Surface Tension – Loss of urban sponges and consequent flooding

Lakes: **Present lost**

Groundwater is not considered as critical for water supply, recharge is neglected

- Urban planners cannot see beyond land
- Land is valued, **water is not**
- No legal protection for city lakes, catchment and drainage systems
- Waterbody and its catchment have been encroached upon or taken away for housing and other buildings

Sponges of our cities then get destroyed-

encroached, full of sewage, garbage or just filled up and built over

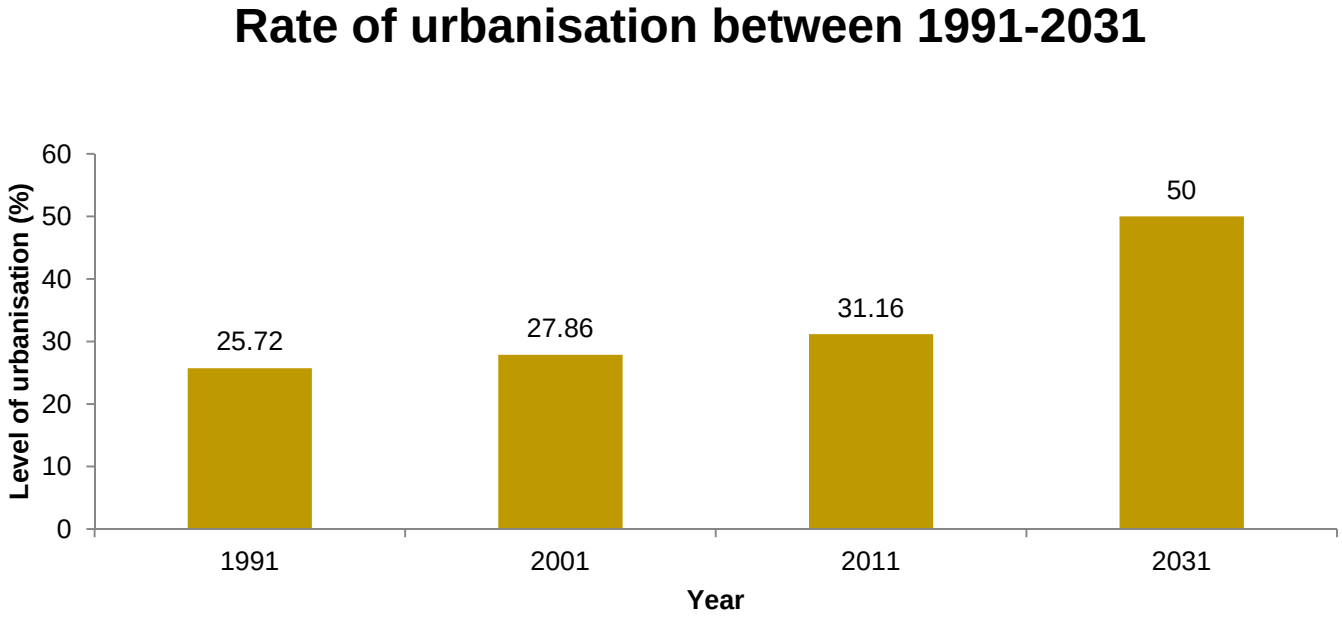
Vanishing act

- In1960, Bengaluru had 262 lakes, but right now only 4 per cent are in healthy condition
- Hyderabad is also losing its waterbodies. Between 1989 and 2001, 3,245 ha of waterbodies were lost, which is 10 times the size of Hussain Sagar, the major waterbody of the city
- Pallikarnai marshland in Chennai – flood sink in the city - The marshland that was around 5,000 hectares (ha) during independence got reduced to almost 600 ha (12 per cent of the original size) around 2010-11. The only reason for all this was rapid urbanisation.

