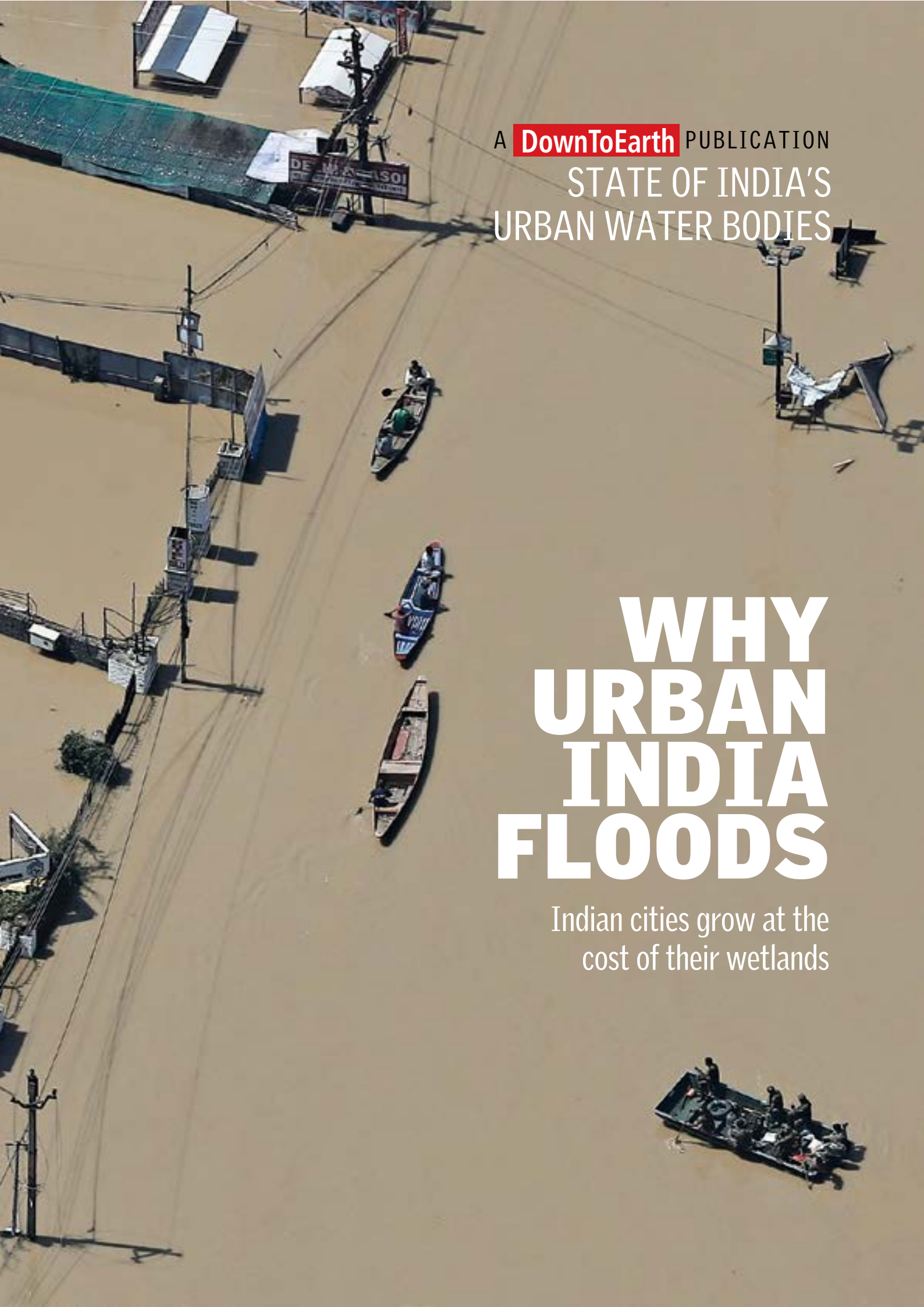

A DownToEarth PUBLICATION

STATE OF INDIA'S URBAN WATER BODIES

WHY URBAN INDIA FLOODS

Indian cities grow at the cost of their wetlands

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Disclaimer:
The book has incorporated developments reported over a period of time. The designations of persons and officials mentioned in the book are what they held at the time of the original reports.

