storms; hydrological- high tides and human factors- changes in land use, sealing of surfaces, urban heat island (Gupta D. K., 2016). The causes of urban flooding may be different in different cities, but in recent decades, it is mainly due to human factors like construction on flood prone zones and deforestation for urbanization to name a few.

2.Increasing drainage capacity

The drainage capacity of Indian cities has not been able to keep up with urbanization and water supply. Indian cities need integrated planning with scientific data and technology that takes care of water supply and drainage into the urban planning process. (Gupta K. , 2005)

3.Removing and preventing encroachments on catchment areas

In the case of Bangalore, heavy encroachments on lake beds is an important reason for regular urban flooding. Also, storm water drains are not connected to water bodies. The city planning process has to respect and conserve these ecological features.

4.Increasing the porosity of urban surfaces

Urbanization is increasing the hard, non-porous urban surfaces which makes it impossible for storm water to soak inside the earth. Urban design measures, which include a combination of hard surfaces along with landscape planters along street and, using newer permeable urban materials will prove to be beneficial.

5.Policies for green spaces

In the absence of green policy, felling of trees for metro construction across cities, especially Bangalore and for the expansion of roads or for other construction purposes is becoming common. Strategies for increasing plantations like avenue planting (which Bangalore traditionally has) and cluster planting might help soak the excess rainwater.

6.Conserving large parks

We can all agree how environmentally beneficial the size and presence of Central Park (3.41 sq km), Sanjay Gandhi National Park(82 sq km) Maidan Garden (4 sq km) are for New York, Mumbai, and Kolkata respectively. The latter is under pressure for development from all sides (including proposals for construction of a road, underground tunnel, and ropeway).

Central Park in New York is highly competed land and has a lot of pressure for development, but political will and activism has saved it. The Conservancy model of Central Park is a great example of maintaining a public park with endowments from different agencies. Such models will help identify open spaces and parks as valuable economic resources as well, apart from being a valuable ecological resource.

Even though there is a lot of developmental pressure on green patches of land, or just vacant land, it is very important that cities conserve these natural spaces and work policies around maintaining them. Garden Cities of tomorrow may have failed on different accounts, but the inherent merit is that the larger city has a neighbouring countryside with open, green spaces that the city has access to, both for ecological and public functions.

7. Mitigating urban heat island and climate change through afforestation

In recent times, high intensity rainfall in a short duration (believed to be due to climate change), is causing flash floods in many Indian cities. As a long-term plan, cities may look at afforestation as one of the strategies to mitigate this. Some cities like Chennai are adopting the Miyawaki technique (planting indigenous trees in a dense manner about 60cm apart). Bangalore also started investing in Miyawaki forests from November 2018 on Hejjala, Mysore Road. 25 such forests have been created in Bangalore across various locations (Khanna, 2021). But critics argue that this technique

might not be suitable for tropical foliage, because our natural forests are not very dense and our vegetation is not always tall and straight, but lush and spreading.

Still, it is important that forests in urban areas must be protected, as they are a mirror to local geography, flora and fauna, and help to regulate local climate (Rao, 2021).

8. Sponge city concept of China

Proposed by Professor Kong Jian Yu in 2013, sponge city is a nature-based solution to make cities absorb and retain rainwater, preventing flooding and solving water problems. Qunli stormwater park in China is a successful example of a Sponge city and may be considered as a model for Indian cities.

9. Holistic planning

Urbanization should not be all about building. It has to be about unbuilding as well. A hierarchy must be followed for planning cities. To start with, conserving the natural regional settings should be regarded as the most important step and secondly, the heritage (tangible and intangible). Then, cities should also invest in the creation of adequate open spaces in the form of forests, stormwater parks, lakes, rivers, scrublands, streams, neighbourhood parks, playgrounds etc. (Goswami, 2020). After this, cities must accommodate the built, considering higher densities. Both long term (urban planning proposals with the vision of the city) and short-term planning (capacity building to accurately predict and manage

