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Tools for Urban Water Security Planning and Management

inspiring change

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CRDF CEPT RESEARCH AND DEVELOPMENT FOUNDATION
CEPT UNIVERSITY

INDIA FACES WORST WATER CRISIS IN ITS HISTORY

12% of India's population is already living the **'Day Zero'** scenario

21 major cities (Delhi, Bengaluru, Chennai, Hyderabad and others) are racing to reach **zero groundwater levels by 2020**, affecting access for **100 million** people --- NITI Aayog

Demand for **potable water** will outstrip supply by **2030** if steps are not taken

Source: India Today article on Droughts to flash floods: Can India weather the climate crisis published on August, 2019; New York Times article on India's omnious future: Too little water, or far too much; Down to Earth (2019) "India's water crisis"; NITI Aayog (2019) "Composite water resource management" Image Credits: Business Line article on In drought run Marathwada, wells run dry published on June, 2019; AFP/Getty Images; Pradeep Gaur, MINT;

WATER MANAGEMENT IN URBAN AREAS MORE CHALLENGING!

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Climate change and erratic rainfall

Overexploited, unregulated and depleting groundwater

Increasing population and water demand

Competition in sectors - Agriculture, industry, household

Deteriorating infrastructure

Increasing dependency on distant sources

Picture credits: Ajay Verma, Reuters; Priyanka Prasar, Mint; Getty images

MOVING TO WATER-WISE CITIES

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CONVENTIONAL APPROACH

- Supply side management
- Planning at city scale
- Reliance on distant water sources and inefficient infrastructure
- Different sectors of water cycle managed separately
- Lack of participatory approach

INTEGRATED APPROACH

- Both supply side and demand side management
- Planning at watershed scale and making Basin connected cities
- Regenerative water services
- Treating water cycle as one unit
- Integrated and participatory approach making water-wise communities

Based on IWA, Water-wise cities principals and CWAS, CEPT University's studies

BHUJ A CITY LOCATED IN GUJARAT, INDIA HAS SURVIVED AN ARID CLIMATE FOR CENTURIES

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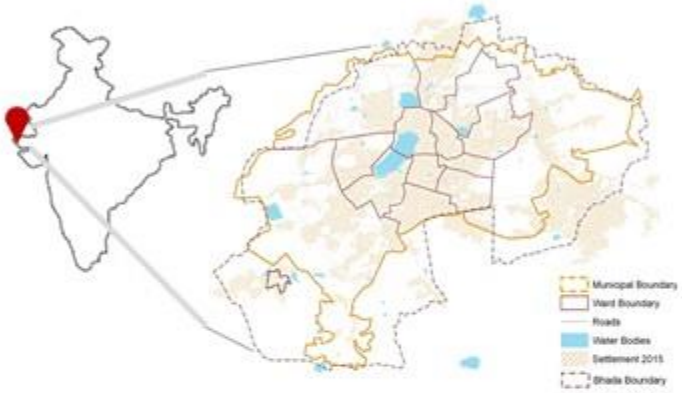
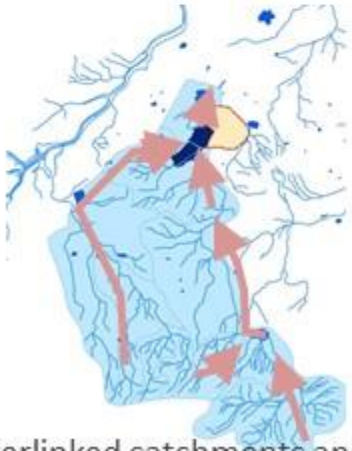


Traditional Water Systems in Bhuj

Water conservation and ground water recharge

Canal linking the catchments



Interlinked catchments and lakes

Community managed lakes and well systems

NEGLECT OF CATCHMENTS FOR BHUJ WATER SUPPLY

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Collapse of Interlinked Catchment System; Many drains encroached