Down To Earth
SCIENCE AND ENVIRONMENT FORTNIGHTLY

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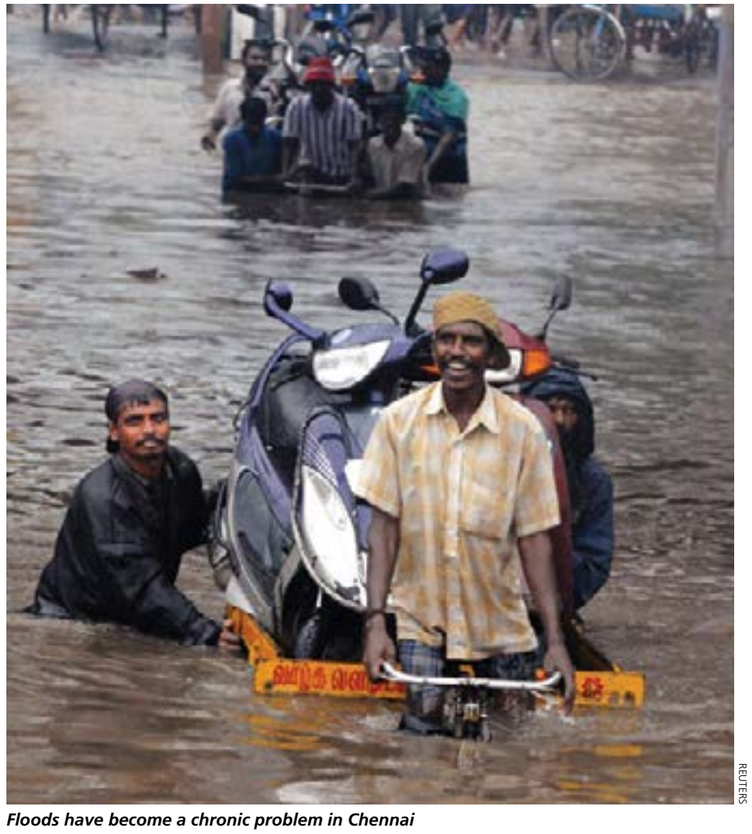
An urban nightmare

Floods ravaging urban India are getting increasingly regular. The solution lies in rethinking our urban planning



REUTERS

Floods have become a chronic problem in Chennai

SUNITA NARAIN

The memories of unprecedented floods in Mumbai, Srinagar and Chennai are still fresh. Ignored as sporadic or once-in-a-while event, urban floods have become regular, and increasingly devastating.

The floods repeatedly draw our attention to only one fact: our urban sprawls have not paid adequate attention to the natural water bodies that exist in them. A case in point is Chennai, where each of its lakes has a natural flood discharge channel which drains the spill over. But we have built over many of these water bodies, blocking the smooth flow of water. We have forgotten the art of drainage. We only see land for buildings, not for water. And the result is in front our eyes.

An urban water body provides some crucial services such as groundwater recharge and flood management. If you ask the obvious question of how construction was permitted on the wetland, you will get a not-so-obvious response: wetlands are rarely recorded under municipal land laws, so nobody knows about them. Planners see only land, not water, and builders take over.

A number of cities including Chennai are both water-scarce as well as prone to flooding. Both problems are related—excessive construction which leads to poor recharge of groundwater aquifers and blocking of natural drainage systems. The city witnessed severe floods in 2015 when the entire city got completely submerged under water after it rained for a few days.

Delhi-based non-profit Centre for Science and Environment's research shows that Chennai had more than 600 water bodies in the 1980s, but a master plan published in 2008 said that only a fraction of the lakes could be found in a healthy condition. According to records of the state's Water Resources Department, the area of 19 major lakes had shrunk from a total of 1,130 hectares (ha) in the 1980s to around 645 ha in the early 2000s, reducing their storage capacity. The drains that carry surplus water from tanks to other wetlands have also been encroached upon.

The analysis also shows that the stormwater drains constructed to drain flood waters are clogged and require immediate desiltation. Chennai has only 855 km of stormwater drains against 2,847 km of urban roads. Thus, even a marginally heavy rainfall causes havoc in the city. Explaining the problem of pollution, the City Development Plan says: "The waterways of Chennai... receive flood discharge only during the monsoon season; the rest of the year these act as carriers of wastewater from sewage treatment plants and others."

So Chennai needs to do what all cities must—undertake a detailed survey of the wetlands and then bring every water body and its catchment under legal protection. The Wetlands Conservation and Management Rules issued by the Union Ministry of Environment and Forests and Climate Change are toothless and meaningless. What is needed is to ensure that city development rules include a comprehensive list of water bodies and their catchment. Any change of this land use should not be permitted. Even this will not be enough unless the city values the water this land gives.

The Central government should provide funds for water supply to only those cities that have brought their own water sources under protection. The cities must show they have optimised local water potential before claiming access to water from far away sources. This will reduce the cost of supply. The city can invest the saved money in treating sewage, which pollutes the lakes and ponds in the first place. It is this vicious cycle that needs to be broken.

It is time we realised that a water body is not an ornamental luxury or a wasted land. A city's lake is its lifeline. ■

Wetlands are rarely recorded under municipal land laws, so nobody knows about them. Planners see only land, not water, and builders take over

JAMMU AND KASHMIR

Total number of wetlands
3,651
(including smaller wetlands of area less than 2.25 ha)

Number of lakes/ponds/ tanks (both natural and human-made)
38

Most urbanised city
Srinagar

Urban floods (in past decade)

Jammu	Srinagar
1	2

State's level of urbanisation

2001 24.81%

2011 27.21%

Slow decay

Srinagar witnessed its worst floods in 2014 which left hundreds dead and caused losses worth millions. From experts to the administration, all believe the most important reason behind the floods was the collapse of the natural drainage system in the city. Scientists say that since the drainage channels of the city has been blocked and the link between the lakes has been cut off due to unplanned urbanisation and encroachment, the lakes have lost their power to absorb water the way they used to a century ago and save the city from floods. The city lost half of its water bodies between 1911 and 2004. The story is not much different in Jammu where almost all of the 150 ponds have shrunk in size. Unplanned urbanisation has reduced most wetlands into dumping sites.

