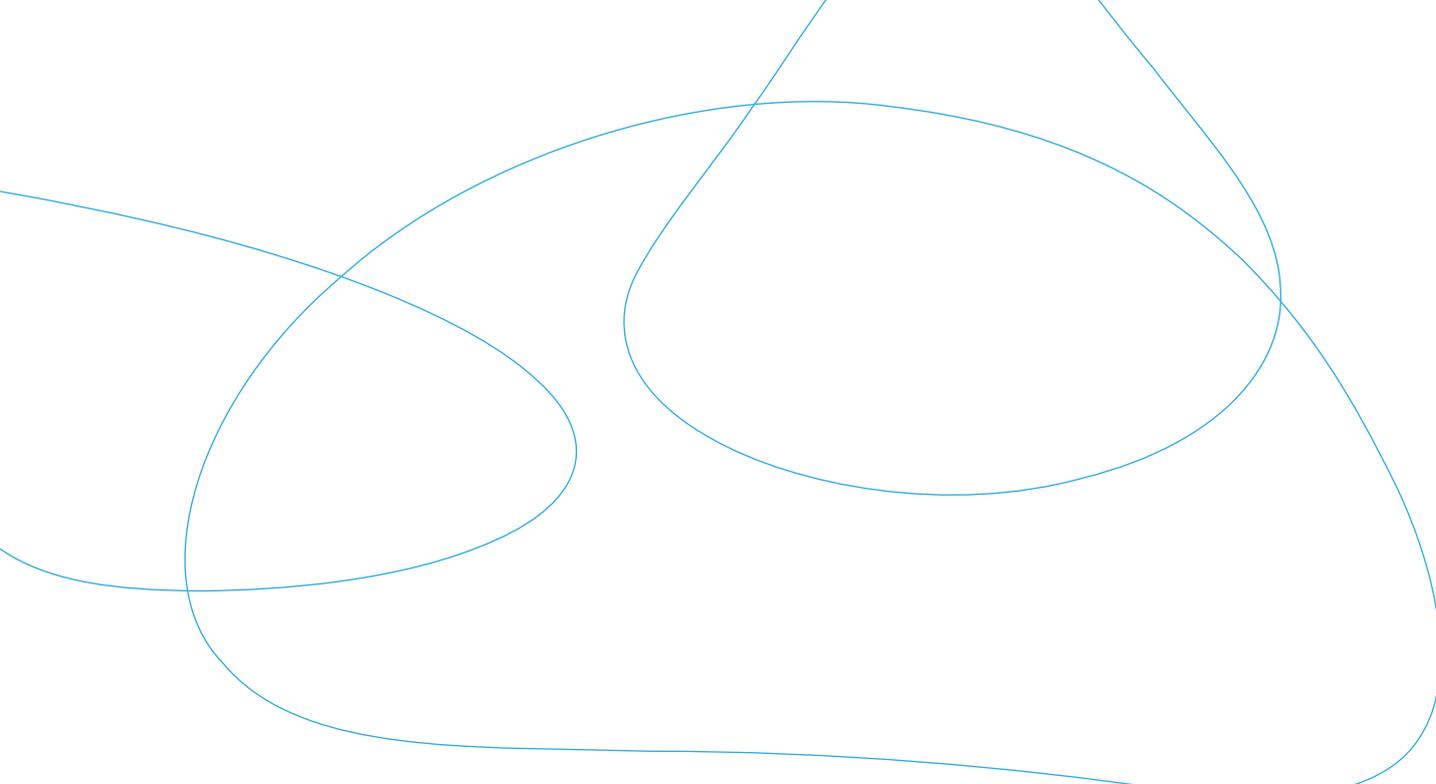




THE CITY WATER RESILIENCE APPROACH

REFLECTIONS ON THE
'IMPROVING CITY WATER RESILIENCE'
FORUM AT THE ROCKEFELLER
FOUNDATION'S BELLAGIO CENTER



Over the past year, Arup has worked closely with the Resilience Shift (TRS), the Rockefeller Foundation and other partners in developing Phase 1 of the City Water Resilience Approach that will help cities grow their capacity to plan and implement projects to improve water resilience.