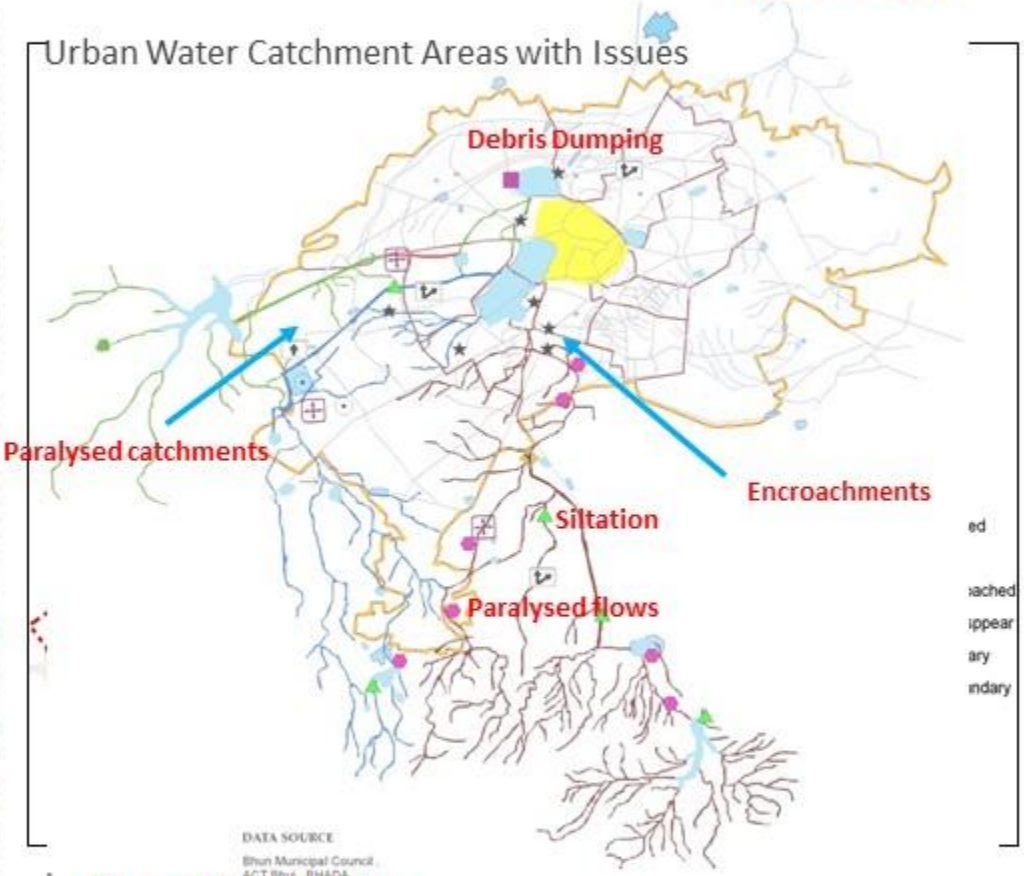
Less Water Flowing in lakes which dried up many lakes

Encroachment and construction on lakes

Disappearance of lakes exacerbated flooding Issues

There was less water for recharging the aquifer

Groundwater level fell and there was declining quality of water



From **66** lakes to

7 vanished

EFFORTS OF COMMUNITY TO REVIVE WATER RESOURCES AND WATER SUPPLY IN BHUJ

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1. Technical studies
2. Community mobilization
3. Revitalization of Urban Watershed
4. Exploring Alternative sources
5. Advocacy to Local government and Convergence with existing schemes and policies

ARID COMMUNITIES & TECHNOLOGIES

How to replicate in other cities?

URBAN WATER SECURITY TOOLKIT

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Lessons from Bhuj experience

+

Existing concepts, toolkits and case studies

Technical studies

Community mobilization

Revitalization of Urban Watershed

Exploring Alternative sources

Advocacy to Local government and Convergence with existing schemes and policies

IUWM
Integrated Urban water Management

WSUD
Water Sensitive Urban Design

PGWM
Participatory GroundWater Management

SWITCH
toolkit for IUWM

GWP
toolkit

IRAP
toolkit

Simplify for different types of stakeholders !!!

