GWSP
GLOBAL WATER SECURITY & SANITATION PARTNERSHIP

Incorporating circular economy and resilience principles in the water sector

WORLD BANK GROUP
Water

SCHEDULE AND CONTENTS

TIME	SESSION
9:00 – 10:30	**Session 1. Overview of the principles of circular economy and resilience in the water sector** ▪ Presentation of the Water In Circular Economy and Resilience (WICER) Framework ▪ Is your project WICER? Use the WICER quick assessment online tool ▪ Discussion by table and reporting to the whole group
10:30 – 11:00	Coffee break
11:00 – 12:30	**Session 2. Presentation of real case studies and good practices examples** ▪ Presentation of cases showcasing different approaches to circular economy ▪ Discussion by table and reporting to the whole group
12:30 – 13:30	Lunch break
13:30 – 15:00	**Session 3. Interactive session to prioritize and apply the WICER principles** ▪ Presentation to set up the scene ▪ Hands-on exercise to prioritize WICER interventions to solve a challenge working in teams
15:00 – 15:30	Coffee break
15:30 – 16:45	**Session 4. The importance of the right Policy, Regulation and Institutional Environment and Stakeholder engagement** ▪ Presentation to set up the scene ▪ Presentation on the Australian example ▪ Hands-on exercise on PIR and stakeholder mapping exercise.
16:45 – 17:00	Closing and next steps

But first….

Let’s do a short poll!

Grab your phone, computer or iPad
(make sure you have internet access)

GWSP
GLOBAL WATER SECURITY & SANITATION PARTNERSHIP

Session 1. Overview of the principles of circular economy and resilience in the water sector

Water **I**n **C**ircular **E**conomy and **R**esilience **(WICER)**

Anna Delgado, Water Specialist

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Water

CONTENTS

THE CURRENT WATER CRISIS IS ONE OF THE GREATEST CHALLENGES OF OUR TIME

THE CHALLENGE

Increasing population, economic growth and shifting consumption patterns have driven a rapid rise in demand for water resources, while 36 percent of the world's population already lives in water-scarce regions.

Water is essential for socioeconomic development and it links with nearly every Sustainable Development Goal. Nevertheless, water is undervalued, and water resources are used inefficiently.

Water pollution resulting from human activities has clear health, socioeconomic and environmental impacts, and further threatens the sustainability of water supplies.

Climate change is challenging the sustainability of water resources, which are already under severe pressure in many regions of the world.