ATTEMPTS TO SAVE WETLANDS

2000
Lawyer Syed Mujtaba Hussain and non-profit Green Kashmir files a writ petition in the Supreme Court to save the Dal Lake. The petitioners invoke the extraordinary jurisdiction of the apex court, under Article 32 of the Constitution, urging it to intervene to save the Dal Lake that has turned into a reservoir of sewage, waste and effluents. But nothing happens.

2001
Jammu and Kashmir High Court passes several directions to remove encroachments and to clean up the Dal Lake. The state government also undertakes several drives that at best provide temporary relief.

2015
Jammu and Kashmir High Court appoints a two-person court commission to inspect the Dal Lake on daily basis and submit weekly reports on its encroachment.

See more coverage on www.downtoearth.org.in
Track court cases on www.indiaenvironmentportal.org.in and www.rainwaterharvesting.org

DELHI-NCR

Total number of wetlands
573
(including smaller wetlands of area less than 2.25 ha)

Number of lakes/ponds/ tanks (both natural and human-made)
363

Most urbanised city
Delhi

Urban floods
(in past decade)

Delhi
3

Delhi's level of urbanisation

2001 93.18%

2011 97.50%

High on construction

Being one of the most urbanised cities in the country, Delhi is at a high-risk of urban floods. The rate of urbanisation can be gauged from the fact that the built-up area increased by seven times between 1970s and 1990s. During this period, the area under wetlands in the city reduced to one-third of its earlier size. The last major flood the city witnessed was in 2013, when the water level of Yamuna rose to 207.49 metres, the highest water level ever recorded in the river. Various low-lying areas in east Delhi were inundated by Yamuna waters in 2013.

ATTEMPTS TO SAVE WETLANDS

2010
A case was filed by non-profit Tapas in the Delhi High Court to protect the city's degrading wetlands. A year later, the court asks the Delhi government to survey the number of water bodies in Delhi and to undertake restoration projects. A final verdict on the case is awaited and encroachment continues unabated.

2013
The Delhi High Court directs the police to ensure that water bodies such as lakes and ponds are not encroached or allotted in future for development work.

2015
The National Green Tribunal asks various government authorities to file a report on the status of water bodies under their jurisdiction. Reports from most authorities are pending.

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RAJASTHAN

Total number of wetlands
46,748
(including smaller wetlands of area less than 2.25 ha)

Number of lakes/ponds/ tanks (both natural and human-made)
10,796

City with most water bodies
Udaipur

Urban floods (in past decade)

Jaipur	Udaipur
3	2

State's level of urbanisation

2001 23.39%

2011 24.89%

Left to die

Almost all water bodies of Udaipur, popularly called the city of lakes, are highly polluted and encroached upon. The condition of Pichola Lake is symptomatic of the ills that plague the lakes and rivers of the city. Once an important source of drinking water, the lake today is surrounded by 55 raw sewage inlet points that carry untreated effluents from over 3,500 industries. The city's lakes are also choking due to siltation. Rains cause run-offs in the upland slopes carrying huge silt discharge, which ultimately settles in the city's lakes. Embankments have been constructed all along these water bodies to help contain more water, but they have had an opposite effect: seepages and cracks in these embankments, when the lakes overflow during monsoons, have resulted in a colossal loss of water.

ATTEMPTS TO SAVE WETLANDS

1992
Balwant Singh Mehta (1992) and Praveen Khandelwal, along with Jheel Sanrakshan Samiti (1997), file public interest petitions in Rajasthan High Court on Fateh Sagar and Swaroop Sagar lakes in Udaipur.

2007
The high court asks Rajasthan government to form a lake development authority and to effectively protect the no-construction zone. It says no conversion and construction in/around lakes and their catchment, except on "rare occasions".

2012
The high court criticises the state government over illegal allotments and encroachments in the catchment area of water bodies in the state. It says that government officials were encouraging illegality.

2015
The high court bans all activities, including bathing and washing of clothes, in lakes in Udaipur to curtail pollution. But degradation of water bodies and their catchments continues.

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GUJARAT

Total number of wetlands
23,891
(including smaller wetlands of area less than 2.25 ha)

Number of lakes/ponds/ tanks (both natural and human-made)
8,858

Most urbanised city
Ahmedabad

Urban floods (in past decade)

Ahmedabad	Surat	Vadodara
7	4	4

State's level of urbanisation

2001 37.36%

2011 42.58%

Not so rich after all

While Gujarat is one of the most prosperous states in the country, its performance with conserving wetlands has been poor. According to Central Groundwater Board, there has been a decline of three metres per year in the groundwater level of Ahmedabad in recent times. In 1960, Ahmedabad had 204 lakes. Today, only 137 water bodies remain. Out of these, at least 65 have witnessed construction of apartments and other structures approved by the government under various town-planning schemes. In July 2000, when it rained 508 mm in one day, the city as well as the outskirts went under water. As soon as the monsoon was over, the city faced a huge water crisis, which was so severe that it became a political issue. Still the legislators never thought of conserving the lakes.

