

Climate-Proofing a Water System: How Surat Learned and Adapted

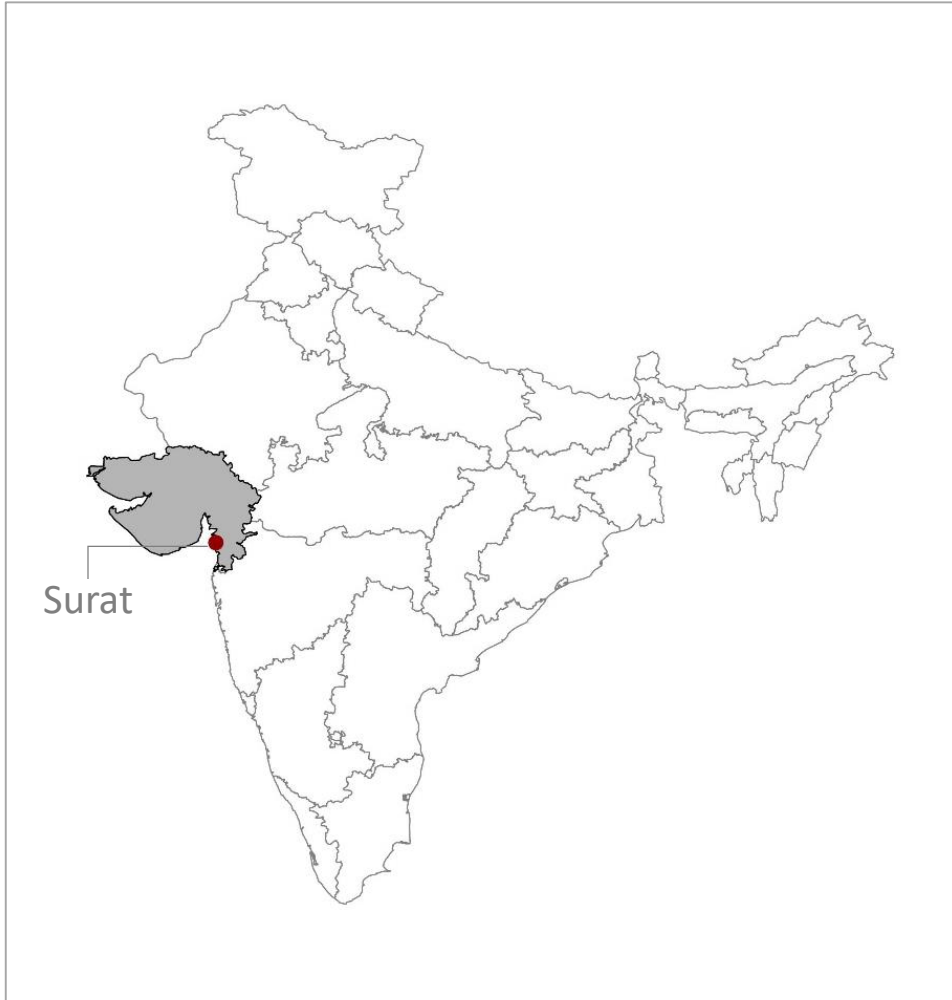
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Concept of Climate Proofing

- UNDP defines climate-proofing as “...**actions that make infrastructure more resilient and resistant to anticipated scenarios** of long-term climate change, as well as the risks associated with geological hazards and climate variability and extremes.”
- “.....not only **take account of future impacts of hazards** and disasters, but also **cultivate capacities to plan for incompletely understood problems and uncertainties** and risks that climate change brings.....”
- ‘Climate proofing does not reduce climate-based risks to zero, but allows cities to use infrastructure and social systems to reduce risks to a quantified level, accepted by the society or economy, and **learn to live with them using local knowledge, iterative learning and experimentation, scientific projections as well social partnerships and relationships on the ground** (Kabat et al. 2005).