Throughout this process, we have relied on the insights of experts committed to addressing cities' most pressing water needs. These insights have been key to the success of our work, and will continue to be as we progress the City Water Resilience Approach into Phase 2 and beyond.

I would like to thank all attendees of the 'Improving City Water Resilience Forum' forum for joining us at the Rockefeller Foundation's Bellagio Centre, and for contributing their insights and experiences. The discussions around water resilience held during the event will benefit our collective efforts moving forward, and contribute to the partnerships that are key to developing pathways to more resilient water future.

MARK FLETCHER
Arup Global Water Leader

INTRODUCTION

The City Water Resilience Approach (CWRA) has been launched to respond for the demand for tools to diagnose and design for water resilience.

The CWRA supports cities to build the capacity of city water systems to endure, adapt and transform in the face of shocks and stresses. It is designed to help diverse actors—including city government agencies, civil society, private sector organizations and academic institutions—to better understand the relative strengths and vulnerabilities of water systems, identify opportunities to build resilience into all aspects of water management and chart paths forward for achieving better outcomes. The CWRA works to strengthen all aspects of the water system, not only physical assets but also including those encompassed by the six capitals (human, social, political, economic, physical and natural). It represents a step forward in helping cities to ensure that their citizens survive and thrive in the face of water-related shocks and stresses, and that water systems can 1) provide access to high quality water resources for all residents, 2) protect residents from water-related hazards and 3) connect residents through water-based transportation networks (“provide, protect, connect”).

The CWRA is led by Arup, in partnership with the Stockholm International Water Institute, OECD and 100 Resilience Cities and is supported by The Rockefeller Foundation and The Resilience Shift. It has been developed in partnership with eight cities: Cape Town, Greater Miami and the Beaches, Amman, Kingston upon Hull, Mexico City, Greater Manchester, Rotterdam and Thessaloniki.

Between Monday 5 – Friday 9 November 2019, 22 water and resilience practitioners from 19 global organisations convened at the Rockefeller

Foundation’s Bellagio Centre at Lake Como for a Forum on ‘Improving city water resilience.’ The Forum was convened by Arup, Resolute Development Solutions and the Netherlands’ Special Envoy for Water as part of the City Water Resilience Approach initiative.

Organisations represented at the forum included:

- 100 Resilient Cities
- Arup
- Carbon Disclosure Project
- City of Cape Town Resilience Department
- Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH
- Global Environmental Facility (GEF)
- Global Resilience Partnership
- Indian National Institute of Urban Affairs
- International Water Association
- Miami-Dade County Office of Resilience
- Stockholm International Water Institute
- Miami-Dade County Water and Sewer Department (WASD)
- Netherlands Enterprise Agency
- Organisation for Economic Co-operation and Development (OECD)
- Resolute Development Solutions
- The Kresge Foundation
- The Resilience Shift
- UK Department for International Development
- The World Bank

The objectives of the forum include:

1 *Understand the City Water Resilience Approach.*

2 *Review and validate Phase 1 of the City Water Resilience Approach and associated Framework and Tools.*

3 *Build partnerships, link programmes and mobilize our collective work to advance city resilience through the City Water Resilience Approach and related efforts.*

4 *Co-create the next steps (Phase 2) of the City Water Resilience Approach*

In this document, we describe the City Water Resilience Approach and associated resources, including the City Water Resilience Framework and OurWater. We also summarise the reflections that we gathered from the 'Improving City Water Resilience' forum and outline next steps.

1. UNDERSTAND THE CITY WATER RESILIENCE APPROACH

The result of an 18-month research process—combining a review of literature, interviews and workshops with key stakeholders, input from outside experts and observations of field conditions—is the City Water Resilience Approach (CWRA).