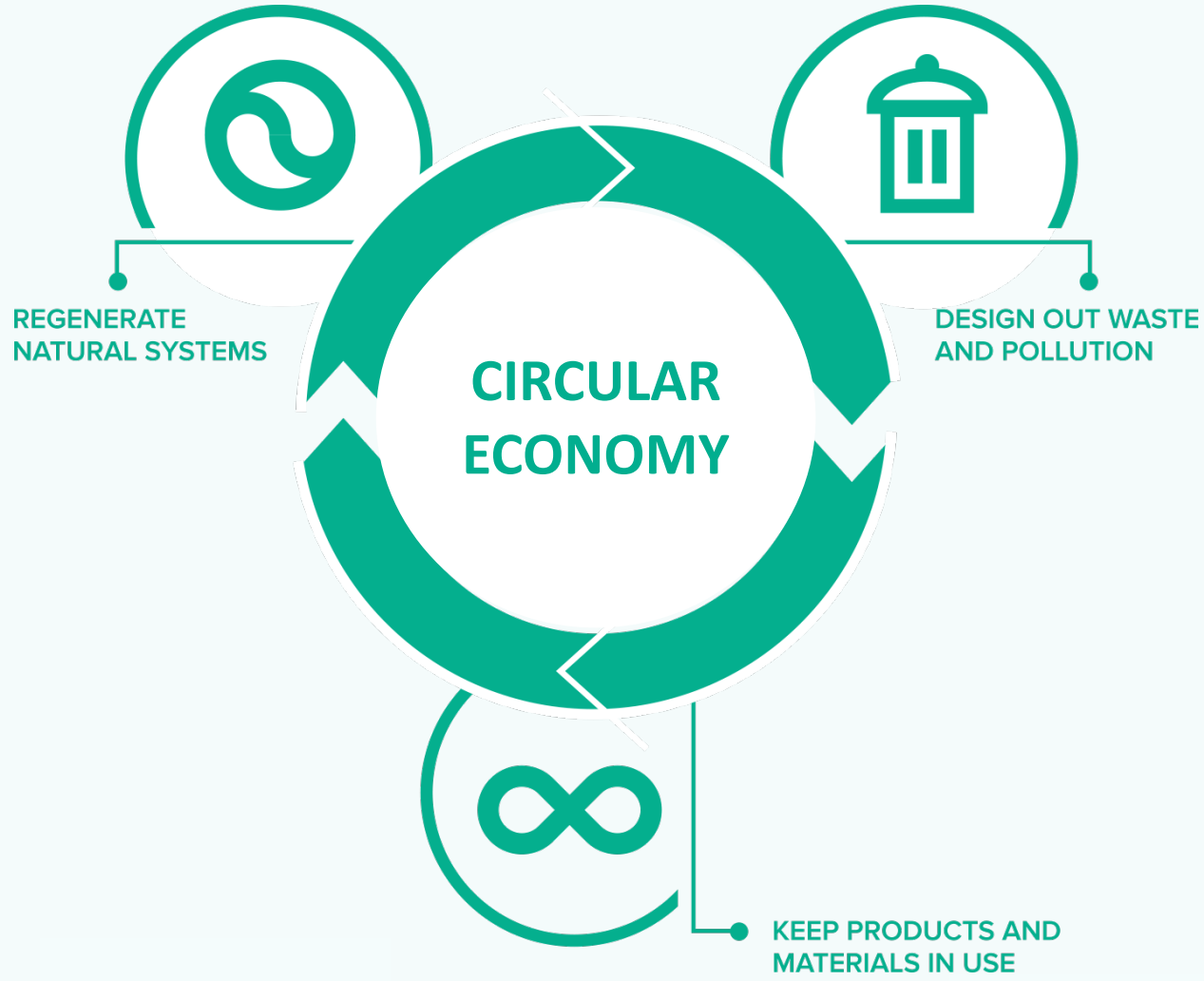
These challenges are particularly felt in urban areas

...where for the first time in history more than half the global population lives

Circular Economy

- Has emerged as **a response to the current unsustainable linear model** of “take finite resources, make, consume, waste and pollute”
- The principles draw and build on concepts developed years ago (limits to growth, “cradle-to-cradle”, the behavioral “Rs”, etc.)
- All feature the principle of maximizing the value of resources recognizing that the Earth’s resources are limited, and that the planet itself has a limited capacity for managing and assimilating pollution
- Circular economy principles offer an opportunity **to recognize and capture the full value of water** and to tackle water related challenges by providing a systemic and transformative approach to delivering water supply and sanitation services in a more sustainable, inclusive, efficient, and resilient way.

What are the principles of Circular Economy?