ATTEMPTS TO SAVE WETLANDS

2000 and 2003
Ahmedabad resident Shailesh R Shah files a public interest petition in the Gujarat High Court requesting the court to revive and recharge the Chandola Lake situated on the outskirts of Ahmedabad. In 2003, the high court delivers the final judgment that directs authorities to protect and recharge them. However, the restriction on building activity around lakes, which had brought builders to their knees, is later lifted. Solid waste dumping and encroachment continues in the lake.

2015
In a public interest petition filed by Aam Aadmi Party member Ritu Raj Mehta in July 2015, the Gujarat High Court directs the civic body to prevent encroachment upon water bodies in Thatlej area by constructing fences around them. It also orders the Ahmedabad district collector to take action against encroachment and dumping of waste in Thatlej area, which lies on the city's eastern side. Nothing significant has yet been done to conserve the water bodies.

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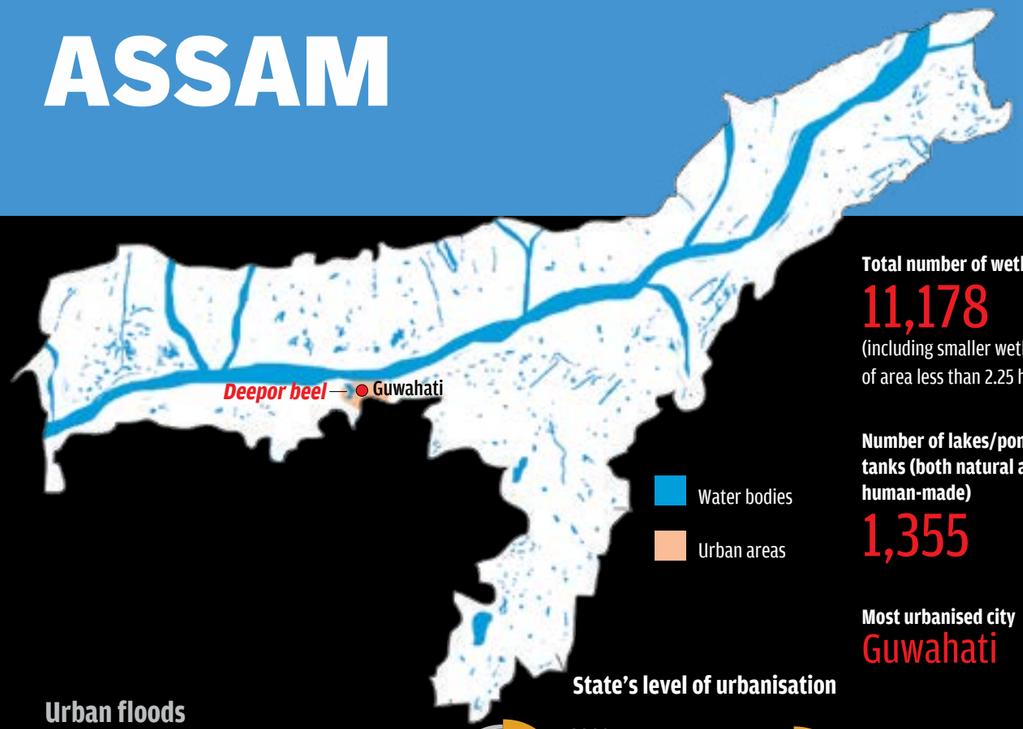
ASSAM



Total number of wetlands
11,178
(including smaller wetlands of area less than 2.25 ha)

Number of lakes/ponds/ tanks (both natural and human-made)
1,355

Most urbanised city
Guwahati

Urban floods
(in past decade)
GUWAHATI
5

State's level of urbanisation

Never-ending tragedies

Assam is possibly India's most flood-prone state: since 1950, the state has seen at least 12 major floods. According to Assam Water Department data, 40 per cent of the state is flood-prone. The last major floods in the state happened in September 2015 that impacted the lives of 1.5 million people in 17 districts. The average annual loss due to flood in Assam is ₹200 cr.

And one of the worst affected is the state capital Guwahati, which has witnessed unfettered urbanisation in the recent past. The built-up area in the city has increased by more than 45 per cent between 1997 and 2007. And this has come at the cost of its wetlands, forest and agricultural lands. For example Deepor *beel*, Guwahati's largest wetland, has decreased by 50 per cent since 1990s.

ATTEMPTS TO SAVE WETLANDS

2000 and 2006

Unnayan Samiti has filed two petitions with the Guwahati High Court in 2000 and 2006 to stop encroachment of Sola *beel*. Despite the high court asking the state government to protect wetlands, the state revenue department in 2006 allocated lake-bed for construction. The high court gave a stay order on the allotment. In 2013, Unnayan Samiti filed a formal complaint with the police to stop illegal construction in Sola but nothing happened.

2007 and 2014

Two major cases have been filed to save the Deepor *beel*. The first one was filed by non-profit Unnayan Samiti in 2007 to stop the encroachment and dumping of garbage into the wetland. Despite a Assam High Court stay order, encroachment continues. In another case filed in 2014, the National Green Tribunal (NGT) asked the Assam government to submit a status report on the condition of the wetland in response to a public interest petition filed by RTI activist Rohit Choudhury. The state government is yet to file a concrete reply to NGT.

