

An aerial photograph of a city with a large river winding through it. The sun is low on the horizon, casting a golden glow over the scene. The river reflects the light, and the city buildings are visible in the foreground and background.

# MOVING CITIES TOWARDS WATER SECURITY

## Workshop Report

8<sup>th</sup> July, 2016  
Ahmedabad



CEPT University, Ahmedabad

## “MOVING CITIES TOWARDS WATER SECURITY”

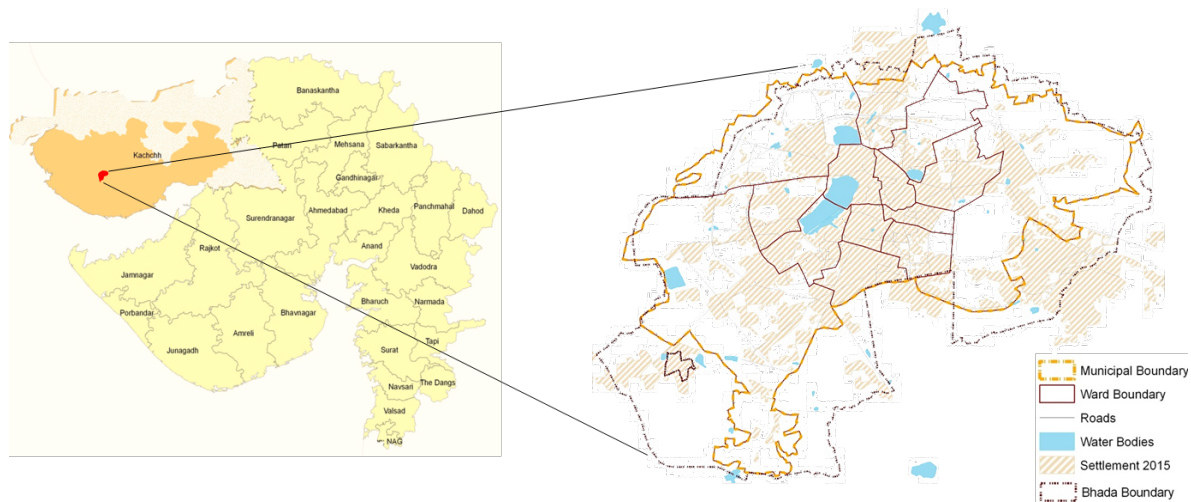
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#### Background

Cities have become more susceptible to water scarcity than ever before. Climate change and resultant uncertain weather patterns are forcing cities to take extreme steps to combat severe water crisis, especially during summer months. Trains loaded with water have been sent to many drought affected cities this year. It is time to think of a more sustainable solution for urban water supply services.

Bhuj, a city located in the arid region of Kachchh in Gujarat has successfully survived centuries of low rainfall and droughts. Its survival was made possible due to the strategic water reserves created through a traditional water management system, linking watersheds, lakes and wells. The water resource management system was designed to satisfy water demand of the city even in a drought year. It showed an excellent application of knowledge and wisdom in using the special geo-hydrology of the region and implementation through a participatory management of water resources.



However, over the years, this conventional wisdom appears to have been lost. With city’s growth, many water bodies in the city have disappeared, and ground water quality as well as quantity is depleting at a fast rate. Realizing the deteriorating situation of water resources, Arid Communities and Technologies (ACT), a NGO in Bhuj, initiated work on urban Participatory Ground Water Management (PGWM). ACT’s efforts combine a deep knowledge of history of water resources and

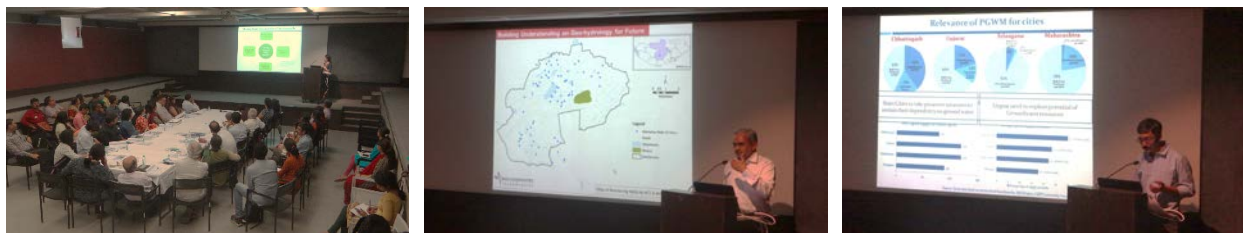
an ongoing technical assessment of water resources through participatory ground water management process. It has conducted many demonstration activities. Its efforts have led to influencing the new Development Plan and local government programmes.