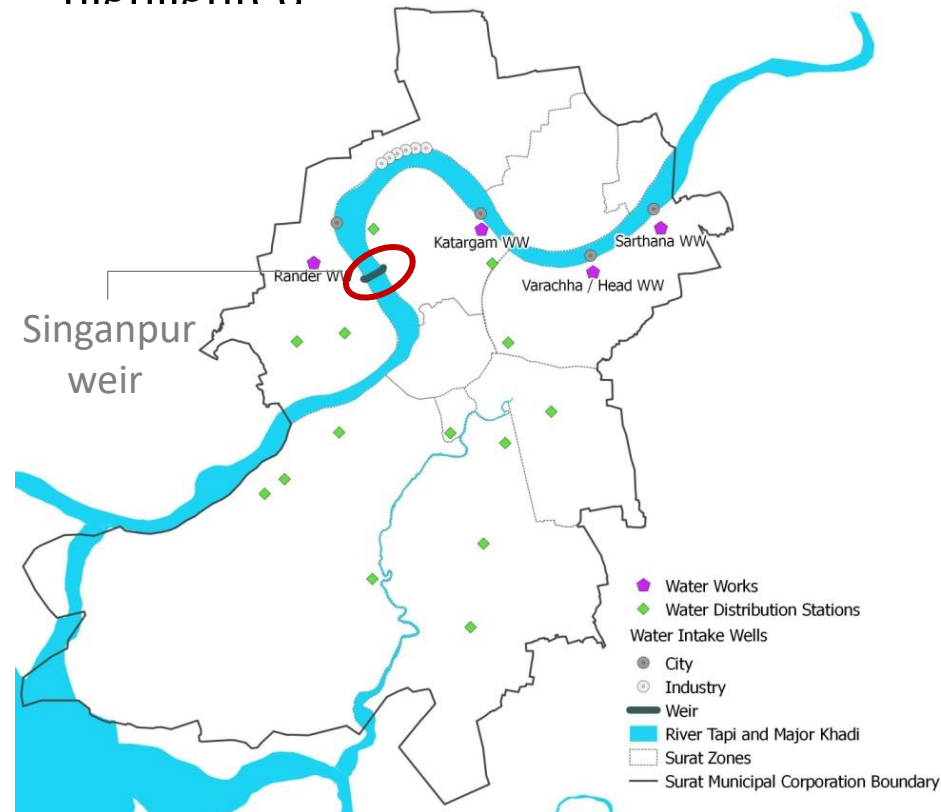
Background and Context



- On the banks of the Tapi River in Western Gujarat
- Growing industrial city of over 5 million people
- Dependent on the Tapi River for its water supply
- Water flow restricted by upstream Ukai dam which is under different jurisdiction
- Development in the floodplains
- History of flooding during monsoon (90% of rainfall)
- Floods of 1994 and 2006 turning points for transforming the city and its water system
- Climate models: ↑ annual rainfall, ↑ intensity in short period, ↑ avg. max. temp., rise in sea water

Surat's 1st Turning Point: 1994 Floods

- Flood followed by plague
- Inadequate public service provision highlighted

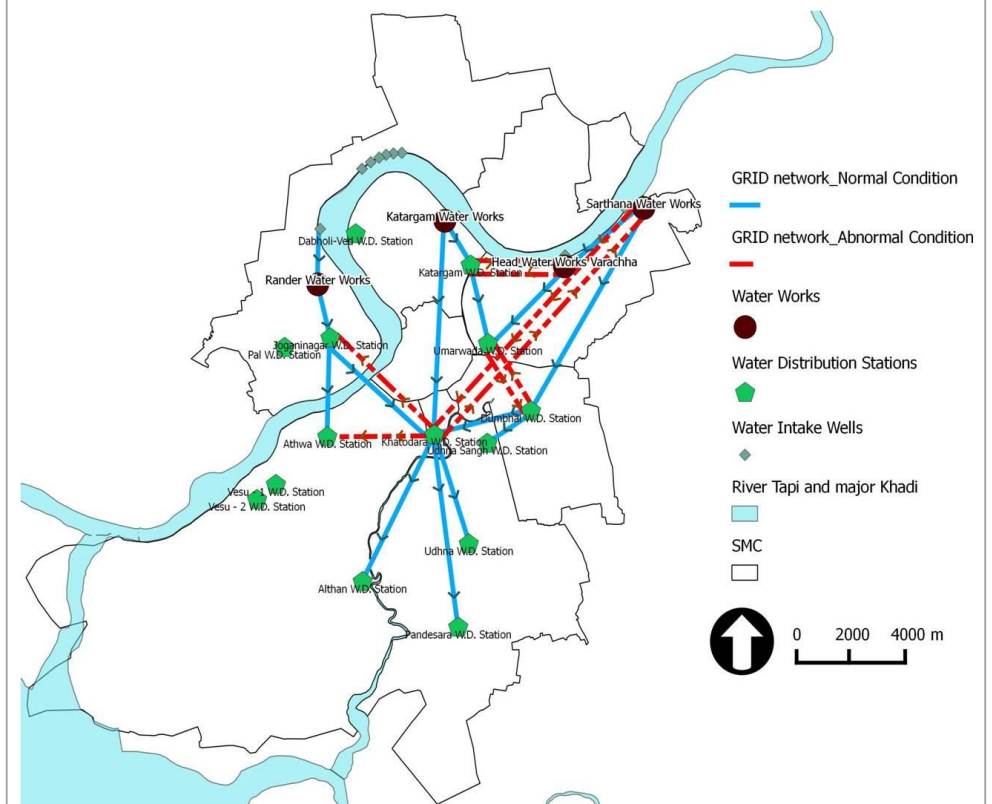


- Immediate action taken by business community and local government
- Storm water and sanitation system upgraded first; slums paved, sewer cleaning
- Decentralization of urban governance (delegating authorization power, officers designated to areas, more field time, complaint filing system)
- Century old water system, gradual augmentation fell short, Singanpur weir built in 1995 with Hazira Area Industries Association
- Reduce flood risks, water works developed within city limits, increase in water supply (180 mld in 1995 to 580 mld in 2006)
- Modernization of all departments and accounting system