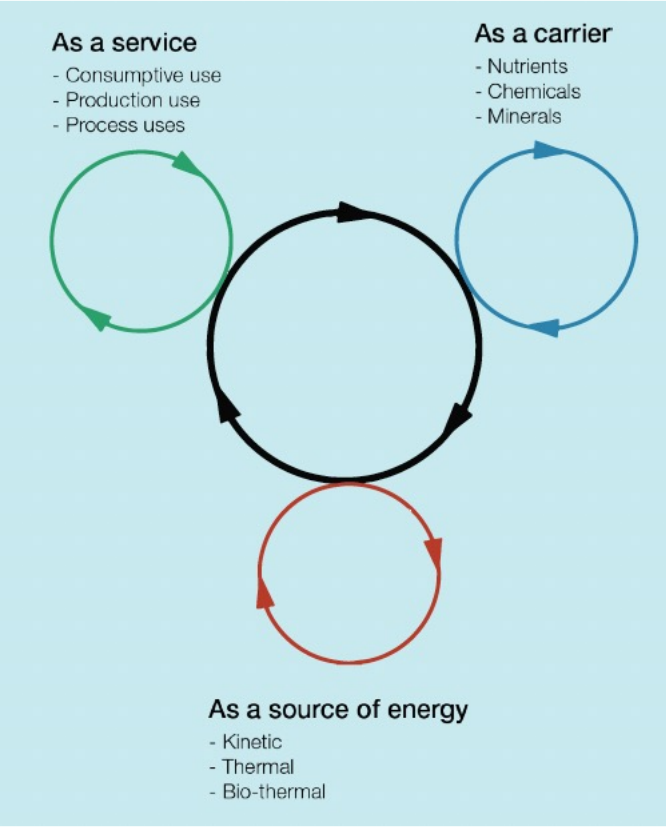


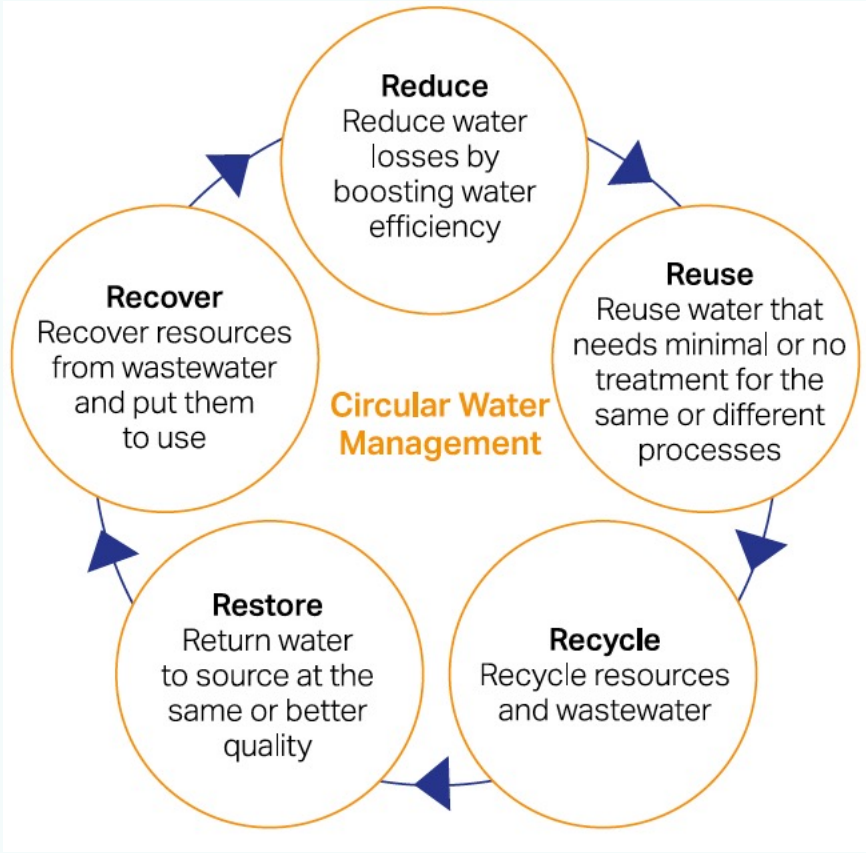
- decoupling economic activity from the consumption of finite resources and from environmental degradation
- replacing the end-of-life concept with restoration
- restoring and regenerating ecosystems by intention and design,
- eliminating waste through superior design—of materials, products, systems, and business models
- not a synonym of recycling (recycling should be the last resort)