URBAN WATER SECURITY PLANNING TOOLKIT

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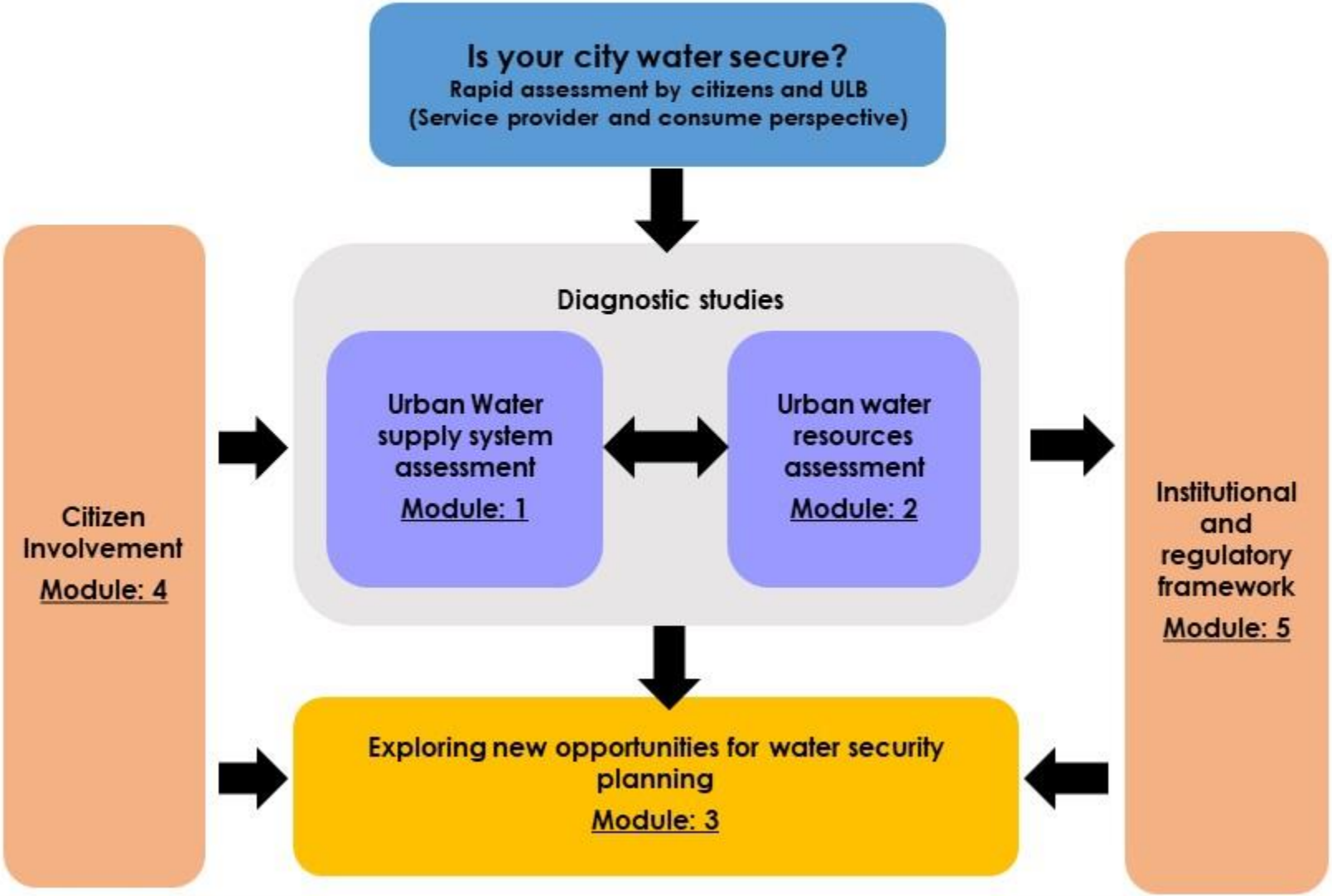

KEY FEATURES OF THE TOOLKIT

- This toolkit can be adapted and tailored according to the context and needs of each city.
- Focus on urban water services and urban water resources together.
- The resources are in the form of case studies and decision supporting tools.
- The tools and methods are aimed at a wide user base including local governments, city officials, planners, consultants engaged in city planning as well as NGOs and civil society groups championing the cause of urban water security.
- It is intended to help other cities develop their own Water Security Plans.