Lakes: **Future lost**

- With climate change extreme rainfall events will grow
- More rain, fewer rainy days
- Cities need sponges to capture rain, recharge for scarcity
- Need to consider in future planning

Urbanisation in India



Increased rate of urbanisation from 2.1 percent between 1991 to 2001 to 3.3 per cent between 2001 to 2011 and almost will increase to almost by **more than 18 per cent between 2011 to 2031**

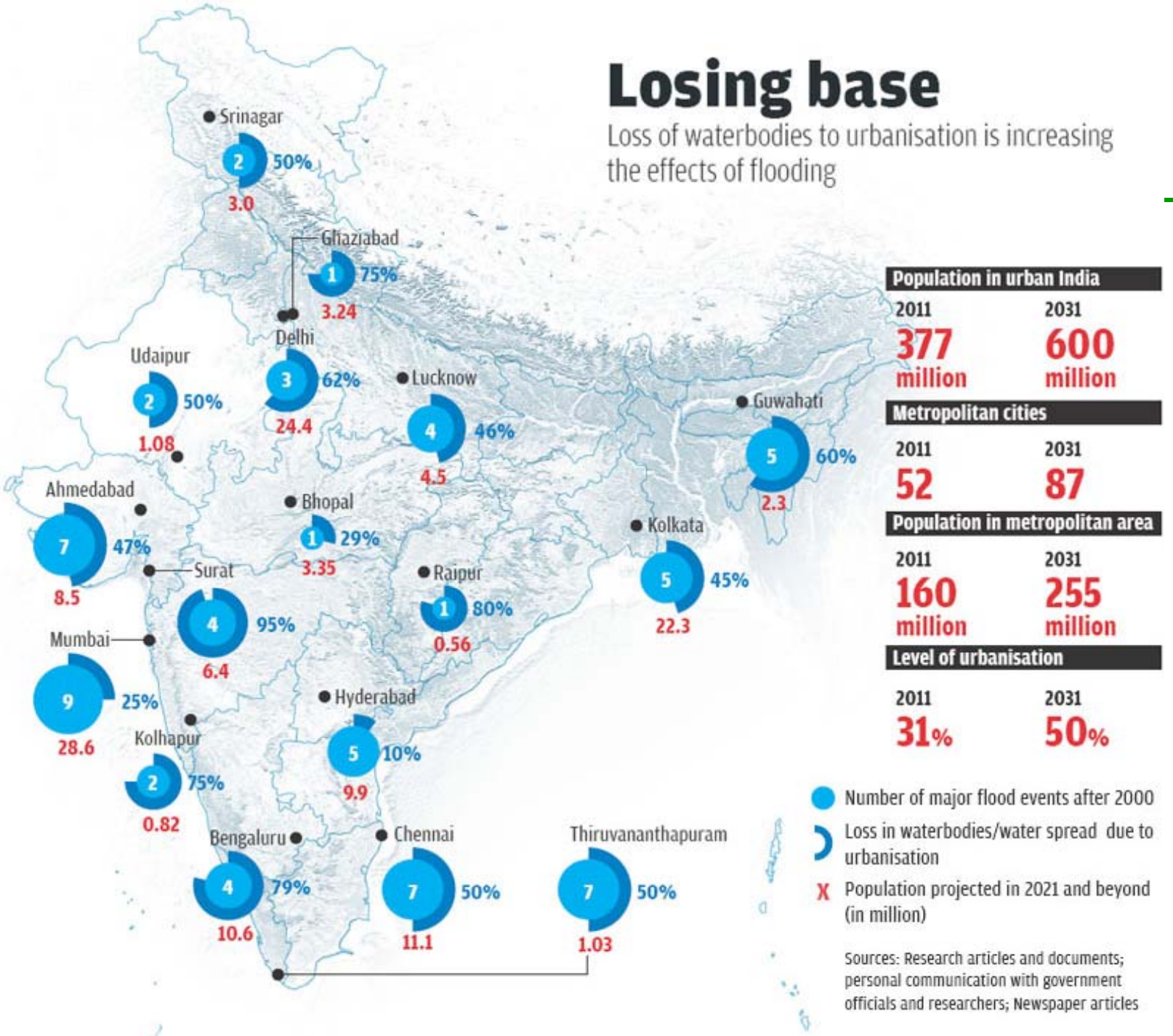
Source: Bhagat, R B., 2011. Economic and political weekly and Ministry of Urban Development

Urban floods

- National Disaster Management Authority recognised urban floods separately from riverine flood in 2010
- According to NDMA, urbnanisation creates artificial catchments which increase the flood intensity by six times as opposed to riverine floods. Consequently, flooding occurs quickly in urban areas
- **Disconnect** between geological-hydrogeological cycle and urban planning
- No detailed study on topography, drainage, rainfall and soil lithology of catchments