The CWRA emphasises five key steps, with activities under each step, including the methodologies and resources to be used in each step. These resources include the City Water

Resilience Framework (CWRf), OurWater and other governance analysis resources, along with workshop and programming activities to develop an improved understanding and build urban water resilience. The approach recognizes the need to understand urban water system from a holistic perspective, and the need for a multi-stakeholder approach to achieve better outcomes for urban water resilience.

The five-step
CWRA process

The CWRA derives from a mixed-method research approach that included desk studies to identify current trends in thinking on the subject, and field engagement to better understand the challenges and needs of city partners. It describes an implementation methodology, a series of activities designed to achieve a city water resilience by understanding the wider urban water system and identifying and engaging the responsible actors, then assessing resilience actions, prioritising actions and developing and action plan, implementation of proposed initiatives, and finally evaluation, learning and adapting the plan. The step-by-step approach of CWRA provides guidance on what steps to take, how to perform those steps and why those steps should be taken.

The CWRA provides a clear vision of what urban water resilience means for cities, including what specific conditions must be accomplished to achieve this vision, what efforts will be required to build resilience and what actors are involved in this project.

It provides a detailed plan for prioritizing key actions in cities and implementing them to achieve the city's water resilience plan. Based on an assessment of each city's strengths and weaknesses, the CWRA describes a process for translating shared vision into reality.

It provides resources that will help cities carry out each step of the process by reducing the time and cost for cities. These tools include a mix of analogue and digital tools—including the City Water Resilience Framework (CWRF) and OurWater.

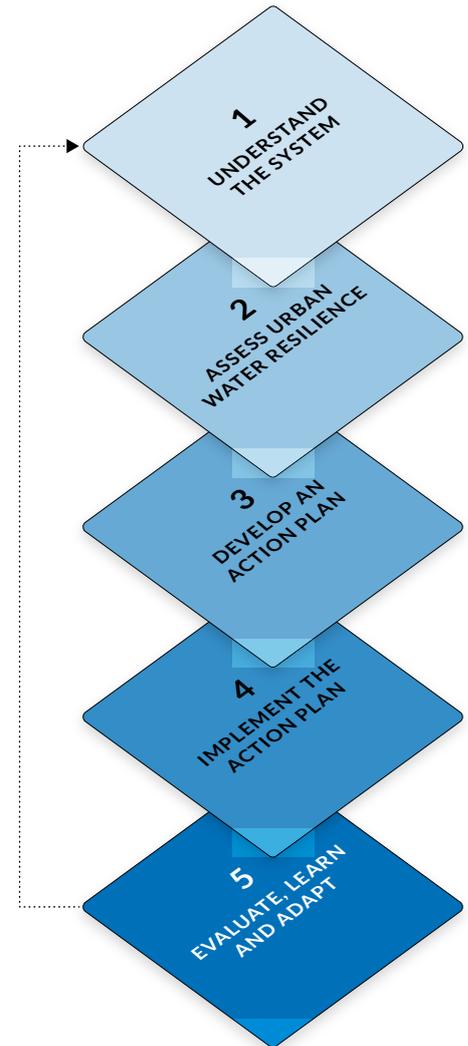
It establishes an extensive and continuously growing body of knowledge on urban water resilience that cities can draw on to share experiences, identify innovative new approaches, and advance a community of practitioners at all stages of the resilience approach. As the CWRA develops even further, it will include experiences of new cities, and ultimately catalyse

new partnerships between a range of users and funders through new learning platforms.