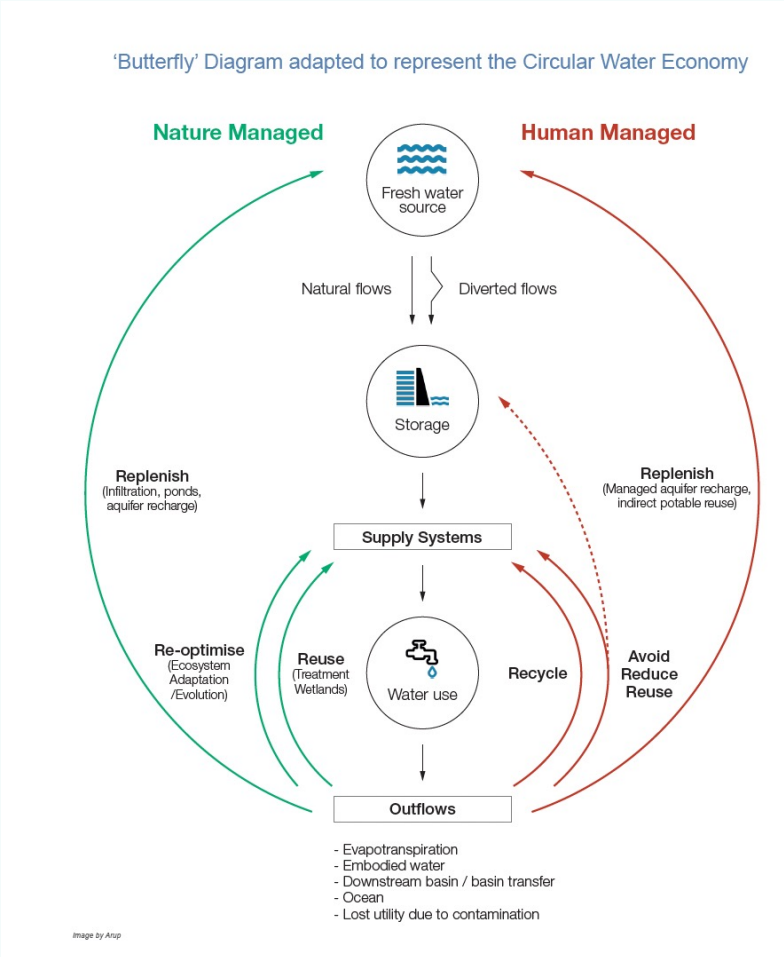
the circular model builds economic, natural, and social capital

Source: Ellen MacArthur Foundation

Circular economy in water







SOURCES

- **International Water Association (IWA), 2016.** "Water Utility Pathways in a Circular Economy." London.
- **World Business Council for Sustainable Development, 2017.** "Business Guide to Circular Water Management: Spotlight on Reduce, Reuse and Recycle." Geneva.
- **Ellen MacArthur Foundation, ARUP, and Antea Group. 2018.** "Water and Circular Economy." White Paper

WORLD BANK GROUP Water

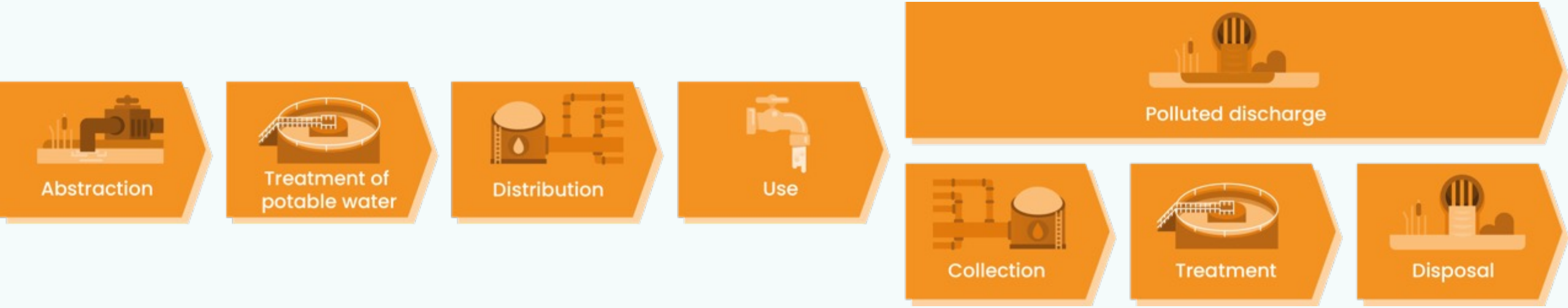
Inspired by the circularity of the water cycle in nature…

