



Rethinking Urban water management: Improving water security

CEPT
UNIVERSITY

C-WAS Center
For Water And Sanitation

ARID COMMUNITIES
&
TECHNOLOGIES

Arghyam
Safe, sustainable water for all

CEPT University, India

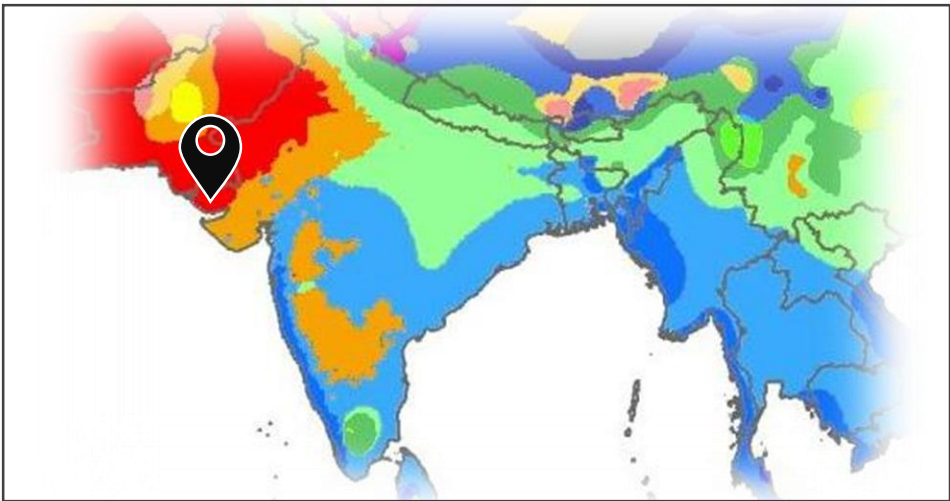
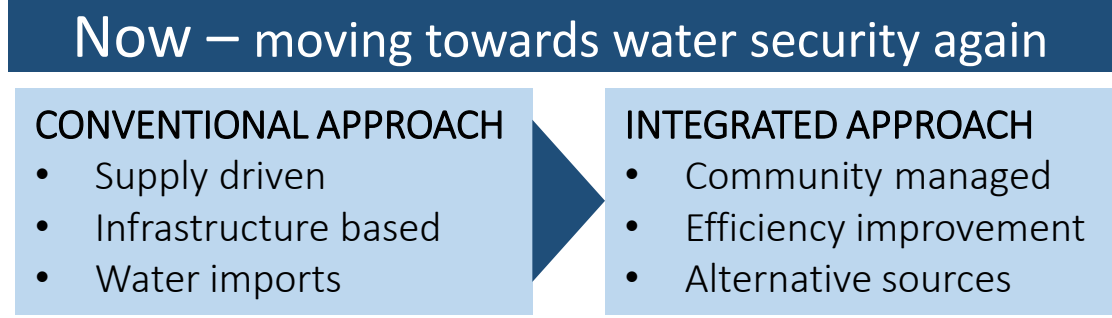
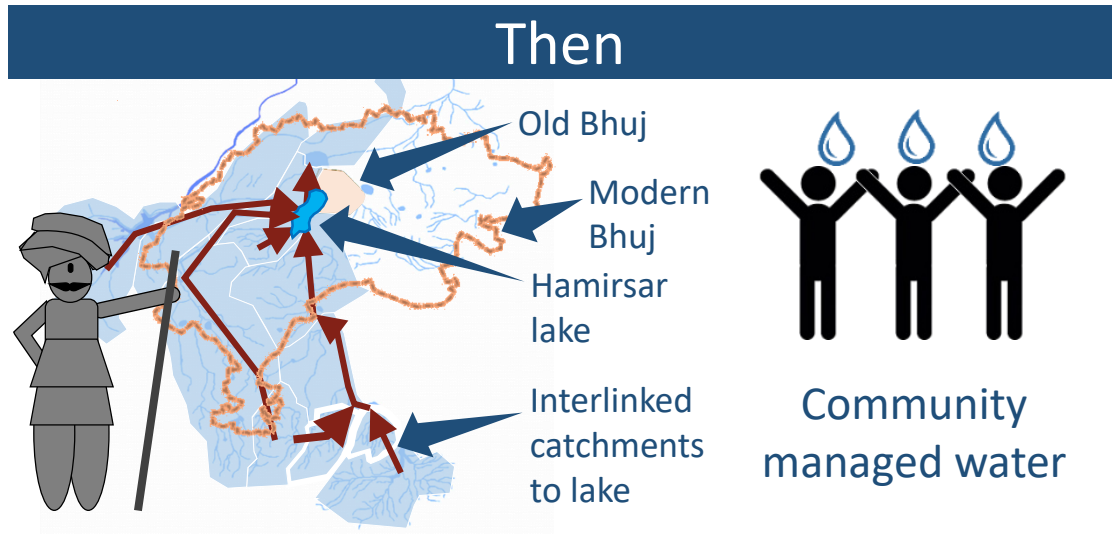