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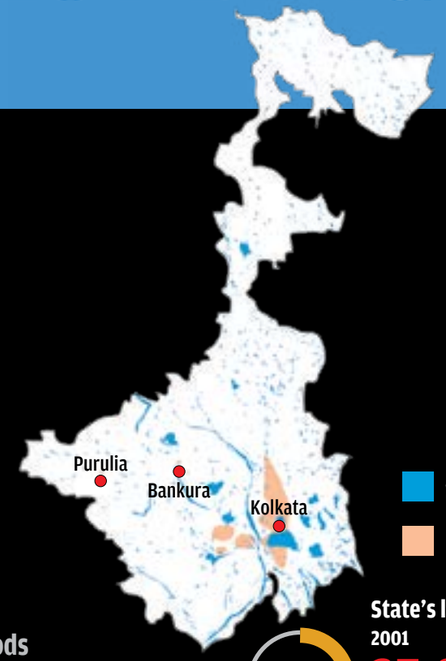
WEST BENGAL



Total number of wetlands
1,47,826
(including smaller wetlands of area less than 2.25 ha)

Number of lakes/ponds/ tanks (both natural and human-made)
5,908

Most urbanised city
Kolkata

Urban floods
Kolkata
5

State's level of urbanisation

Flash floods on the rise

Kolkata's old canal system, which acted as an effective drainage system for some three centuries, is in disrepair. Many wastewater conduits out of the city such as storm water drains, sewers and canals are silted. Besides, gully pits are blocked and there is a time lag for water to reach the pumping stations. This leads to flooding on the surface. Poor solid waste management, along with an overburden of plastic, is the culprit. The original design of Kolkata's drainage system was based on the drainage capacity of the sub-basins. But the unplanned diversion of surface run-off from one sub-basin to another is one of the reasons for overloading of the existing drains, resulting in flash floods. In the metropolitan part of the city, the demise of small water bodies has created problems in holding capacity of surface run-off and groundwater recharge.

ATTEMPTS TO SAVE WETLANDS

1992

Non-profit People United for Better Living in Calcutta files a petition in the Supreme Court to close down tanneries near wetlands in East Kolkata. The apex court orders their closure. Later the West Bengal government passes a bill for the protection of wetlands in East Kolkata.

1995

Petition in the Supreme Court to save water bodies in Howrah. The case is transferred to the Green Bench of the Calcutta High Court. In 2001, the court bans filling up of urban water bodies in Howarh.

2001

The Green Bench of Calcutta High Court orders squatters should be evicted from Rabindra Sarobar. After much protest, the area gets cleared and fenced.

2014

Calcutta High Court appoints a committee to monitor and ensure protection, preservation and beautification of Rabindra Sarobar. There is no sign of compliance of the court order.

2015

Calcutta High Court asks the state government to remove unauthorised constructions in East Kolkata wetlands.

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MAHARASHTRA

Total number of wetlands
42,978
(including smaller wetlands of area less than 2.25 ha)

Number of lakes/ponds/ tanks (both natural and human-made)
23,712

Most urbanised city:
Mumbai

Urban floods (in past decade)

Mumbai	Kolhapur
9	2

State's level of urbanisation

No lessons learnt

It took all of 24 hours in a single day in July 2005 for a cloudburst that spurted 944 mm of rain on Mumbai's suburbs for the financial capital of India to be brought down to its knees. The deluge and the aftermath landslides and outbreak of diseases claimed 698 lives. The casualty list also included 24,000 animal carcasses, 20,000 damaged cars, 2,500 buses and more than 1 lakh houses. Ever since, the situation of Mumbai's wetlands has only deteriorated, which means even rains slightly above normal will be enough to flood the city. A case in point is Mithi river that has been reduced to a drain. The clogging of this drain was responsible for the 2005 floods.

ATTEMPTS TO SAVE WETLANDS

2000
Bhrashtachar Nirmulan Sanghatan and local residents file a case for cleaning of the Powai Lake that was constructed in 1891. In 2004, another case is filed against hostels adjoining the lake, which were built without permission. In 2006, the court orders the removal of encroachments.

2009
After successfully removing garbage and debris from the Charkop Lake, non-profit United Association for Social, Educational and Public Welfare moved court to stop encroachment on the lake and save its mangrove cover. However, only 20 per cent of the water body survives today.

2015
State government allocates ₹550 crore for cleaning Mithi river by February 2017. Citizens not happy with the restoration project.

2014
The Bombay High Court orders a ban on reclamation or construction on wetlands in the state. The Brihanmumbai Municipal Corporation unsuccessfully tries to clear houseboats in Powai Lake.