RESOURCES FOR RESILIENCE

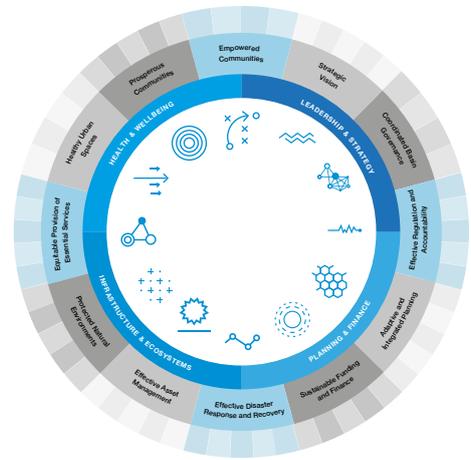
To help cities enact the multi-step CWRA process, Arup has developed a suite of resources, including digital and analogue tools and frameworks, with additional resources planned for the following steps of the approach.

The **City Water Resilience Framework** (CWRF) assessment aligns with the second step of the CWRA approach, helping cities assess strengths and weaknesses in their water systems, and



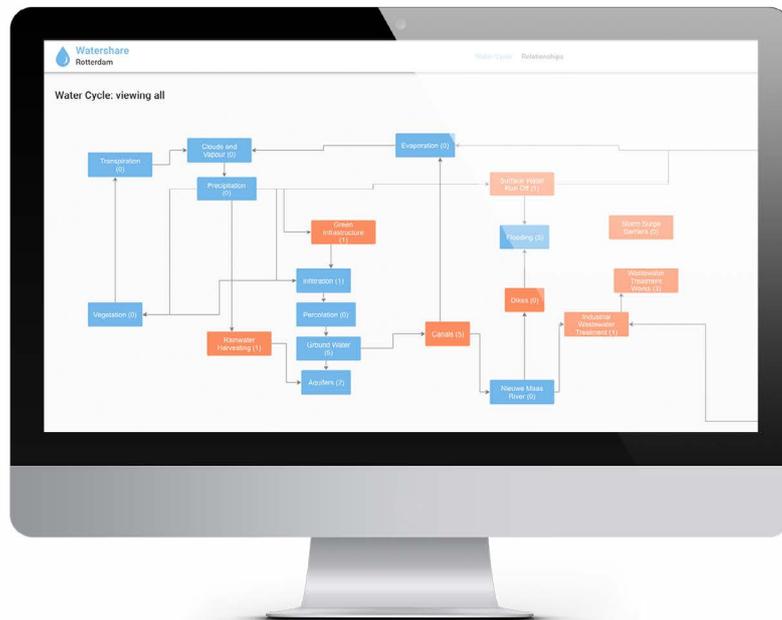
generate a framework of understanding of water resilience to guide future action. The framework brings together diverse stakeholders to agree upon a shared vision of urban water resilience in their city. It helps cities measure progress in building local resilience, and prioritize key actions and identify actors.

Another resource, the **OurWater** digital tool is designed to help cities improve water governance through better understanding of local water systems and the role of key decision-makers. This means improving awareness around the types of shocks and stresses confronted, the impact of these shocks and stresses on infrastructure systems, and the interaction between key stakeholders involved in urban water management. OurWater allows users to input information about the infrastructure and governance processes they participate in, and to map relationships between stakeholders throughout the entire water system. By answering key questions about the interactions between assets and actors that make up the water system, the tool addresses a fundamental challenge in most cities, where water governance functions are often siloed.



The City Water Resilience Framework

A prototype version of the OurWater digital tool



2. REVIEW AND VALIDATE PHASE 1 OF THE CITY WATER RESILIENCE APPROACH



VALUE OF PHASE 1 OF CITY WATER RESILIENCE APPROACH

The value proposition of the City Water Resilience Approach was explored through the question:

What is the added value of the City Water Resilience Approach to current resilience diagnosis, design and planning processes?