Bhuj has survived for centuries in an arid climate through a clever system of interlinked catchments and community managed groundwater...

This system broke down with modern piped supply and management...

Now the citizens are working towards water security again and have achieved some success...

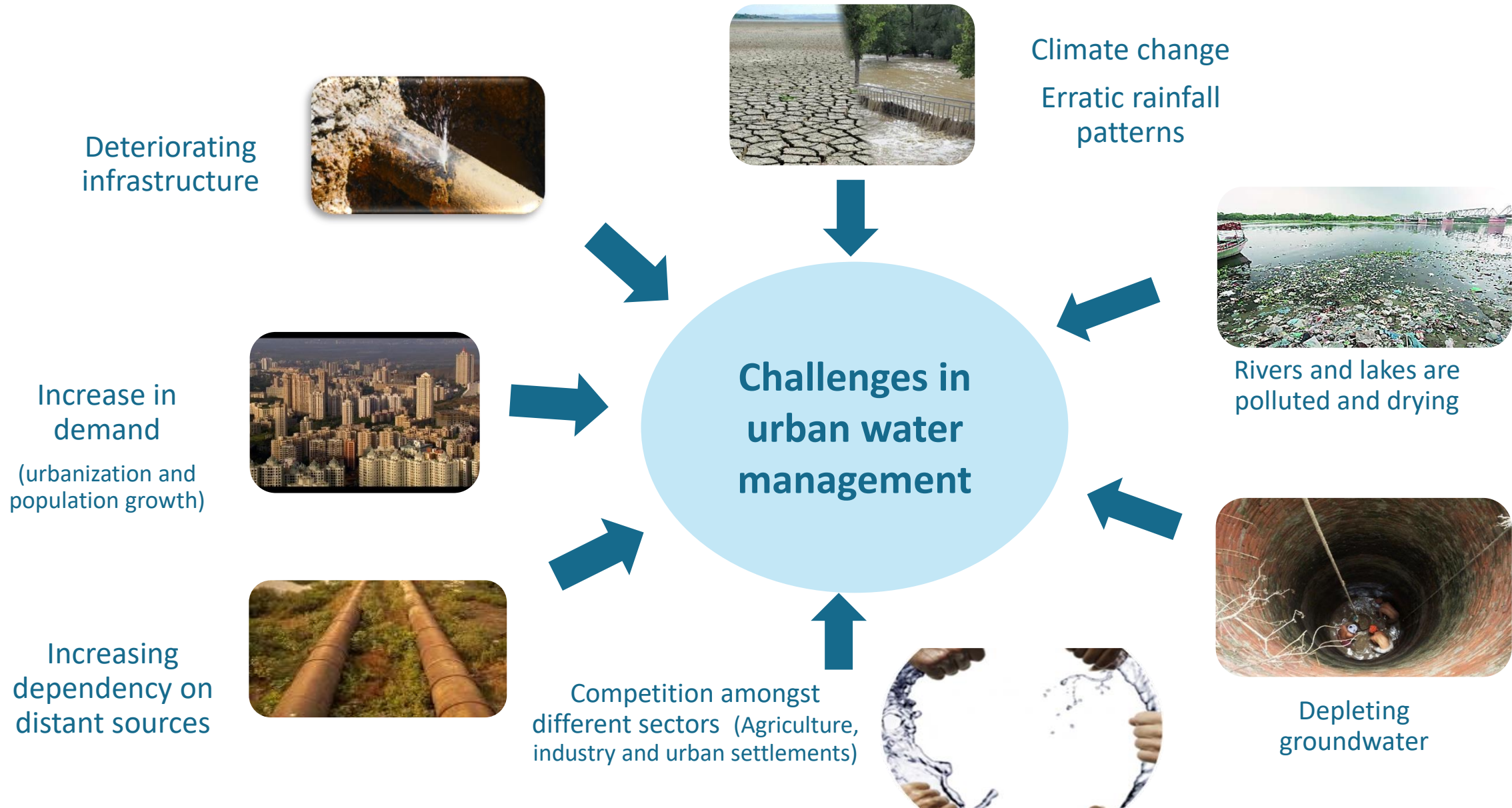
How to replicate this in other cities?