CEPT University, with support from Arghyam, Bangalore, has documented the Bhuj story – its unique history and ACT's activities in Bhuj, to highlight key lessons. CEPT intends to translate these lessons to develop generic guidelines that can be used in other cities and pave way for them to become water secure.

## Key Highlights

It is in this background that a workshop was organised at CEPT University, Ahmedabad on 8th July 2016, to share Bhuj's experiences and discuss how cities can become **water secure**. The participants also discussed the approach to a guidance framework for urban Participatory Ground Water Management (PGWM) proposed by CEPT that outline efforts required by local stakeholders and urban planners for their cities to become water secure.

The presentation by the CEPT team was on "Moving Bhuj towards water security". This presentation focused on the past and present water resources and water supply of Bhuj city. It also presented the PGWM approach adopted by ACT and its implications on Bhuj water resources. ACT presented its work on Hydro-geology of Bhuj and PGWM efforts. The CEPT team also made a presentation on an initial outline for developing a guidance framework on urban PGWM.



Key highlights from the discussions at the workshop are summarized below.

### 1. Defining Urban Water Security and Watershed Boundaries

The story of Bhuj showed that concepts of 'water security' and 'participatory approach' in the urban context are new and important concepts. Water security has generally been defined in a broad manner in global discussions. For example, the UN water defines it as "the capacity of a population to safeguard sustainable access to adequate quantities of acceptable quality water for sustaining livelihoods, human well-being, and socio-economic development, for ensuring protection against water-borne pollution and water-related disasters, and for preserving ecosystems in a climate of peace and political stability"<sup>1</sup>. Leading researchers Grey and Sadoff (2008) define it as "the availability of an acceptable quantity and quality of water for health, livelihoods, ecosystems and production, coupled with an acceptable level of water-related risks to people, environments and economies"<sup>2</sup>. In IUWM, urban water security is viewed within the



<sup>1</sup> UN Water (2013), "Water Security and Global Water Agenda: A UN-Water Analytical Brief", UN-Water

<sup>2</sup> Grey, D. and Sadoff, C. W. (2007) "Sink or Swim? Water security for growth and development", Water Policy, 9, p. 545-571



context of “water supply, storm water and waste water as components of an integrated physical system” and its links with the “organizational framework and a broader natural landscape”<sup>3</sup>. It was suggested by participants that, it will be useful to develop a definition of urban water security in the Indian context.

A common theme in urban water security is the importance of watershed based approach. In this context, there was considerable discussion on how to delineate the urban watershed boundaries. While the basic definition and approach to watershed remains the same, it is important to consider the effects of development and construction that often takes place on natural drains in urban areas. In any city that takes up planning and PGWM approach, one of the first steps would be to delineate watershed boundaries.

It was also suggested that the new Government of India programmes such as AMRUT and Smart Cities need to incorporate the concepts of urban water security.

The discussion further focused on deciding the boundary for the management of water and for planning. There was some debate on governance aspect and difficulties of managing a watershed boundary, or an aquifer boundary, given administrative overlaps. The concept of carrying capacity of the ecosystem was brought up and participants suggested assessing carrying capacity based on ground water availability.

## **2. Understanding and Focusing on Local Water Resources**

Participants agreed that traditional wisdom around water security based on ground water and lakes has been lost. It was felt that a local history of water resources was needed to be documented for cities in order to plan for water security. One of the solutions proposed was to understand aquifers and ground water with the help of the local people. Such an approach has been successfully used in rural areas and can be adapted in urban areas. Ensuring that urban water sheds become functional and rejuvenate lakes was considered essential. Recharging the ground water with the help of rain water harvesting or with the help of treated wastewater suggested as mandatory practice. This would indeed help to balance the overall hydro geology and water resources of a region.

Participants were in agreement that water security can never be obtained by transporting a huge amount of water from outside. Supplying unlimited water to the cities and trying to augment it with the help of external resources merely leads to the negligence of local resources. It was inferred that the biggest threat to water security in Bhuj is its dependence on Narmada water. It was suggested that there should be a policy at a national level to limit the transfer of water from a long distance and between watersheds.

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<sup>3</sup> Kumar Dinesh (2014), “Thirsty Cities: How Indian cities can meet their water needs”, Oxford University Press, p. xvii.