Losing base

Loss of waterbodies to urbanisation is increasing the effects of flooding



Population in urban India

2011	2031
377 million	600 million

Metropolitan cities

2011	2031
52	87

Population in metropolitan area

2011	2031
160 million	255 million

Level of urbanisation

2011	2031
31%	50%

- Number of major flood events after 2000
- Loss in waterbodies/water spread due to urbanisation
- X Population projected in 2021 and beyond (in million)

Sources: Research articles and documents; personal communication with government officials and researchers; Newspaper articles

Cascade tanks of South India – engineering marvels

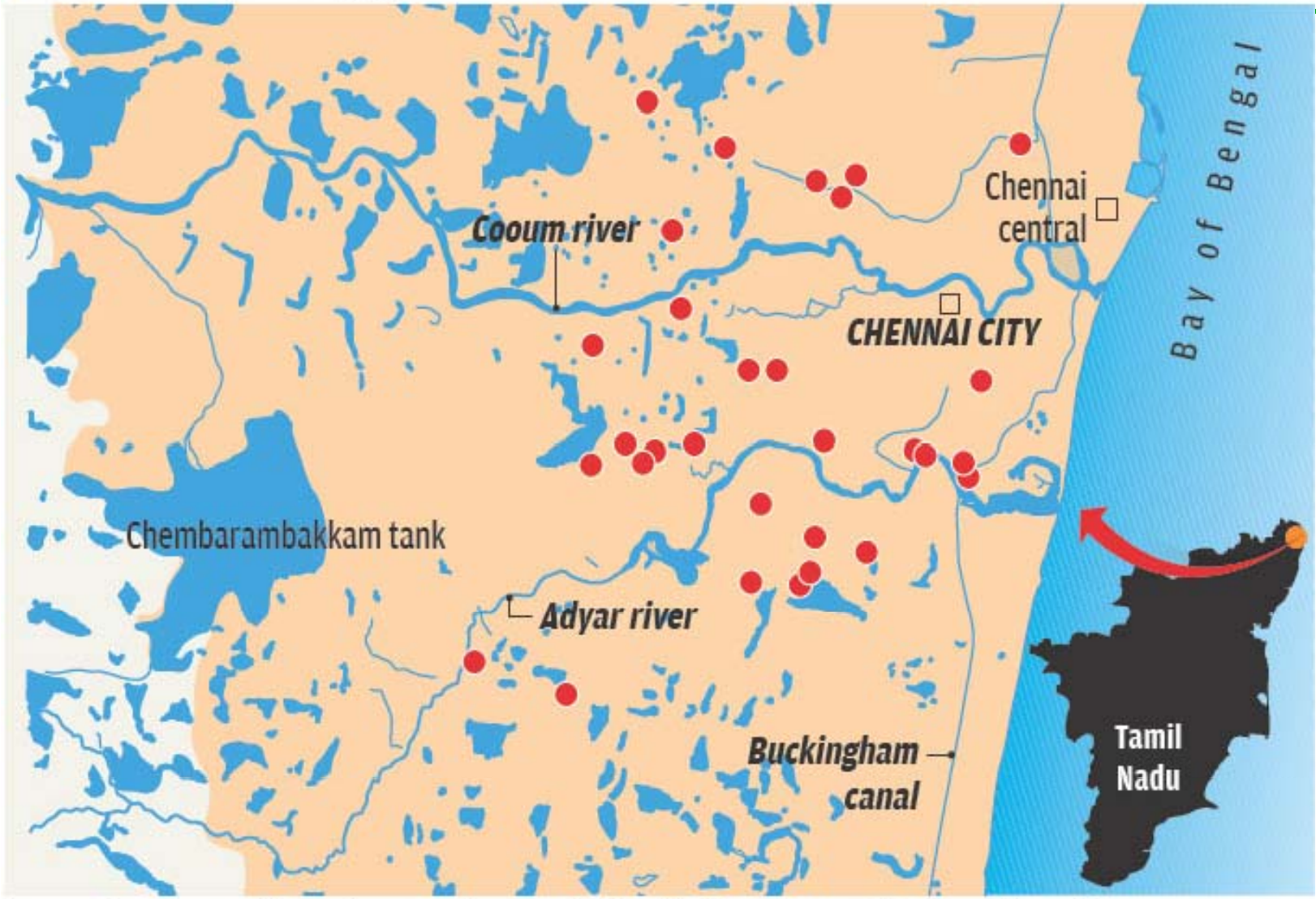
Chennai: Sitting on flood bomb

- In 2000, southern Chennai became an information technology hub
- The city engulfed several fishing and agricultural villages and hamlets
- By 2011, the city corporation area increased **four times** its original size
- Open areas decreased drastically - the built up and paved areas, according to an analyses increased by 35 per cent between 1991 and 2013 – **at a rate of almost 1.5 per cent per year**
- Flood sink – Pallikarni marsh - marshland that was around 5,000 hectares (ha) during independence got reduced to almost 600 ha around 2010-11 due to urbanisation and mismanagement of solidwaste. Around 273.50 ha was allotted to different institutions by 2010. Over and above this, there are other allotments that made the total allotment equal to 474 ha.

Chennai clogged

The city is flat and needs a very good drainage system. Flood-like situation was experienced in areas where waterbodies have been encroached upon