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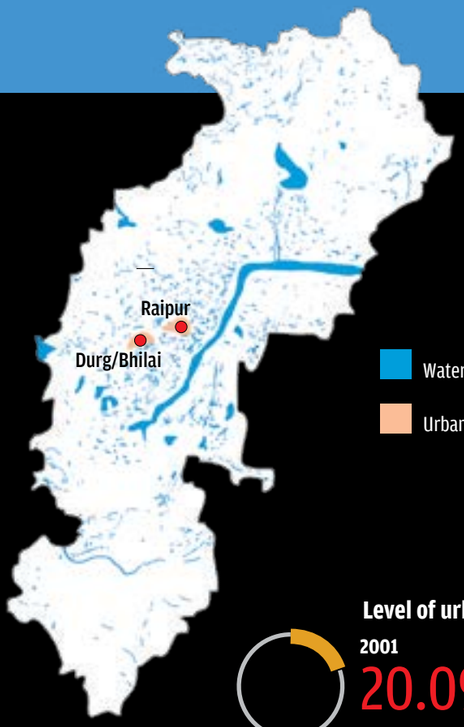
CHHATTISGARH



Total number of wetlands
35, 534
(including smaller wetlands of area less than 2.25 ha)

Number of lakes/ponds/ tanks (both natural and human-made)
6,906

Most urbanised city
Raipur

Urban floods (in past decade)

Raipur
1

Level of urbanisation

Waiting for a disaster

Chhattisgarh capital Raipur is urbanising at a rapid pace. And like most urban centres, the city is growing at the cost of its wetlands. The city suffered its first floods in 2015. Soon after, the state government announced that it would revive ponds across the state under the Sarowar-Dharohar Yojana. The government also said it would use the scheme to construct new ponds on government land. News reports, however, suggest that the Raipur Municipal Corporation, which has over 100 lakes, is yet to initiate work under the scheme. In fact, the corporation says the reason for their inaction is that most ponds in the city are private owned and outside their ambit. A 2012 report published in the International Journal of Earth Sciences and Engineering says that the city lost 19.03 per cent wetland area between 1976 and 2006. The amount of water in them decreased by 3.6 per cent, says the report.

ATTEMPT TO SAVE WETLANDS

2009
After conducting inspection of six historic ponds in the capital, Chhattisgarh chief minister directed the civic authorities to complete desilting and cleaning of all the ponds within 25 days. Civic authorities identified 22 water bodies for restoration and conservation. These included Pahadi, Maulimata, Bandhwada, Pahaldava and Kho Kho *talaavs.*

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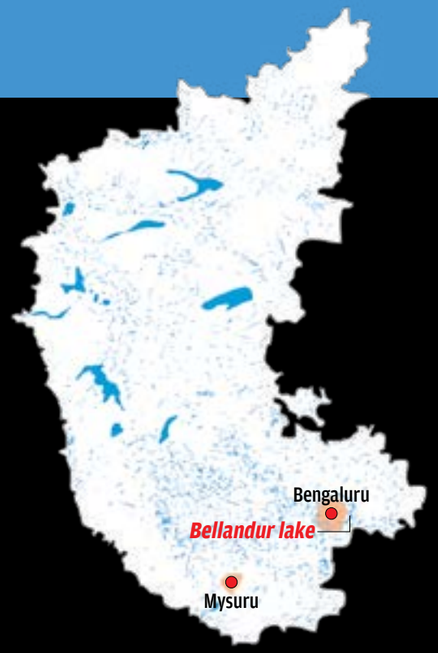
KARNATAKA



Total number of wetlands
25,276
(including smaller wetlands of area less than 2.25 ha)

Number of lakes/ponds/ tanks (both natural and man-made)
10,413

State's level of urbanisation

2001
33.99%

2011
38.57%

Urban floods (in past decade)
Bengaluru
4

City with most water bodies
Bengaluru

Choked to death

Urbanisation has literally choked Bengaluru's water bodies. A latest field survey of Bengaluru lakes shows that nearly 66 per cent of lakes are sewage fed, 14 per cent are surrounded by slums and 72 per cent showed loss of catchment area. Also, lake catchments were used as dumping yards for either municipal solid waste or building debris. In the sixties, the number of lakes and tanks in the city stood at 262 (and the spatial extent of Bangalore was 112 sq km). However, the number of lakes and tanks got reduced to almost 30 per cent in 1980s.

ATTEMPTS TO SAVE WETLANDS

1996
Bellandur gram panchayat files first public interest petition to prevent pollution of the Bellandur Lake, which is the largest Bengaluru lake. The Karnataka High Court in 1999 orders for proper sewage treatment plant for villages in the Bellandur area. But dumping of untreated sewage continues.

2008
Environment Support Group, a non-profit, files a petition against the state government's 2007 decision to allow privatisation of lakes.

2012
In 2012, the high court allows privatisation with certain conditions. The court directs the setting up of District Lake Protection Committees and State Level Apex (Appellate) Lake Protection Committee.

2015
National Green Tribunal fines two Bengaluru companies ₹189.8 crore for illegal construction on wetlands. It also halts all approvals given by the government agencies for construction of buildings on wetlands and catchment areas of water bodies in Bengaluru.