Urban Water Security Planning Toolkit

1 Need and concept of this toolkit	3 Introduction: Urban Water Security Planning Toolkit	M1 Urban water supply system assessment <small>Service and Citizen Issues and challenges Future demand</small>
2 Approaches and toolkits for water security planning	? Is your city water secure? Rapid assessment by citizens and ULB	M2 Understanding urban water resources <small>History of use Rainfall Surface water and wetlands Aquifer and Groundwater</small>
		M3 Exploring new opportunities for water security planning <small>Rain GW Recharge Source Reuse WWT Reuse Reducing NRW Improving quality Wastewater Continuous supply Demand management</small>
		M4 Citizen involvement in water resources management <small>Awareness and campaigning Technical demonstrations Involvement in decision making Involvement in assessment and implementation</small>
		M5 Institutional and regulatory framework <small>Institutions Acts Regulations Policy Stakeholders Gap assessment Strengthening framework and institutions Capacity building</small>

Water management in cities is more challenging...



Need to move away from conventional approach towards integrated approach

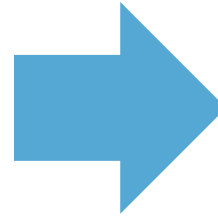
CONVENTIONAL APPROACH

Planning at city scale

Transportation of water from distant sources of water

Building New infrastructure

Lack of participatory approach



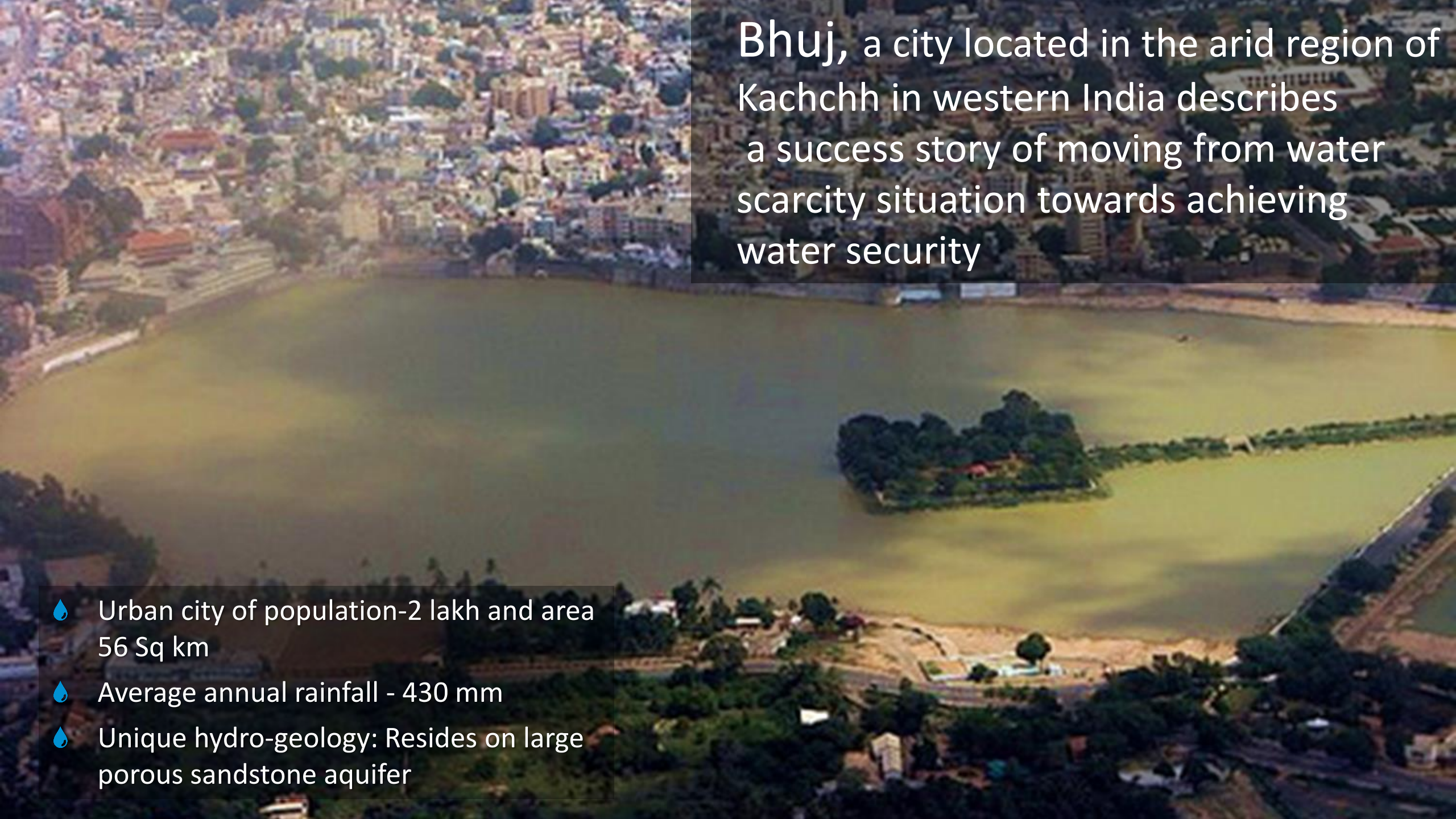
INTEGRATED APPROACH

Planning at watershed scale

Augmentation of local sources, Exploring alternate sources

Increasing efficiency of existing systems

Integrated and participatory approach



Bhuj, a city located in the arid region of Kachchh in western India describes a success story of moving from water scarcity situation towards achieving water security

- 💧 Urban city of population-2 lakh and area 56 Sq km
- 💧 Average annual rainfall - 430 mm
- 💧 Unique hydro-geology: Resides on large porous sandstone aquifer

Bhuj Approach



1 Technical studies

2 Strong Citizen Participation

3 Revival of traditional knowledge and Exploring alternative water systems

4 Local government Support

Technical studies as backbone for work



1

Understanding

- Local hydro-geology
- History of water management

Aquifer geology

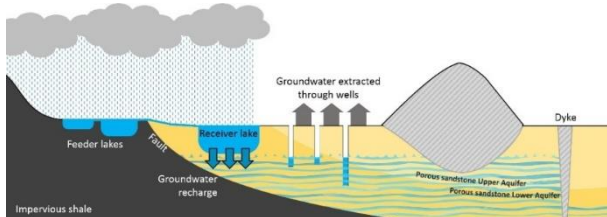
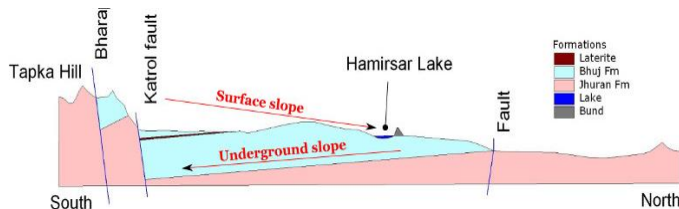
Watersheds, Lakes