● Areas affected by water logging

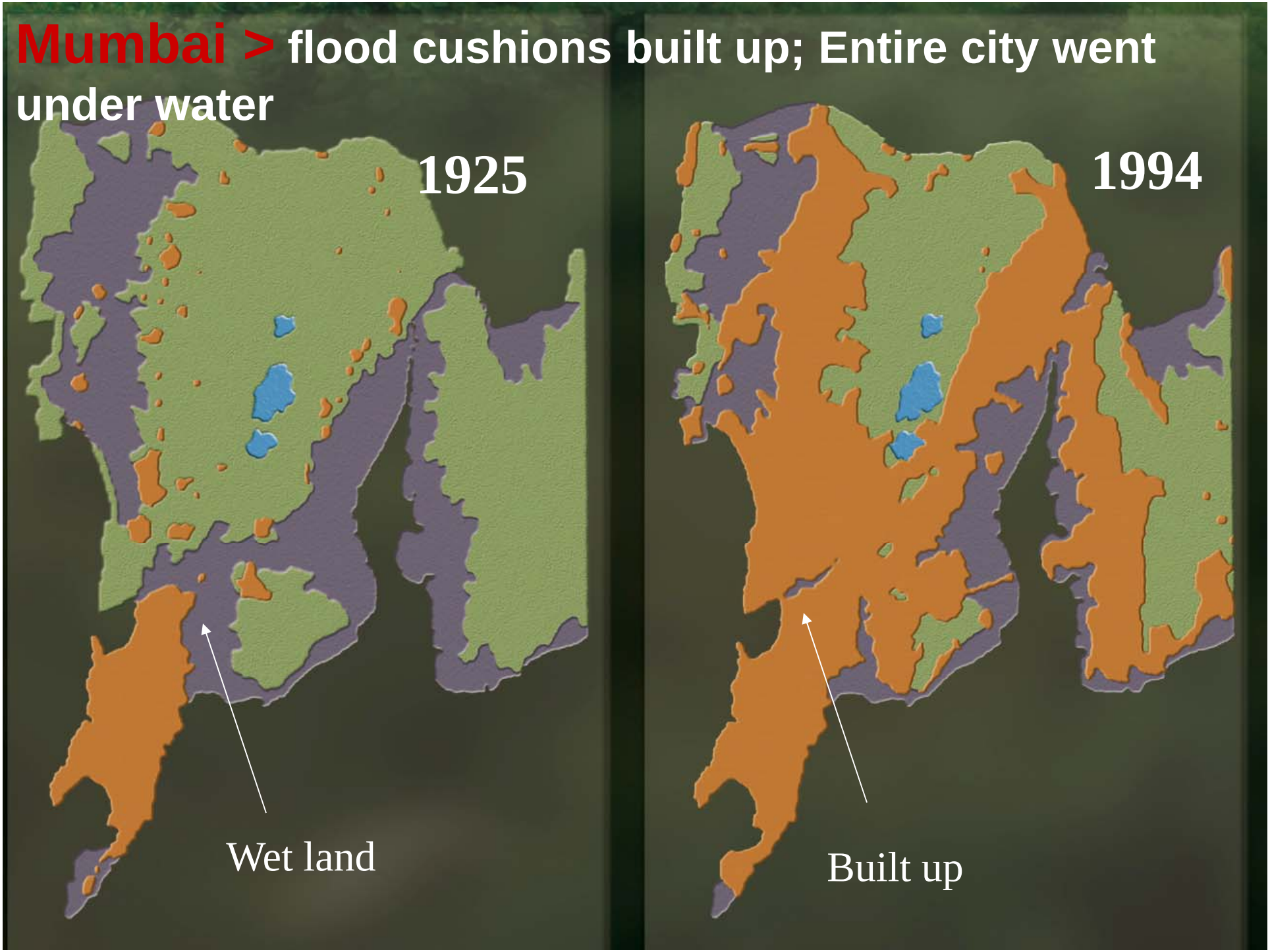


Source: *chennaicorporation.gov.in*, personal communication with Chennai corporation; Map not to scale

Chennai's waterways: **its shame**

- The study on sludge in Chennai, shows most of these waterways were choked with sludge and wastes
- Despite Chennai's much vaunted sewage treatment infrastructure, its waterways continue to receive sewage from the colonies and industries along their way