### **3. Planning for Water as a Key Component of Urban Planning**

Many participants suggested that water resources should be a key component of urban planning. Local water resources are generally not considered by planners while making an Urban Development Plan. Urban planning needs better integration of hydro-geological aspects in land-use planning. This would require a better understanding of geo-hydrology and micro aquifers, delineation of local watersheds and a history of water resources planning in the city. Urban planning needs to be based on an analysis of local watersheds and channels in planning of landuse and road systems. In this context ACT has recently made an analysis of channels required for better storm water planning in the Bhuj based on an analysis of rainfall patterns. These have been suggested for incorporation in the new Bhuj Development Plan which is currently under preparation.

Urban planning, when aligned with water resources can also help better promote reuse of treated wastewater. This may require exploring the possibilities of centralized treatment and reuse within urban areas by activities such as gardening, recharge etc.

CEPT has proposed to develop guidance framework for PGWM with a focus on urban planners. This was welcomed by participants. A suggestion was also made to take up a student exercise on water sensitive Urban Development Planning at the CEPT University.

### **4. Critical Importance of Information and Regular Monitoring**

There was a consensus among the participants about the critical need for good information and monitoring as key to successful PGWM and improved urban planning. Many referred to “No management without measurement”. Information, measurement and monitoring are needed for planning and management of water in a number of ways. Lack of information about quantity of water supplied leads to unaccountability and water losses. Most felt that metering of water consumption by households and other users is critical. This will help measure consumption and losses. When combined with proper pricing, it would make people better understand the “value” of water. Besides this measurement, a good system is needed to regularly monitor ground water for both quantity and quality. This will help to better understand local resources on an ongoing basis.

To start with, a good information base for the city’s water resources is needed. This includes basic information on contours, water bodies, natural and altered water channels in the urban context, their width and depth, watersheds, aquifers, rainfall patterns etc.. Some of these will require granular information at city scale which is not readily available. All participants agreed that the efforts made by ACT to create this type of base information have been critical in introducing a unique PGWM model. Participants argued that currently Central Ground Water Board (CGWB) data on aquifer and watershed are available on a macro scale and for undertaking similar studies in other cities more detailed data is needed. Efforts are needed to work with state level agencies such as the (CGWB) to identify the data needs and create the needed database for different cities. This will

most likely require mapping of aquifers at a more granular and micro levels than currently being done. Representatives of CGWB at the workshop offered to work with the CEPT team to develop such information on a pilot basis in a few urban areas.

## 5. Rethinking the Institutional Framework

There was considerable discussion on the role and overlapping jurisdictions of various stakeholders involved in planning and management of urban water resources. The ACT described the civil society based organization Jalstrot Sneh Samvardhan Samiti (JSSS) that it had set up. ACT has also supported other stakeholders to build awareness among local population and build their capacity for regular monitoring.

In the context of issues of overlapping jurisdictions and multiplicity of authorities, it was suggested to map out stakeholders, decision makers and their roles and responsibilities. Many participants suggested the need to explore appropriate institutional arrangements at watershed levels with representation from all stakeholder institutions and civil society. It would be useful to look at the structure of River Basin Organizations in several other countries.

On the topic of regulating individual behaviour, there was a discussion about having an “imposed rule system” or a Leviathan approach in PGWM. In the case of the second, there were ideas about how people could be directly connected to their water resources. One was to understand how people connect to water like the case of Hamirsar in Bhuj.



In the Indian context, it is be important to review the provisions in the existing legislations related to water management. The participants drew attention to the model legislation as well as the recent Acts for Ground Water in Maharashtra. These may help to identify possibilities of appropriate institutional mechanisms that cut across administrative boundaries and also enable participation of various stakeholders.

## 6. Developing a Guidance Framework for IUWM and PGWM for Urban Areas

CEPT presented an overview of available toolkits in the area of Integrated Urban Water Management (IUWM) and PGWM. It was also pointed out that there are several other guidelines which will need to be reviewed; such as for rain water harvesting in General Development Control Rules, Urban and Regional Development Plan Formulation and Implementation guidelines, Wastewater Reuse guidelines, guidelines for Rejuvenation of lakes, etc.

A suggestion was made that the toolkits prepared by CEPT should be very simple and can be understood by even non-technical persons such as civil societies and government officials.

It was also suggested to review the principles developed for PGWM for the rural context by Arghyam based on the work of many partners in India. These principles can be used as guiding principles and adapted for the urban context.

It was also suggested to include a section that explains Government processes to the lay person if the aim of the guidelines is to also enable civil society to carry out PGWM activities.



## The Way Forward

As a first step in the Way Forward, it was agreed to hold a meeting with local stakeholders in Bhuj to share the findings. The Chief Officer of Bhuj Municipality, who participated in the workshop offered to organize such a workshop in Bhuj.