Surat's learning continued between extreme events

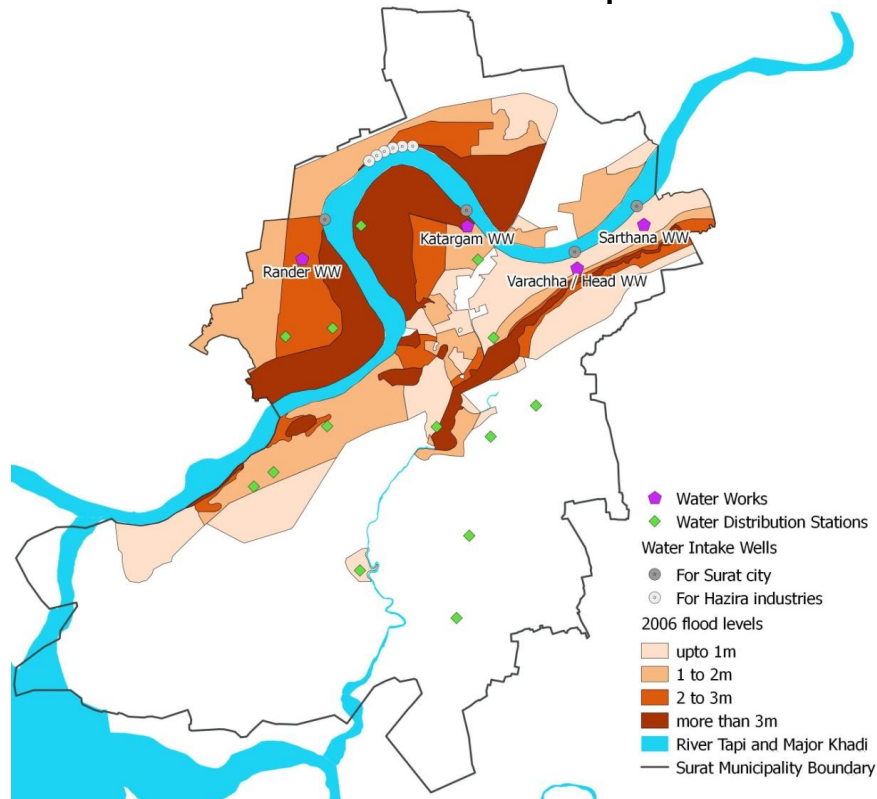
- Applying and utilizing external funding – JNNURM and Chief Minister's urban development schemes
- Augmentation projects to increase treatment capacity, new storage structures
- Pilot biogas electricity generation plant at a waste water treatment facility to save energy
- Energy Efficiency Cell set up in 2001
- Generating additional revenue by selling partially treated waste water to industries
- Water Supply Grid Network - redundancy system built in early 2000s
 - Disruption in any water works does not effect entire water supply system; all distribution stations can be fed from any of the alternative water works

- Water supply restored within 36 hours of 2006 flooding



Surat's 2nd Turning Point : 2006 Floods

- 80% of the city was under water
- Lives lost and heavy economic loss, but no serious health catastrophe



- Water and electricity restored within 36 hours, need to build deeper resilience
- ISO 9001 standards adopted for electric and mechanical maintenance
- IS 10500: 2010 adopted to maintain water quality, investing in technologies for extreme events
- Provision for quick restoration of power supply in water facilities for un-interrupted water supply
- Installing flow-meters in residences and industries, water leakage mapping, water audit, changing tariff plan and rates, addressing leakages to promote accountability and reduce NRW
- Set up emergency response centers for water facilities, training for normal and emergency situations, document past events for training staff

Surat: A Forerunner in Climate Resiliency in India

Climate Resilience Strategy

- 1 of 10 Asian cities to receive funds from Rockefeller Foundation's ACCCRN network
- Surat Climate Change Trust (a city, business, community partnership) developed the City Resiliency Strategy in 2011
- Development of an early warning system to provide 48 hours advance notice
- Establishment of the Urban Service Monitoring System (UrSMS) – digital monitoring of water quality and disease trends in near-real time

Conclusions

- With continuous learning from its climate risks, Surat transformed itself, and has sustained success for over 20 years
- Its reactive response to risks have been forward looking with decentralized governance, revenue generating and efficiency enhancing solutions, adoption of technology, collecting and sharing information, and working across sectors
- Other take away lesson include building and leveraging supportive network from local to international levels, thus making climate proofing a fruit of collaborative efforts

Thank You