+ resilience

+ inclusitivity

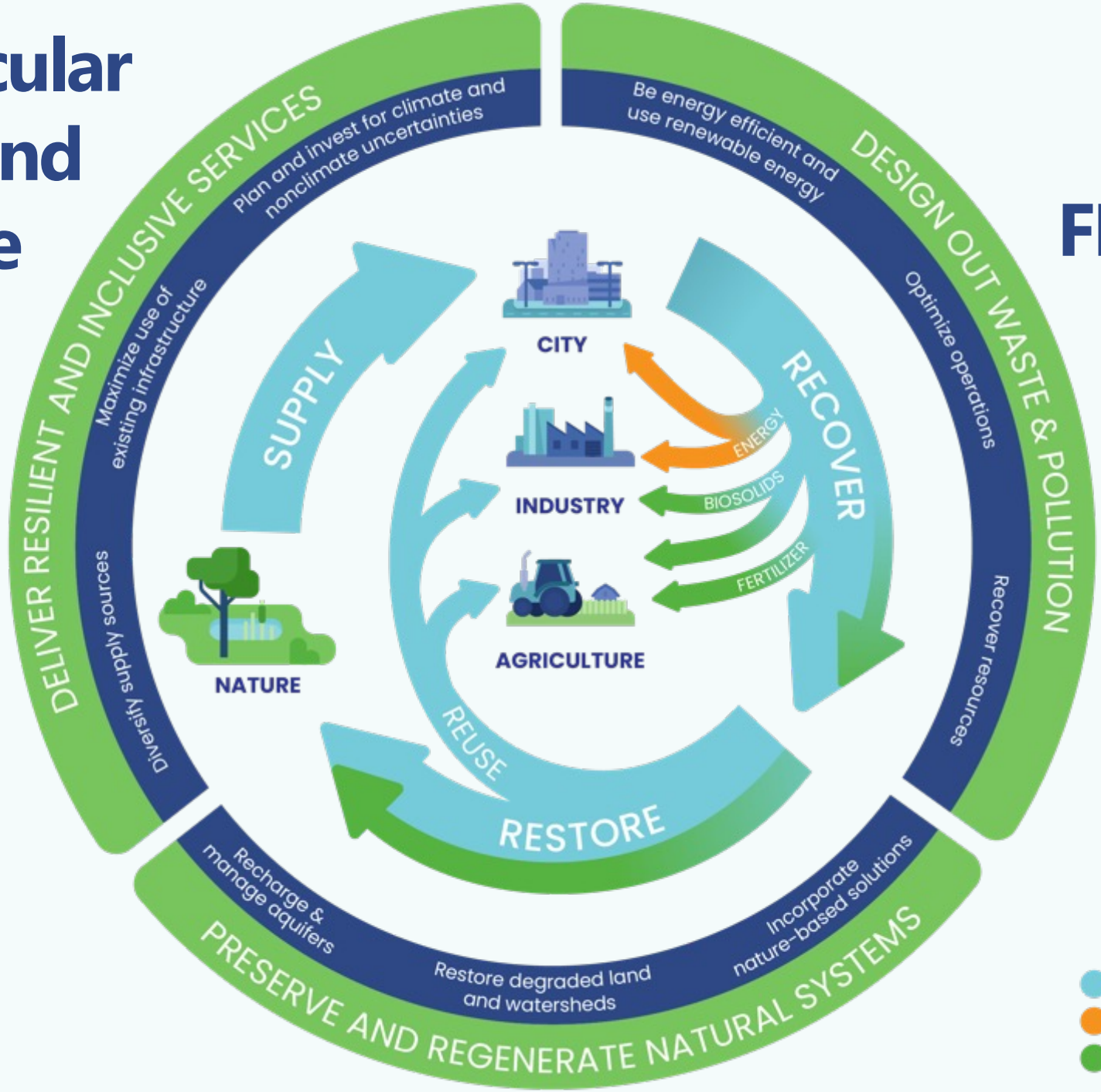
We must shift from…

A LINEAR SYSTEM …



Water in Circular Economy and Resilience (WICER)