Rainfall and Climate

Water use history

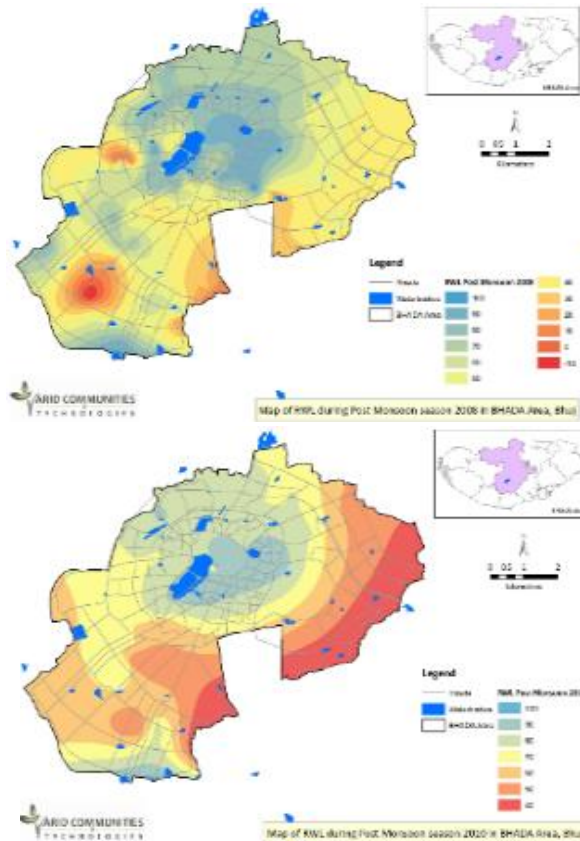
Sources of water

Infrastructure development



2

Groundwater monitoring



3

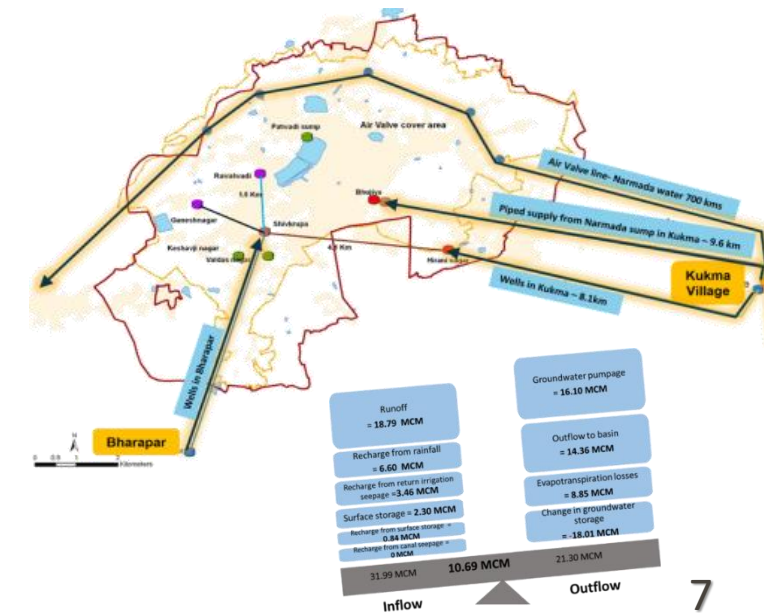
Current water supply system and key issues

Sources, demand and costs

Quality and quantity

Sustainability

Water balance study



'Parab' Para-hydrogeologists- Youth as Champions

1 **Parab-** Gujarati Word for “one who supplies free water to thirsty travelers”



2 Same term given to para hydrogeologists in Bhuj area, who help demystify groundwater management



3 Drawn from local communities and given extensive training and on-field experience.

LEARNING THROUGH THEMATIC MAPS
Water Resource planning

Land Use Map	Surface Geology Map	Water Resource Map	Land Foam Map	Watershed Map
<ul style="list-style-type: none"> Mapping of grazing land, source wise irrigation etc. Area calculation from the map 	<ul style="list-style-type: none"> Identification of rocks especially aquifer rocks Mapping of surface exposures of aquifer rock 	<ul style="list-style-type: none"> Mapping of existing surface water resource development Well inventory Beginning of sub-surface Understanding of water depth and quality (TDS etc) 	<ul style="list-style-type: none"> Identification of land foam conducive for water resource development 	<ul style="list-style-type: none"> Mapping of micro-watershed Water demand in each micro-watershed Run-off calculation

4 Parabes work alongside researcher and help local government collect relevant data



5 Involved in local hydrogeology related activities

Aquifer Mapping	Groundwater monitoring
Watershed Delineation	Working with locals & LG

6 Parabes have now become self-reliant and generate income through external consultancies



Citizen Forum

1

Challenges in citizen involvement

Water system managed by government

Diverse and heterogeneous communities

Acceptance of change difficult

Large scale



2

Citizen forum - JSSS *Jalstrot Sneh Samvardhan Committee* (Water resource development committee)

Bhuj based NGO. ACT, provided initial support, technical backing and championing the cause

Local lake - *Hamisar* – common interest point

Initially made of up of senior citizens

Sub-committees for separate water catchments

Childrens' wing

Collaboration with Parab and advocacy with local government



3

Rallying and mass awareness in collaboration with local NGO - ACT

Jalgatha - "Water story walks" explaining local hydrogeology

At local cultural and religions festivals

Lake clean up drives

Childrens' activities

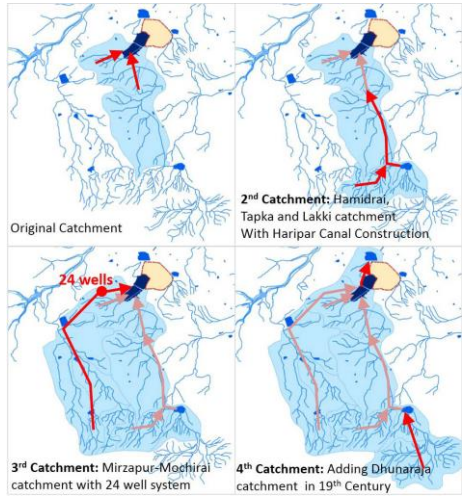


Today the committee is influencing the decision making process by the local government