- The government's own studies accept that the waterways in Chennai convey treated and untreated sewage and garbage together. These waterways, which are also the city's flood discharge channels, are encroached and built upon as well, thereby severely reducing their flow

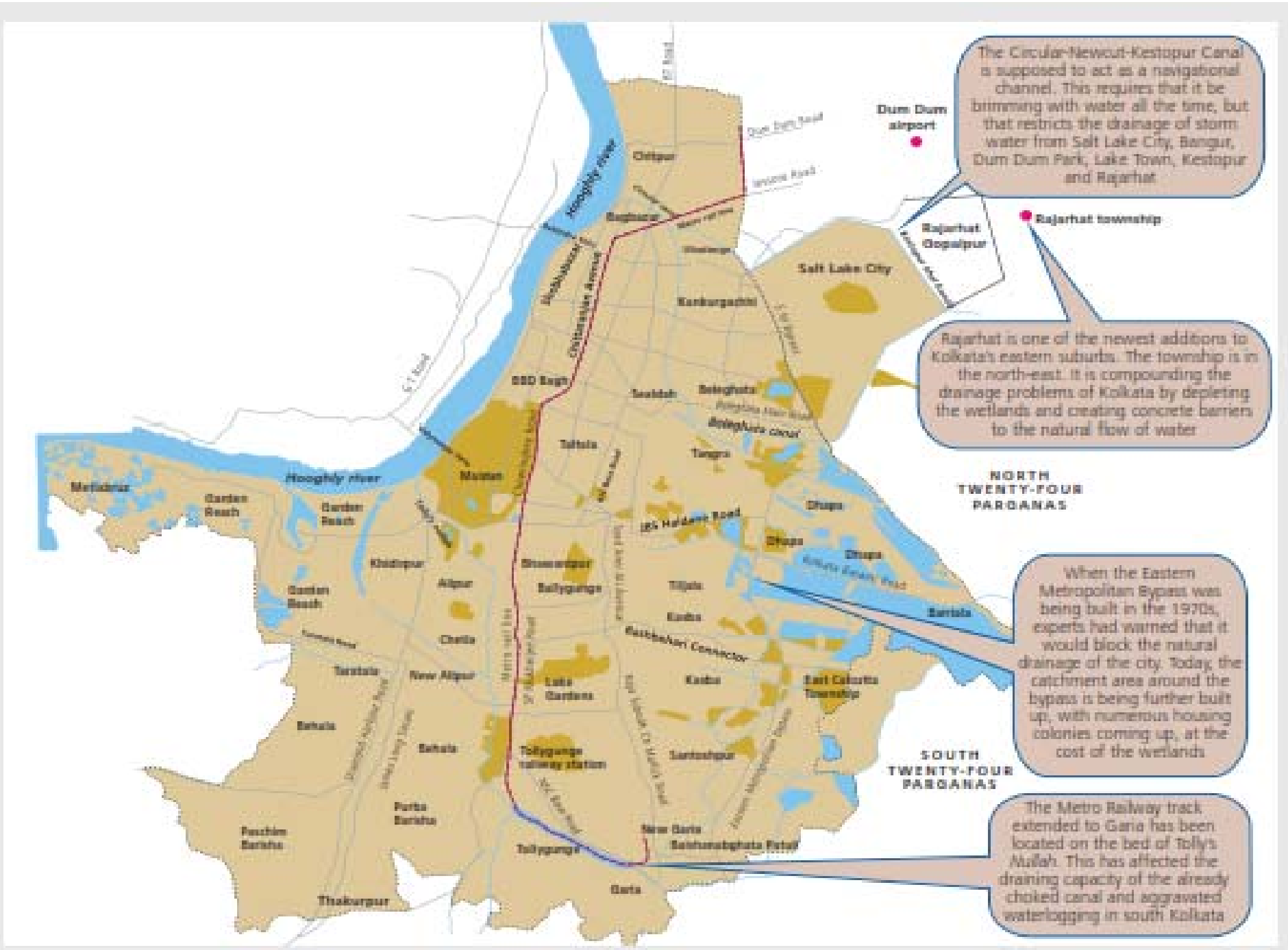
Mumbai > **flood cushions built up; Entire city went under water**