IS YOUR CITY WATER SECURE?

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Usual Answers

City management's outlook

Citizen's outlook

A quick assessment framework is prepared for city managers, planners and government and citizens

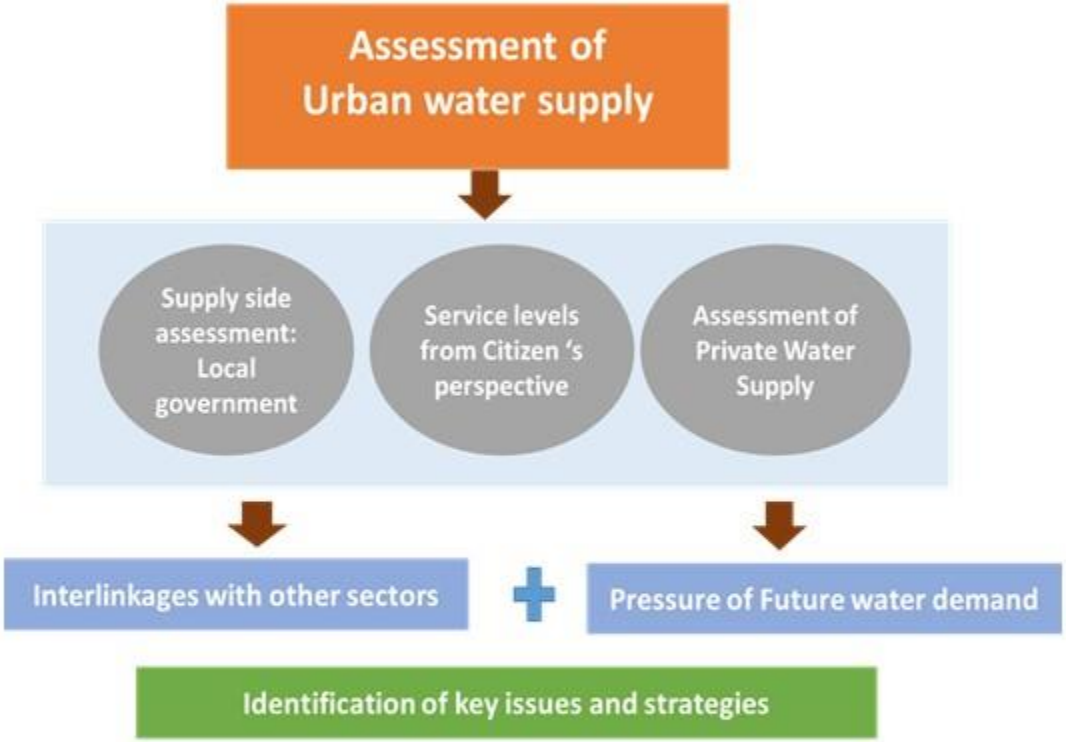
Questions a city must ask itself

	Questions a City must ask itself .....
1	Is the city able to meet the water demand @135 lpcd?
2	Is the water supply infrastructure covering all localities of the city including all slums?
3	Is the city providing daily water supply with fixed duration to all localities?
4	Is there enough supply during all seasons?
5	Is Non Revenue water < 20%? i.e. water and revenue losses in the distribution system
6	Has the city been free from outbreaks of water related diseases in the past year?
7	Is the groundwater potable and without any colour, taste or odour?
8	Are surface and ground water sources for municipal supply "local" (i.e. same river basin as the city/ aquifer falling inside city boundary/ from less than 50 kms away)?
9	Are groundwater levels in the city constant (i.e. seasonal levels similar to previous years)? No cases of borewell deepening?
10	Will the city be able to sustain projected demand at current supply levels for the next 10 years?
11	Is the city free from flooding in inhabited areas?
12	Are Water bodies protected and without instances of land-use change from "water body" to any other land-use in the city plan?