Table 1: Value proposition for the City Water Resilience Approach



Improves understanding of the city water system and the shocks and stresses it faces	Influences and inspires a best practice approach to water management	Supports collaboration between multiple stakeholders to take a coordinated approach to planning and implementation	Drives action to improve the resilience of water systems in cities and urban areas
<ul style="list-style-type: none"> Identifies and manage future challenges; Provides a framework of understanding for water resilience; Share knowledge of the water system; and Maps governance across the water cycle. 	<ul style="list-style-type: none"> Expands the boundaries of current water resilience thinking; Supports becoming an exemplar city that thrives in relation to water; Has the potential to inspire a 21st century approach to water; and Captures and shares case studies and examples of resilience best practice. 	<ul style="list-style-type: none"> Gain a comprehensive understanding of the stakeholders involved in the water system and their objectives; Encourage cross-sector collaboration on water resilience and breaks down silos; Have common goals and a common plan Have a stronger, more co-ordinated voice; Different jurisdictions working together to attract funding; Learn from others, both locally and globally / Be part of a global network of water resilient cities; Extend ownership and responsibility beyond the public utility; Present one clear, aligned message to the public; Take account of interdependencies between critical systems and reduce the risk of cascading failures; Credible approach during to collaboration between the current partners including Arup, Rockefeller Foundation, The Resilience Shift, SIWI, OECD, 100 Resilient Cities, World Bank and University of Massachusetts Amherst; Aligns with existing activities in the cities, for example, the City Resilience Framework and Index and the OECD Water Governance Principles and Indicator Framework; Facilitates city to city, peer to peer learning on water management and resilience; Seamless integration between catchment, city and utility governance to ensure that the right decisions are made; and Additional actors outside the utility at the table in a mixed stakeholder environment. 	<ul style="list-style-type: none"> Assess and test our current plans and processes; Identify gaps in current plans Create a portfolio of bankable projects; Develop evidence-based action plans through a globally recognised process Incorporate resilience / adaptation in decision-making; Identify and fill funding gaps; Enables a holistic approach to stakeholder engagement, institutional mapping and resilience assessment and action; Incorporates additional benefits (e.g. social and natural capital) into solutions; and Facilitates monitoring progress using indicators.

PHASE 1 OF THE CITY WATER RESILIENCE APPROACH FOR DEVELOPMENT

A peer-review of the City Water Resilience Approach and associated tools was undertaken focusing on the question:

What are the important areas of Phase 1 of the City? Water Resilience Approach for further development and how might they be addressed?

The aspects of Phase 1 of the City Water Resilience Approach identified by Bellagio participants for further development are outlined below. The areas for further development will be incorporated in the City Water Resilience Approach at the start of Phase 2 in early 2019.

Table 2: Areas of the City Water Resilience Approach for further development



VALUE PROPOSITION

- Establish the value proposition for the City Water Resilience Approach including understanding the audience, the incentives of undertaking the process and the end goal.
- Identify the hooks that donors need to prioritise this initiative.
- Identify the differentiators between the CWRA and other tools.
- Set out the incentives for undertaking the City Water Resilience Approach. Is there the opportunity to frame the approach in relation to project donors?
- For donors, knowledge and reassurance that the investments are the right thing to do.
- Show other city interests (for example, investors and credit rating agencies) that the city understands its future

CITY WATER RESILIENCE APPROACH

- Develop a manual to support the approach
- Is any preparation need for stakeholder meetings to get a common understanding?
- Explore the incorporation of scenario planning
- Provide an outline of the city resource requirement for completing the approach.
- Inclusion of a manual of the process
- Establish the entry point
- Include an explicit step in the approach of sharing knowledge and lessons learnt with other cities.
- Include the step of spatially mapping water-related shocks and stresses and infrastructure, not just governance.
- Incorporate a step to baseline the score to reflect existing projects and programmes. This could use the Arup actions inventory.
- Incorporate reflection and adaptation step into the approach.

CITY WATER RESILIENCE FRAMEWORK

- Include informality in the framework
- Is city an inclusive term? Commonality of language/ Language clarification (framework vs.. tool vs.. approach) / Globally speaking the right language between sectors as well as within.
- Strengthen the narrative around the contribution of the goals and sub-goals to resilience. Add a golden thread of uncertainty and adaptive management, resilience to the process in sub-goals
- Include best practice examples for each sub-goal to encourage best practice for water management. Ensure that the framework inspires adoption of best practice.