Exploring alternative water supply systems

1

Revival of local, traditional sources



De-silting lakes with public participation

2

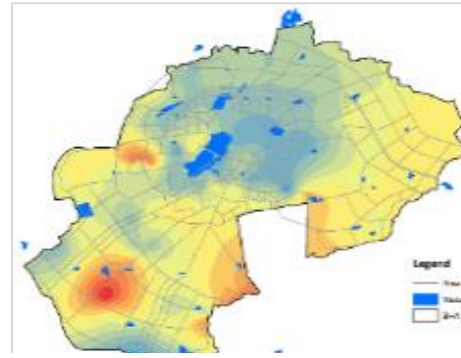
Rainwater Harvesting



Student managed rain water harvesting in school

3

Groundwater recharge



Ensuring viability of groundwater borewells

4

Wastewater Reuse



Greening by DEWATS

Through...

Citizen Involvement

Pilot project demonstrations

Parab involvement

Repairing traditional lake catchment system developed by old rulers



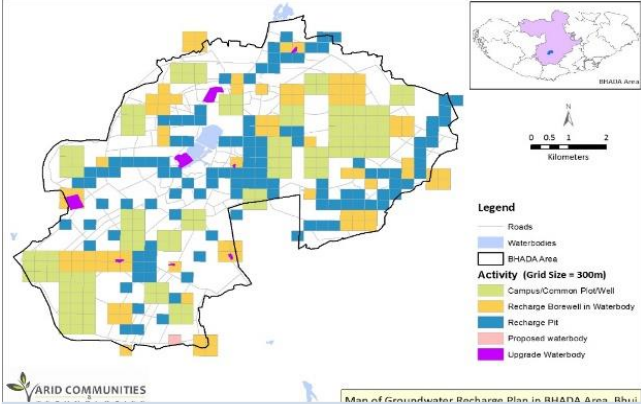
Revival of old unused well for a slum



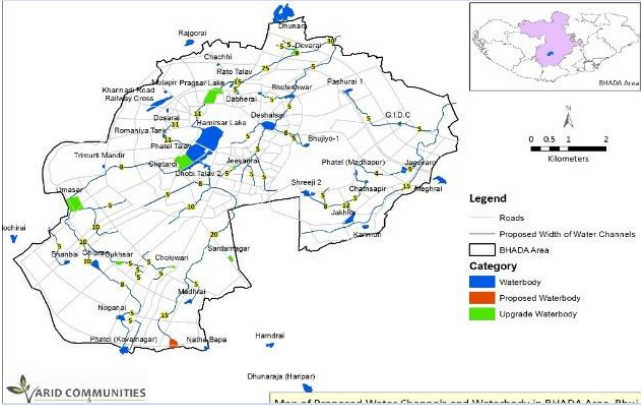
Flood control through GW recharge for a housing colony