Questions a city must ask its citizens

	Questions a City must ask its citizens .....
1	Do you get adequate water for your family's needs?
2	Do you get regular water supply?
3	Are you satisfied with the quality of water?
4	Do you get adequate supply in summer months ?
5	R.O. or bottled water is not required
6	During rainy season, does water quickly drain off from your locality?
7	Do you feel the groundwater level in your area is same or increasing with each passing year?
8	Are you satisfied with the quality of groundwater in your area?
9	Do you feel the city government is taking adequate steps to conserve/ protect water sources?
10	Do you practice water conservation/ harvesting?

M1: URBAN WATER SUPPLY SYSTEM ASSESSMENT



Main Tools for assessment

- Checklist for data collection
- NRW assessment and water audit
- Template for analysis of private service providers
- Population projection
- Water quality testing regime
- Private sources assessments
- Water profile and indicators calculation tool
- Water demand projection

Outputs:

- City water profile and service performance indicators
- Spatial analysis and identification of intervention areas

M2: UNDERSTANDING URBAN WATER RESOURCES

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Water resources inventory

- Rainfall and its potential
- Watershed and surface water assessment
- Aquifer and GW assessment
- Documenting and understanding history of water management

Outputs:

- Land suitability and Vulnerability analysis
- Water balance assessment

Main Tools for assessment

Tools for water resources inventory	Guide on how to mark water shed
Resources for Aquifer assessments	Detailed steps for assessing rainfall and its potential
Protocols for Groundwater and surface water monitoring	Template for Water balance

M3: EXPLORING NEW OPPORTUNITIES FOR WATER SECURITY PLANNING

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Based on assessment in module 1 and 2, identifying new opportunities.

Alternative Urban Water Sources			
Rainwater Harvesting	Revival of Local Water Sources	Groundwater recharge	DEWATS / Wastewater Reuse

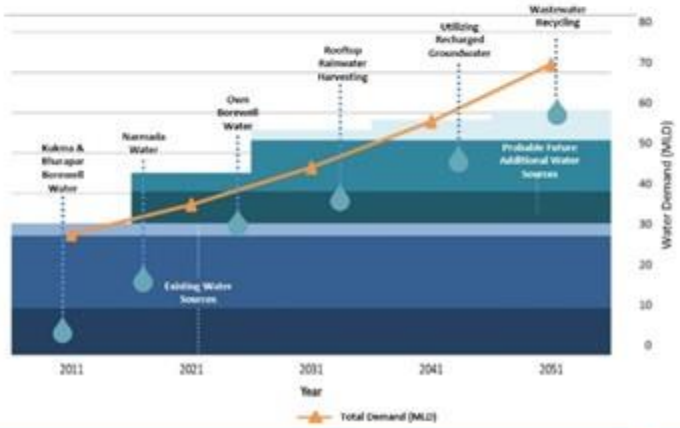
Increasing Efficiency of Existing water systems			
Reducing Non revenue water (NRW)	Pricing as a tool for water demand management	Improving quality of water supply	Metering of water supply

Output:

- Developing comprehensive urban water scenarios

Main Tools for assessment

- Resources for rooftop RWH
- Lake conservation practices and guidelines
- Assessing NRW template
- Guides for Artificial recharge
- Wastewater reuse guidelines
- Water tariff model