OURWATER

- Peer review and test the OurWater Governance Tool
- Change the name of the tool to reflect governance rather than water resources management.
- Explicitly clarify how OurWater contributes to the approach

IMPLEMENTATION

- Partner or network cities to improve their cross-fertilisation of ideas.
- Demonstrate implementation of the City Water Resilience Approach

3. CO-CREATE THE NEXT STEPS (PHASE 2) OF CITY WATER RESILIENCE APPROACH

The Phase 2 Strategy was co-created through two main questions:

What value do you hope to gain from the Phase 2 effort? How might we strengthen the Phase 2 Strategy to fulfil our expectations?

PHASE 2 STRATEGY FOR THE CITY WATER RESILIENCE APPROACH

The Phase 2 Strategy for the City Water Resilience Approach set out five objectives:

Implement the City Water Resilience Approach Step 2 (Assess Urban Water Resilience) for all eight partner cities. This includes re-engaging with Wave 1 and Wave 2 city partners and carrying out Step 2 in each city, entailing testing and improving the City Water Resilience Framework and OurWater tool.

Co-develop the approach for Step 3 (Develop Action Plans) with the Wave 1 cities. This includes analysing resulting from the City Water Resilience Framework, co-developing a methodology for developing and prioritising plans and programmes, and co-creating City Action Plans for cities.

Engage new Wave 3 cities to identify city champions, introduce the approach, and begin to implement Steps 1-2.

Refine and update OurWater digital tool based on user testing with cities, to incorporate new functions into the tool and help cities improve local water governance.

Promote water resilience learning by setting up a knowledge sharing and learning community between partner cities and a Global Knowledge Exchange between partner cities and steering group members to share challenges, experiences and learning from the resilience journey.

The proposed programme for 2019 for the Phase 2 of the City Water Resilience Approach is described in Table 3.

Table 3: Proposed programme of work for CWRA development in 2019

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
CWRA Development	Review Phase 1 and develop CWRF indicators				Action plan methodology co-creation and testing						Review following city engagement	
Wave 1 Cities	City (Re) Engagement and Water Resilience Assessment					Action Plan Co-Creation						
Wave 2 Cities		City Re-Engagement		Water Resilience Assessment			Action Plan Co-Creation					
	Resilience Learning											
	OurWater v2.0											
Wave 3 Cities										City Engagement		

Table 4: The value of the Phase 2 strategy and aspects that were identified to be strengthened include:

Topic	Value	Areas to Strengthen
WAVE 1 AND 2 CITIES	<ul style="list-style-type: none"> Widespread uptake of systematic approach. Implement in Wave 1 and 2 cities to provide credibility to the process and confidence in scalability and applicability 	<ul style="list-style-type: none"> Set up an advisory group including the partner cities to provide feedback on the indicator approach and indicators developed. Implement in five Wave 1 and three Wave 2 cities in 2019. For the five Wave 1 cities, use the information that was collected in the fieldwork and align any subsequent fieldwork and feedback with city schedules.
COMMUNITY OF PRACTICE AND RESILIENCE LEARNING	<ul style="list-style-type: none"> Broaden and strengthen our community of practice. Knowledge exchange (peer to peer) 	<ul style="list-style-type: none"> Discuss with other tool developers on alignment (e.g. CRC Water Sensitive Cities, OECD Water Governance Indicator Framework). Workshop in Brisbane to align CRC WSC. Align with the Sustainable Development Goals. Develop partner's pack for potential project partners. The partners pack should include a clear proposal of how support can be provided, an outline of the value proposition of the City Water Resilience Approach, an outline of the approach, framework and tools and articulation of the phase 2 and 3 strategy and the visionary end goal.
CWRF AND OURWATER	<ul style="list-style-type: none"> Improved resources for coordination between organizations for better water governance. Assessment of city progress to date and prioritization of key actions in partner cities 	<ul style="list-style-type: none"> Align with the OECD Water Governance Indicators Support other aspects of the City Water Resilience Approach Map existing available indicators for quantitative and qualitative indicators from existing frameworks and data that cities collect. Develop comprehensive indicators (qualitative and quantitative indicators) Include flexibility in the framework, pick from a list of indicators Include the rationale behind the indicators Explore the approach to indicators including flexibility, quantitative vs. qualitative and weightings.
DEVELOPMENT OF CWRA	<ul style="list-style-type: none"> Action plans that are complete and well-informed. Ability to measure and monitor using the tool to determine progress and adapt approach Efficient use of funds (within the water system) to create resilience. Promote 21st century approach to water resilience. Case studies to show what good looks like. Comprehensive identification of strengths and gaps. 	<ul style="list-style-type: none"> Have a clear monitoring methodology Develop a 'simple and rapid' or 'lite' version for cities with limited resources. Prioritise how we act to capture the resilience value/dividend Total value evaluation, including natural and social capital Incorporate impact chains Incorporate multi-criteria analysis approach Insert an activity of getting initial feedback from the cities on the approach. Clarify what cities do and what facilitators do. Raise the profile of the wider benefits of some resilience solutions.
WAVE 3 AND ROLL-OUT	<ul style="list-style-type: none"> Greater certainty of cost of application to cities 	<ul style="list-style-type: none"> Implement in African cities and Asian cities/global south, which are under-represented in the current cities. Develop a business plan going forward including resource requirements for the implementation of the framework, how much do cities contribute, where does the remaining funding come from. Communicate, publish and engage the City Water Resilience Approach and tools widely. Step by step document for facilitators and cities explaining the approach. Raise profile for new cities and define entry point for new cities Define the entry points for new cities joining the initiative. Capitalise on advantage of overlap with the City Resilience Framework and City Resilience Index. Develop a financial strategy for city involvement.



4. BUILD PARTNERSHIPS, LINK PROGRAMMES AND MOBILIZE OUR COLLECTIVE WORK TO ADVANCE CITY RESILIENCE THROUGH FUTURE CITY WATER RESILIENCE APPROACH AND RELATED EFFORTS

The 'Improving City Water Resilience' forum at Rockefeller Foundation's Bellagio Center offered the opportunity for new partnerships and for links between programmes to be developed to mobilize our collective efforts to improve city water resilience.

During the event, it was agreed upon that a community of practice with participation by the Bellagio participants would be set up. This community of practice would need to define its terms of reference, but they could include active review of outputs and dissemination of the City Water Resilience Approach. The International Water Association has offered to support the community of practice. It was also suggested that we should invite other experts to join the Community of Practice, for example, American Water Works Association, World Economic Forum and the Utility Climate Alliance, and that we should approach other audiences for the City Water Resilience Approach, for example, insurance companies and credit rating agencies.

Support for the City Water Resilience Approach was offered by participants at the Forum. These include:

- Leveraging existing networks for the piloting and roll-out of the City Water Resilience Approach. These networks include:

- The Resilience Shift
- The 100 Resilient Cities network;
- The Global Platform for Sustainable Cities (supported by the Global Environment Fund, World Bank, Inter-American Development Bank, United Nations Environment Programme and the Asian Development Bank), which currently includes 28 cities;
- The Carbon Disclosure Project Company and Investor Network.
- Integration with existing plans and programmes, including:
 - Water as Leverage programme;
 - Asian Development Bank Technical Assistance programme, which includes 25 cities in 8 countries; and
 - National Institute of Urban Affairs Water-centric Master planning project.
- Opportunities for further discussion of assistance with The Resilience Shift, UK Department for International Development, 100 Resilient Cities, World Bank and the International Water Association.

We expect that this support, along with other insights shared during the event, will greatly benefit the CWRA and increase the project's impact going forward.