Further work will focus on a more in-depth understanding of decentralized solutions that ACT has developed for Bhuj and assess the potential of scaling up. This assessment will be done in the context of the technical feasibility and financial viability.



The feedback from this workshop will also provide some pointers for the development of guidelines for Urban PGWM – both for planners and for civil society stakeholders. Efforts will be made to assess the possibility of developing a good information base with adequate granularity to be of value in urban planning. Based on Bhuj experience, it will also include guidance on the regular monitoring systems. Possible role of state and local institutions in this approach will also be identified. Efforts will be made to establish links with these institutions to identify the measures needed for establishing such systems.

The meeting ended with thanks to all the participants for a lively and insightful discussion.



## Workshop Agenda

Time	Session	Presentation by
11:00- 11:15	Welcome and Workshop Objectives	CEPT, Arghyam
11:15- 12:00	Presentation on Moving Bhuj towards water security and evolving urban Participatory Ground Water Management (PGWM)	CEPT
12.00- 12.15	Discussion	
12:15- 13:00	Presentation on Hydro-geology and PGWM efforts in Bhuj	ACT
13.00- 13.15	Discussion	
13.15- 14.00	Lunch Break	
14:00-15:30	Discussion on developing guidance framework for urban PGWM	Round Table discussion
15:30-16:00	Wrap up and Closing Remarks	

## List of Participants

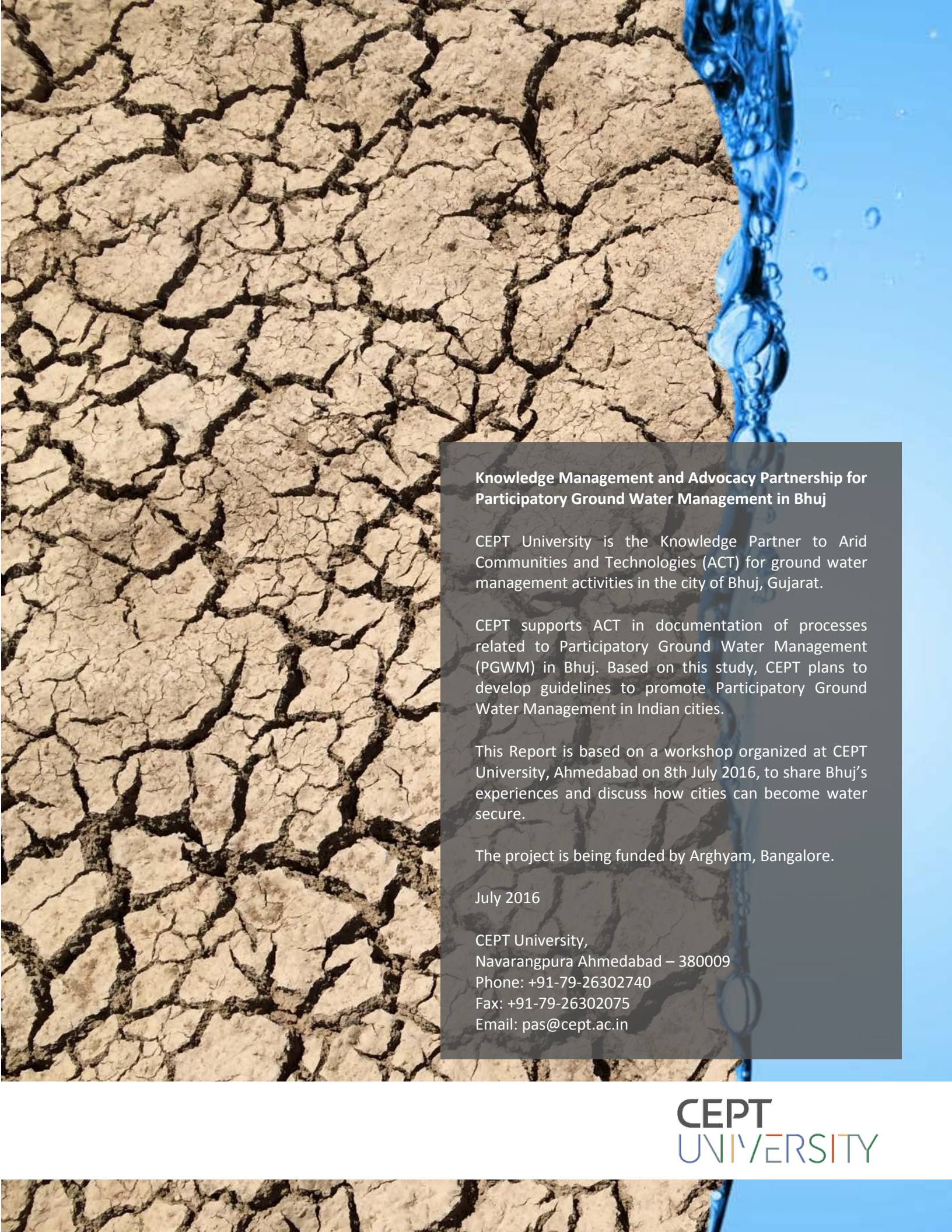
Sr. No.	Name of the Participant	Designation/ Organization
1	Mala Subramaniam	CEO, Arghyam
2	Sundar S.	Sr. Manager, Policy Research and Advocacy, Arghyam
3	Bishwadeep G.	Director Programmes, Arghyam
4	Madhavi Purohit	Senior Manager Programmes, Arghyam
5	R.K.Sama	WASMO(Retired)