M4: CITIZEN INVOLVEMENT IN WATER RESOURCES MANAGEMENT

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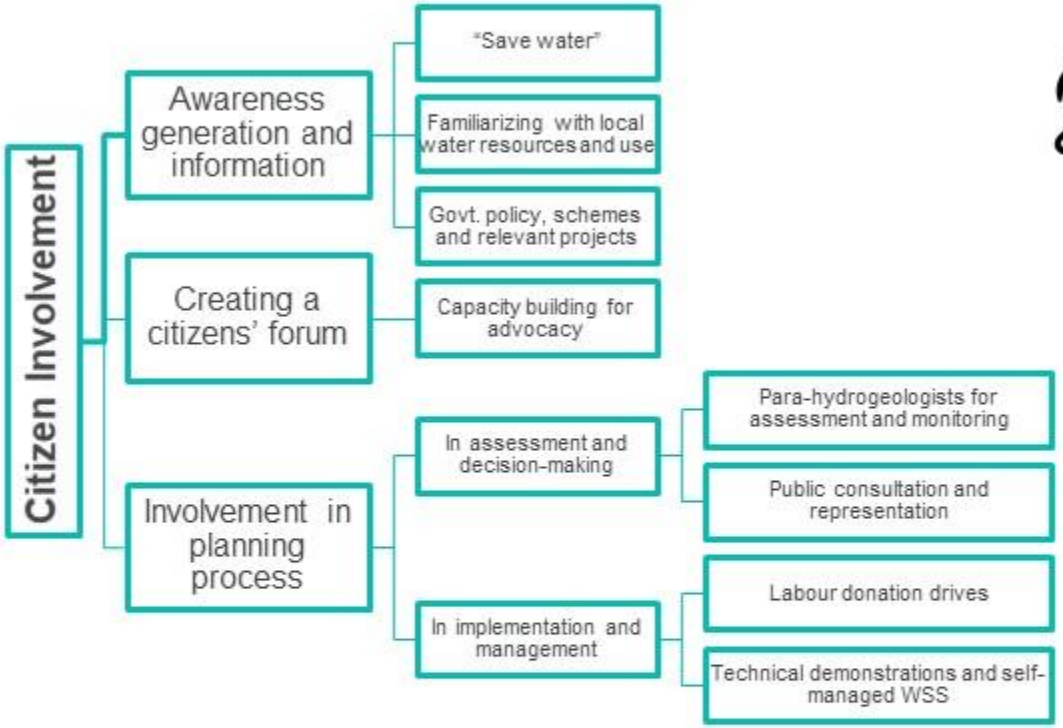

Main Tools for assessment

Guides and resources for IEC

Course outline for para-hydrogeologist training

Training modules for water committees

Training modules for community based water management

M5: INSTITUTIONAL AND REGULATORY FRAMEWORK

Assessment of existing institutional and regulatory framework

- Assessing existing Acts at all government tiers
- Mapping organizational linkages

Identifying gaps and overlaps in the existing framework

- Gap assessment: policy and organization level
- Identifying missing opportunities in organizational structure and policies

Strengthening the framework: coordination and facilitation

- Institutional integration
- Monitoring framework
- Data sharing – a platform
- Inclusion of hydrogeology in mainstream planning

Capacity building and learning alliance

Main Tools for assessment

- **Defining roles and responsibilities**
- **Checklist for gap assessment**
- **Existing practices and Case studies**