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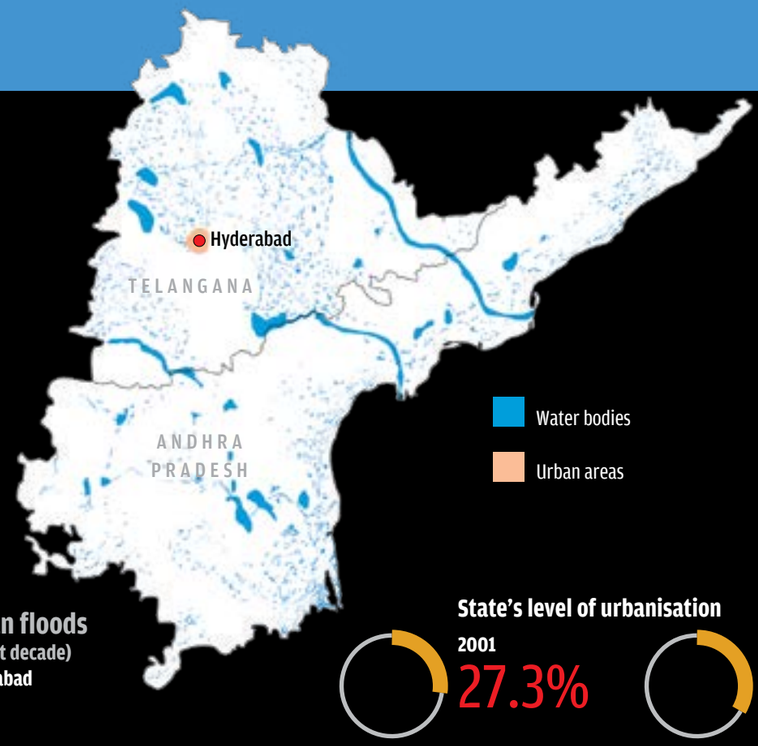
ANDHRA PRADESH & TELANGANA



Total number of wetlands
38,514
(including smaller wetlands of area less than 2.25 ha)

Number of lakes/ponds/ tanks (both natural and human-made)
13,716

City with most water bodies
Hyderabad

State's level of urbanisation

2001
27.3%

2011
33.4%

Urban floods
(in past decade)
Hyderabad
5

Flash floods on the rise

Floods are not new to Andhra Pradesh and Telanagana. In fact the first recorded floods in Hyderabad happened in 1908, which left more than 15,000 dead. On August 24, 2000, the city witnessed the worst calamity in the past 50 years after it rained continuously for just one day (240mm). According to news reports, 90 residential areas were under water (in some places under 10 to 15 feet) and major chunks of several important city roads were washed away.

One of the major reasons for the city's inability to cope with the heavy rains in 2000 was the gradual urbanisation of the city. Hyderabad lost over 404 lakes, which worked as sponges during floods, between 1982 and 2012. Consequently, the water spread area of these lakes was reduced from 14,005 ha to 11,066 ha. In the last 30 years, the area under the water bodies has been reduced by almost 5 per cent.

ATTEMPTS TO SAVE WETLANDS

1995
K L Vyas, convener of the Save the Lake Campaign, files a public interest petition in the Andhra Pradesh High Court. The petition against Andhra Pradesh government sought the protection of 170 lakes in Hyderabad.

2010
The Hyderabad Metropolitan Development Authority (HMDA) launches a campaign for the conservation and restoration of lakes in the city. It also tried to protect city wetlands from encroachments and pollution.

2015
The Lake Protection Committee of HMDA announces notification of 23 lakes for protection. HMDA had earlier notified 415 lakes for conservation in 12 phases. But construction activities continue on the lake beds.

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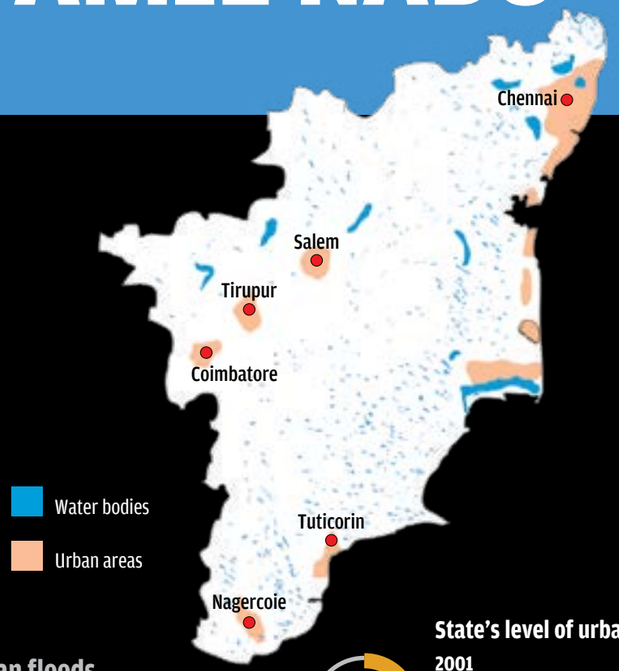
TAMIL NADU



Total number of wetlands
42,978
(including smaller wetlands of area less than 2.25 ha)

Number of lakes/ponds/ tanks (both natural and human-made)
23,712

Most urbanised city
Chennai

Urban floods
Chennai
7

State's level of urbanisation

Watered-down

The Pallikarni marshland, situated 20 km south of Chennai, has long worked as a flood sink for the city. But during the December 2015 floods, the marshland could do little. The reason: just 600 ha of the marshland, which was spread across 5,000 ha, remained by 2006. The marshland today doubles as a waste disposal site and houses several residential and commercial projects. A portion of the marshland has also been allotted to government agencies including the Mass Rapid Transport System of the Ministry of Railways, the National Institute of Ocean Technology, the Chennai Corporation, and the Centre for Wind Energy Technology.