Sr. No.	Name of the Participant	Designation/ Organization
6	B.K. Gupta	Sr. Hydrologist, CGWB, Gujarat
7	Mr. Anup Nagar	Regional Director, CGWB, Gujarat
8	Poonam Argade	Research Associate, CTARA, IIT Bombay
9	Mr. Vijay Anadkat	WPI India, New Delhi
10	K.C. Tiwari	Professor, MSU Baroda
11	Alka Parecha	People in Centre
12	Kavita Mehta	Independent Consultant
13	Mr. Arvind Singh	Urban Management Centre
14	Govind Chandpa	CO, Bhuj Municipality
15	Bhavik Thacker	Water supply Engineer, Bhuj Municipality
16	Dinesh G. Rathi	Gandevi Municipality
17	Dr. Yogesh Jadeja	Director, A.C.T., Bhuj
18	Manishba J. Jadeja	A.C.T., Bhuj
19	Tapan Ghosh	A.C.T., Bhuj
20	Mr. Gaurav Parmar	A.C.T., Bhuj
21	Divyaben C Vaidya	JSSS, Bhuj
22	Kamlesh Shah	JSSS, Bhuj
23	Prof. Vidyadhar K. Phatak	Dean, Faculty of Planning and Public Policy, CEPT University
24	Prof. Dinesh Mehta	Professor Emeritus & Director-PAS Project, CEPT University
25	Prof. Meera Mehta	Professor Emeritus & Director-PAS Project, CEPT University
26	Prof. Madhu Bharti	Professor, CEPT University

Sr. No.	Name of the Participant	Designation/ Organization
27	Prof. Neeru Bansal	Professor, CEPT University
28	Prof. Saswat Bandopadhyaya	Professor, CEPT University
29	Dr. C N Ray	Professor, CEPT University
30	Prof. Sejal Patel	Professor, CEPT University
31	Prof. Mona Iyer	Professor, CEPT University
32	Ms. Mahima Gupta	CEPT University
33	Ron Bergman	CPD, CEPT University
34	Mr. Shailesh Vyas	Director, CRDC, CEPT University
35	Arwa Bharmal	CEPT University
36	Kartik Raman	CEPT University
37	Mahroof Mohammad	Research Associate, CEPT University
38	Dhruv Bhavsar	Senior Research Associate, CEPT University
39	Aasim Mansuri	Senior Research Associate, CEPT University
40	Jaladhi Vavaliya	Senior Research Associate, CEPT University
41	Dhara Shah	Senior Project Executive, CEPT University
42	Upasana Yadav	Research Associate, CEPT University
43	Vishwa Trivedi	Research Associate, CEPT University
44	Aditi Dwivedi	Research Associate, CEPT University
45	Ashish Sontake	Research Associate, CEPT University
46	Urvi Patel	Research Associate, CEPT University
47	Panini Vaidya	Research Associate, CEPT University

Sr. No.	Name of the Participant	Designation/ Organization
48	Jigisha Jaiswal	Research Associate, CEPT University
49	Yugasha bakshi	Research Associate, CEPT University
50	Nilesh Parmar	Research Associate, CEPT University





## Knowledge Management and Advocacy Partnership for Participatory Ground Water Management in Bhuj

CEPT University is the Knowledge Partner to Arid Communities and Technologies (ACT) for ground water management activities in the city of Bhuj, Gujarat.

CEPT supports ACT in documentation of processes related to Participatory Ground Water Management (PGWM) in Bhuj. Based on this study, CEPT plans to develop guidelines to promote Participatory Ground Water Management in Indian cities.

This Report is based on a workshop organized at CEPT University, Ahmedabad on 8th July 2016, to share Bhuj's experiences and discuss how cities can become water secure.

The project is being funded by Arghyam, Bangalore.

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