URBAN WATER SECURITY PLANNING TOOLKIT

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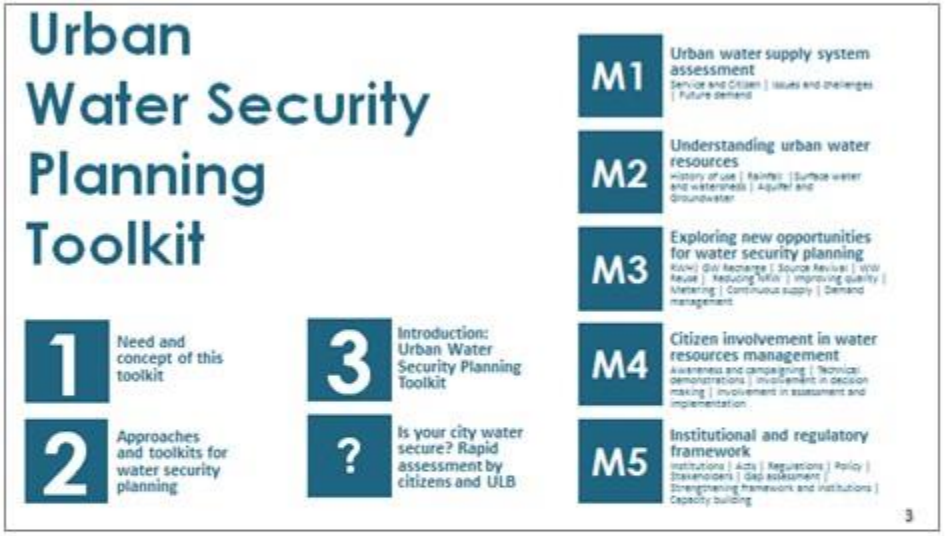
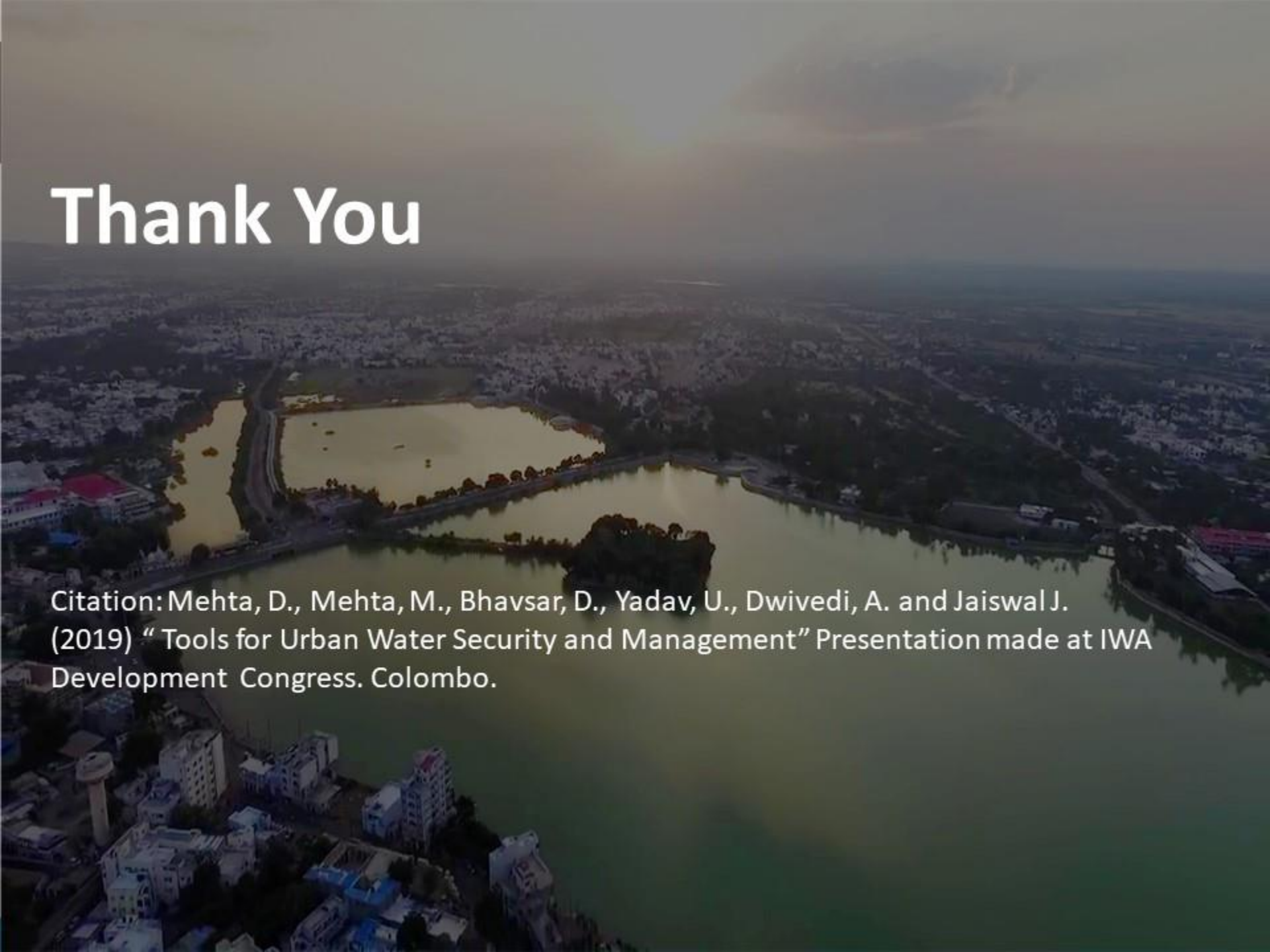


Urban water security planning toolkit available at: https://www.pas.org.in/Portal/document/Urban Water Security Planning Toolkit.pdf

Thank You



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