Mumbai: Between 1925 and 1994

- Built up: increased from 12 per cent to 52 per cent
- Lakes decreased from 28 to 18 per cent

Eksar lake, Mumbai



Source: Anon 2006, 'Venice unintended', *Down To Earth*, Vol 15, No 11, October 31, Society for Environmental Communications, New Delhi

Srinagar-lessons not learnt

Between 1911 and 2004

Built up area has increased by 6 times

Wetland area has reduced to half.

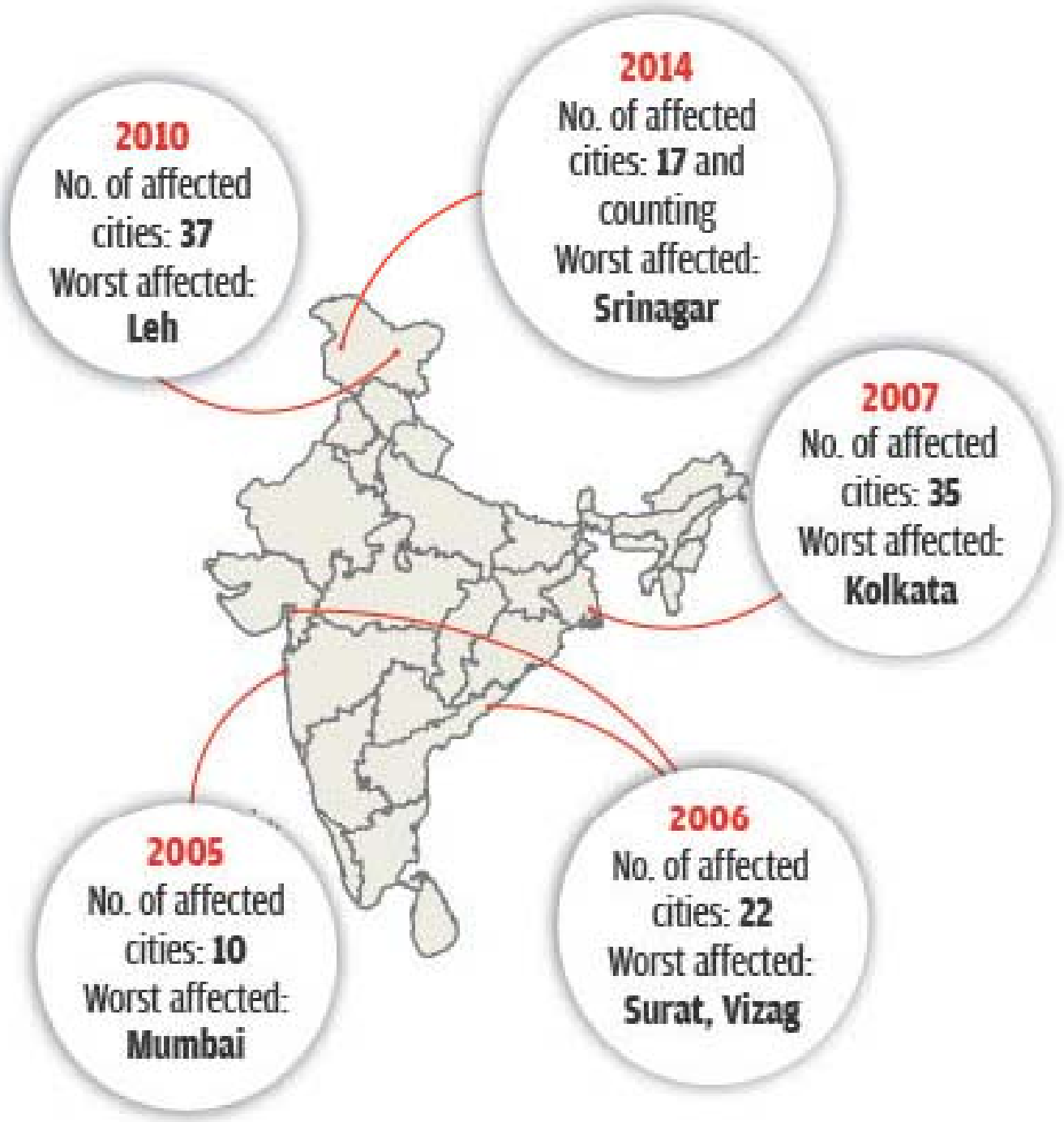
Srinagar-lessons not learnt

Beels of Guhawati destroyed

Guwahati *beels* under stress

Deepor: Encroached by stone quarries, dump yard. Channels to Brahmaputra are choked
Silsako: Has hotels and commercial establishments on one end, poor settlers on the other
Borsola-Sorusola: Commercial establishments. Refinery waste has polluted it
Hansora, Damol: No longer exist

Source: Geography department, Guwahati University


2010
No. of affected cities: 37
Worst affected: Leh
2014
No. of affected cities: 17 and counting
Worst affected: Srinagar
2007
No. of affected cities: 35
Worst affected: Kolkata
2006
No. of affected cities: 22
Worst affected: Surat, Vizag
2005
No. of affected cities: 10
Worst affected: Mumbai

Dried up lake – illegal mininmg in catchment area

Badkhal lake, Faridabad, Haryana: Mining activity in the catchment area has made the lake completely dry

Ashtamudi lake, Kollam

Wetland rule and National Disaster Management Authority guidelines

- Ministry of Environment and Forests (MOEF) issued a rule for conservation and management of wetlands in December, 2010, under the provisions of the Environment (Protection) Act, 1986, called the Wetlands (Management and Conservation) Rules, 2010
- In 2008, NDMA formed a committee on urban floods which formulated the National Guidelines for Management of Urban Flooding. The guidelines were released in 2010
- NIETHER BINDING NOR EXHAUSTIVE

Way forward