ATTEMPTS TO SAVE WETLANDS

2007
P Raju, president of Welfare Association of Chembarambakkam Lake Drinking Water Consumers in Chennai City, files a public interest petition against the state government's proposal to build an industrial park near Chembarambakkam Lake. In 2007, the court gives an interim injunction on the construction. In 2008, the state government announces second master plan of Chennai city that changes the land use of the area around the lake for agriculture.

2009
Madras High Court gives out orders to stop solid waste dumping in Chembarambakkam Lake.

2015
Tamil Nadu High Court says that maladministration in preserving water bodies, waterways and canals resulted in the huge losses during the 2015 floods. It says authorities in power cannot destroy the water bodies or water courses, which had formed naturally, for the benefit of mankind forever.

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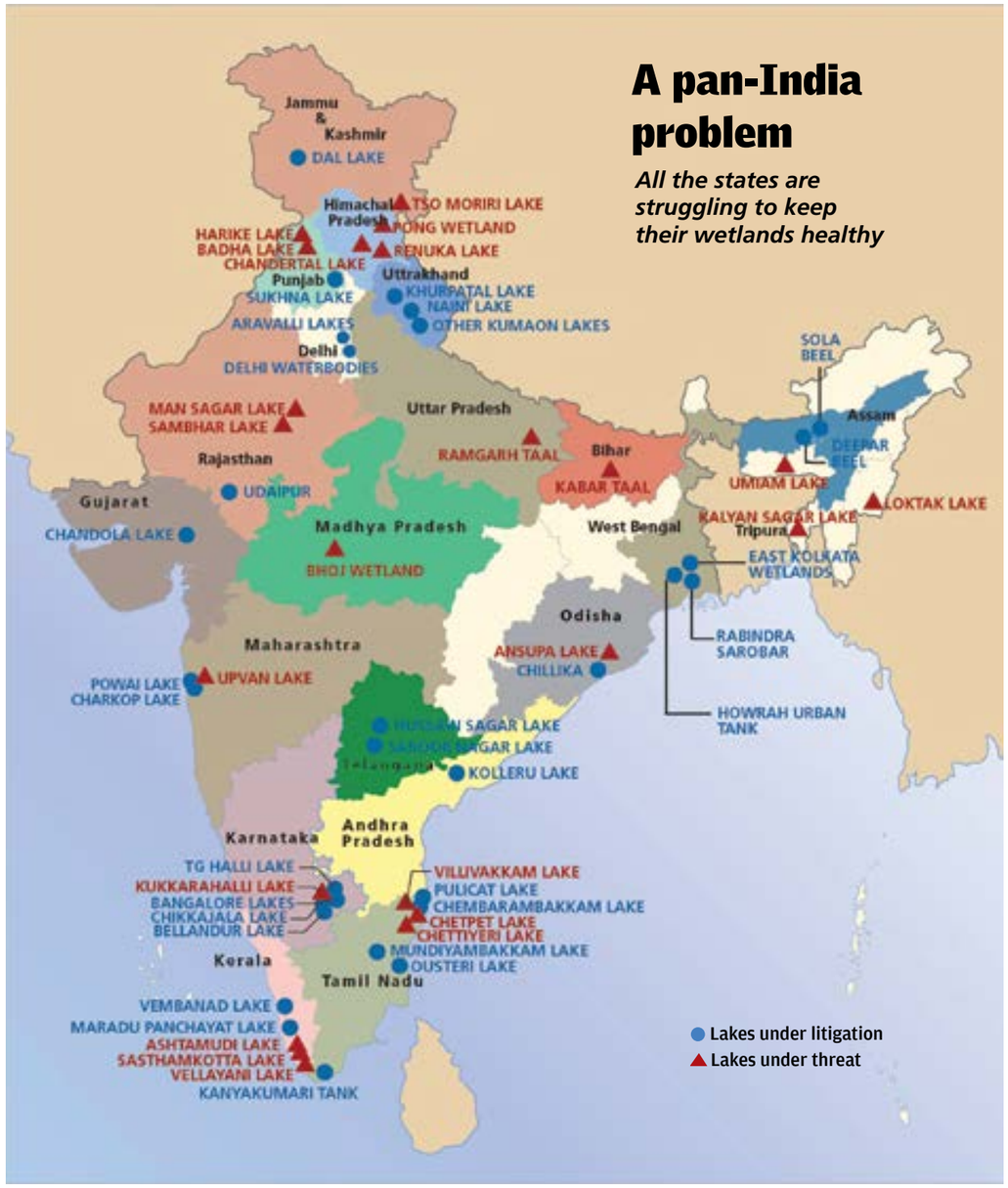

So what do we know about urban floods. Firstly, they are one of the principal hazards in modern towns and cities and are capable of causing major economic losses and devastating social and environmental impacts. Secondly, unlike other types of flooding, urban flooding is a direct, quick and localised consequence of rainfall, making it difficult to predict. In fact, it often happens with little warning and in areas not normally prone to flooding. And thirdly,

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