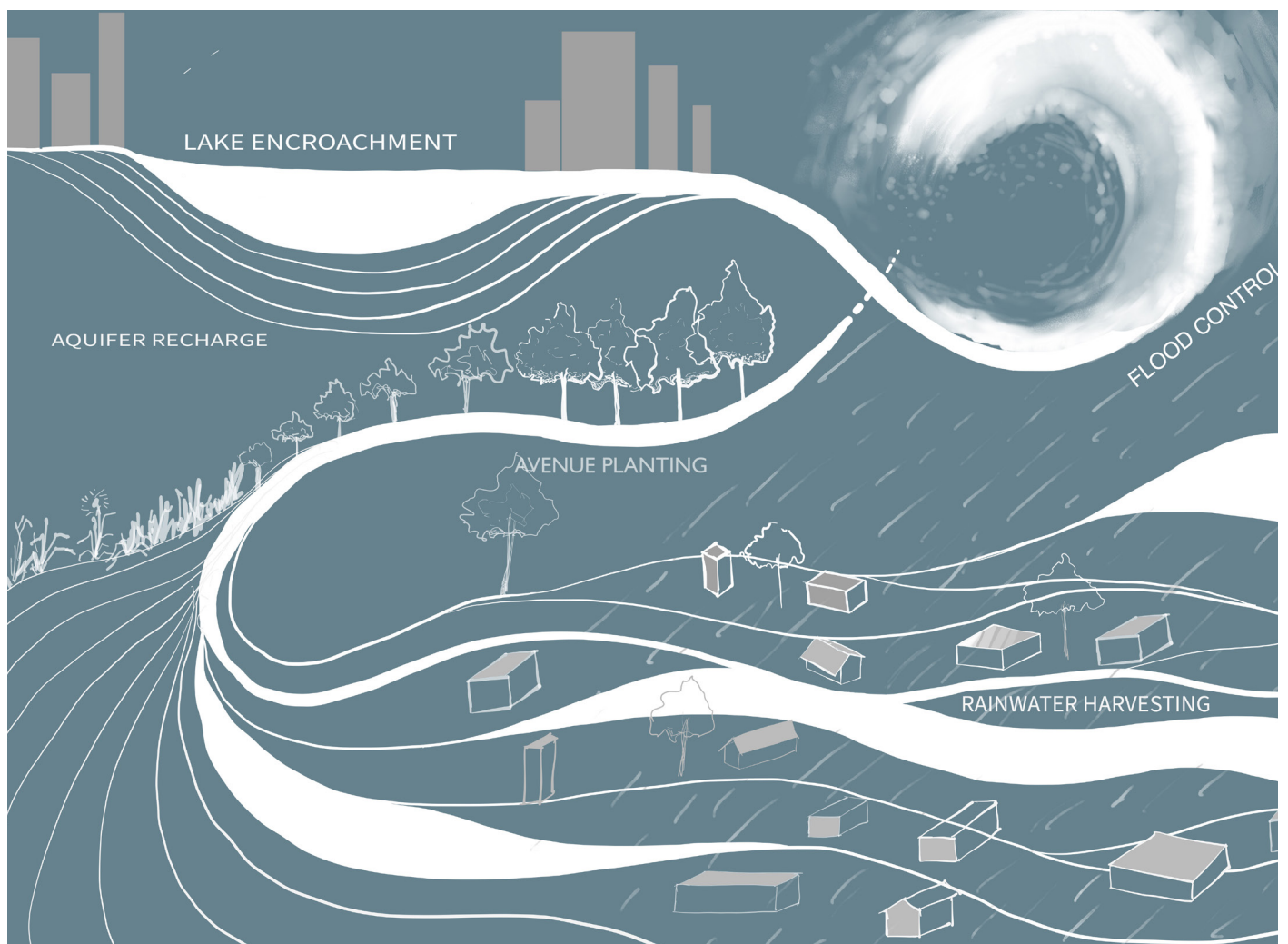


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disasters during the event of flooding) methods are required.

10.Importance of conservation of existing open spaces and creating new ones

Open spaces are as valuable as built because they not only offer clean fresh air and great public spaces, but help in storage of groundwater, control floods, moderate climate and help to abate air and water pollution. Hence, it possesses natural system value.

Many cities levy vacant land tax to reduce housing issues. Instead, cities may look at incentivizing such open spaces at the neighbourhood and city level. Problems must be treated at the unit and ward level. Making it part of the regulation that every ward must have stipulated amount of open space, with or without trees will help the absorption of excess rainwater, apart from its other benefits of creating public spaces. Rainwater harvesting is already incentivized both in Bangalore and Chennai, but implementation is poor.

11.Steps taken till now to mitigate urban flooding

Mumbai has a proposal of building eight pumping stations all over the city to pump excess water and to build underground tanks to store rainwater. But pumping is expensive for the short term, and ineffective because it depends on electricity which cannot be relied on especially during the monsoon (Gupta K. , 2005). Delhi is making its drainage master plan. Bangalore is planning to remove the encroachments on lake beds, but that is not enough. Year after year, more cities are experiencing flooding. This is the time for some action to prevent long term damage.

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