- Urban planners should undertake a detailed mapping of waterbodies, natural drainage and flood-prone areas in cities using remote sensing
- Policymakers should relook the development plans approved by city authorities and find out whether they violate the hydrological cycle of the city or not
- Finally, there is a need for stronger laws to protect urban lakes
- A single authority for the management and restoration of waterbodies is the need of the hour

CSE's draft - Framework Legislation for Conservation and Protection of Wetlands in South Asia

- Decentralisation of management of the wetlands and use of technological advancement in conservation and protection of wetlands
- Classification of critical wetlands for areas that are integral to sustaining environment and livelihoods of local communities
- The draft is very clear that wetlands should not be leased to private companies

CSE's draft - Framework Legislation for Conservation and Protection of Wetlands in South Asia

- The framework talks about the recognition of customary rights and management practices of wetlands and its nearby area
- It introduces ideas of wetland conservation and management fund and incentive-based mechanisms to involve communities in conservation process
- The draft also says that catchment areas and feeder channels should also be declared ecologically sensitive area

CSE's draft - Framework Legislation for Conservation and Protection of Wetlands in South Asia

- The draft talks about detailed mapping process that will involve the people, civil societies and scientific institutions.
- Mapping according to the draft will also record customary rights and management practices
- The draft says a data bank should be created at the state level which should be created in a time bound manner and should be open to public

Draft available on the website

http://cseindia.org/userfiles/Wetlands%20Framework%20Legislation%20final-ELDF-Final-Jan14.pdf


WATER?...
YOU HAVE COME HERE
TO LOOK FOR WATER?