Support to Local government

1 Inclusion of hydrogeology in land-use planning

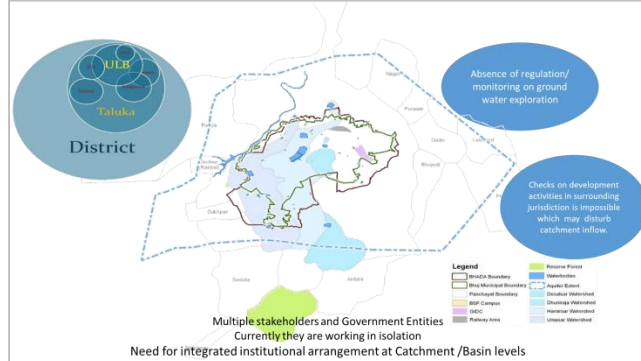


Ground water recharge plan

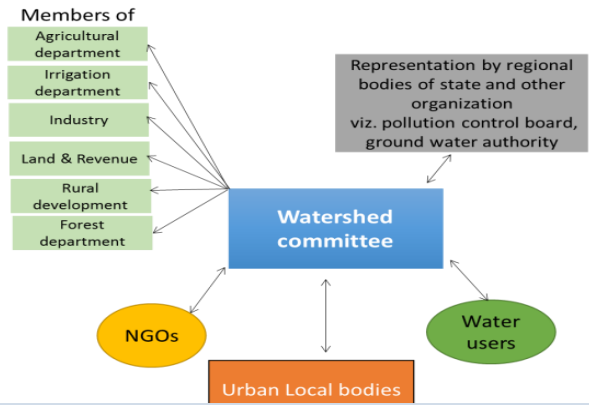


Water channel conservation plan

2 Strengthening institutional framework



Gap Assessment- overlap of institutions



Identification of key stakeholder

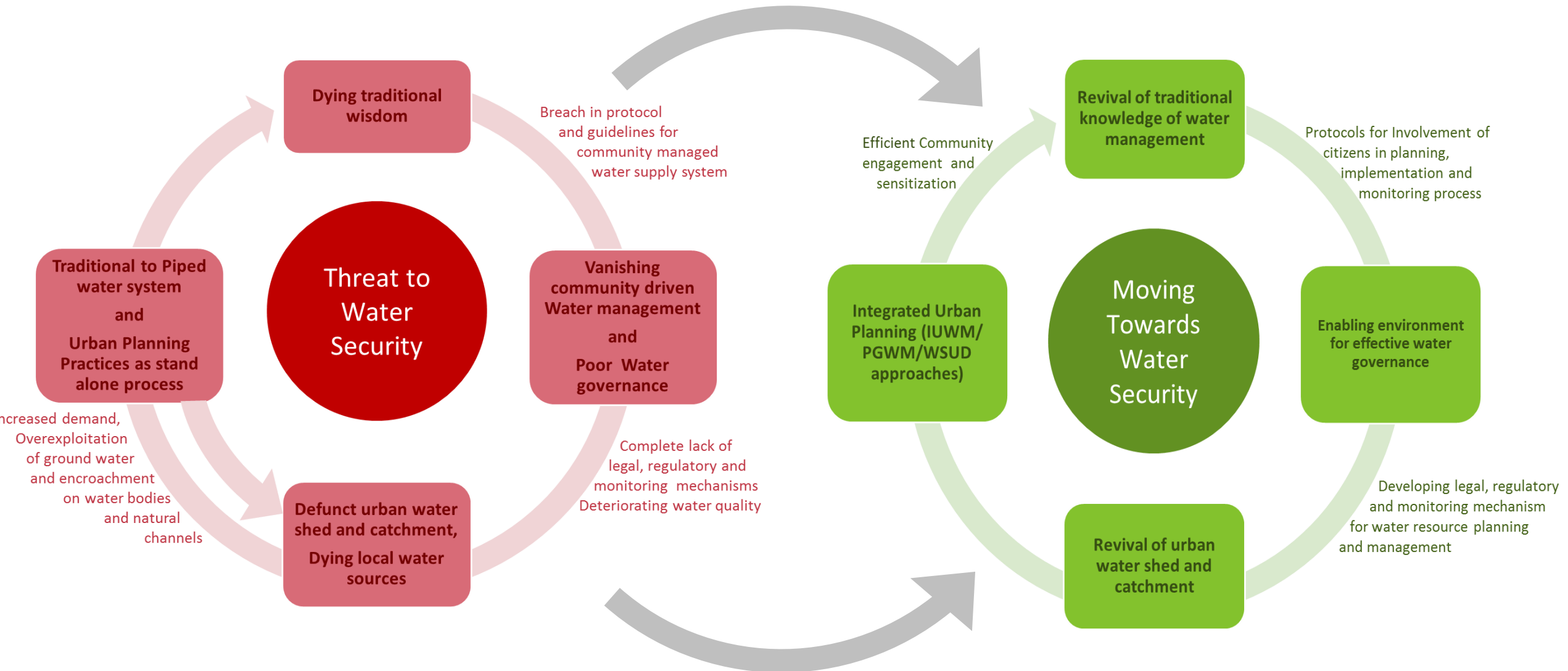
3 Sensitization workshops for officials



4 Taking advantage of current government schemes and programmes



Bhuj is moving from Vicious cycle to Virtuous cycle of water Security



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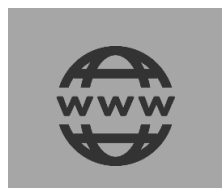
Roadmap of Bhuj Success

Thank you . . .

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