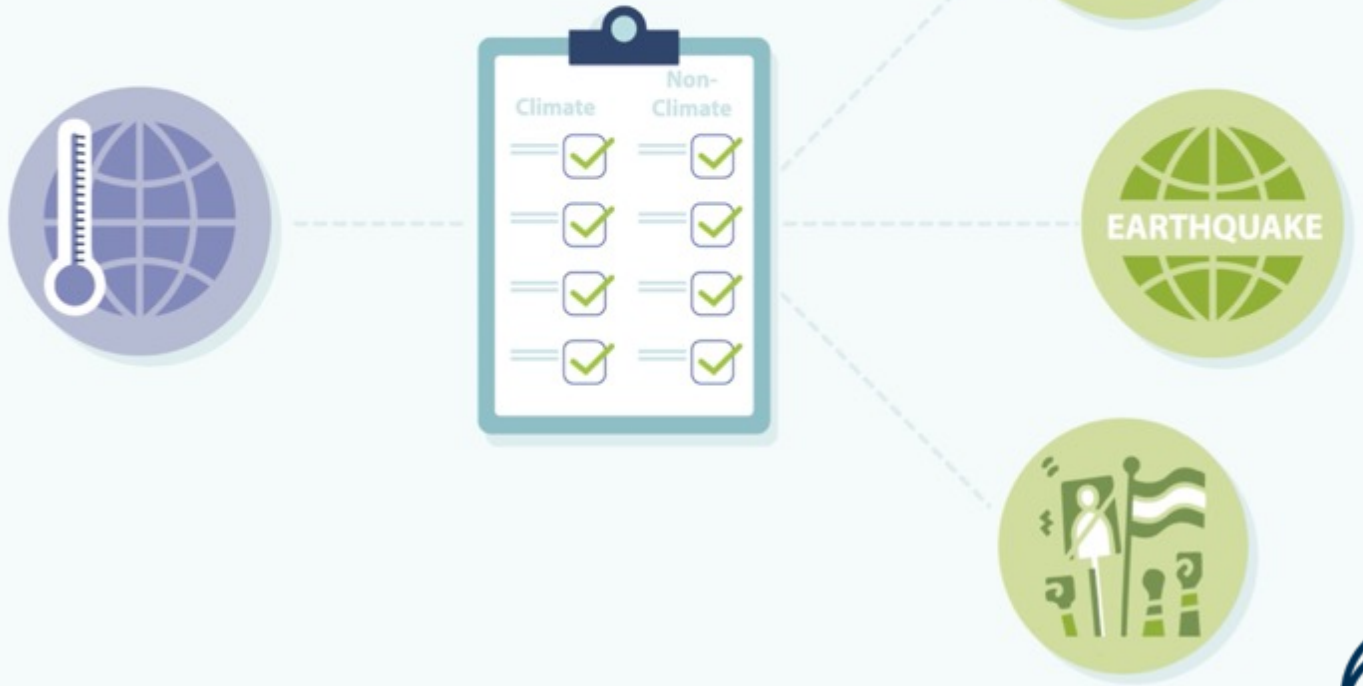
THE WICER FRAMEWORK



http://www.worldbank.org/wicer

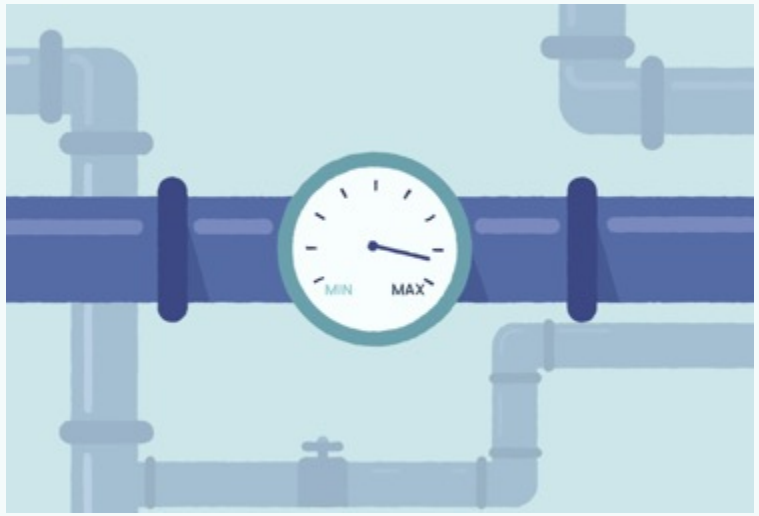
OUTCOME 1: DELIVER RESILIENT AND INCLUSIVE SERVICES

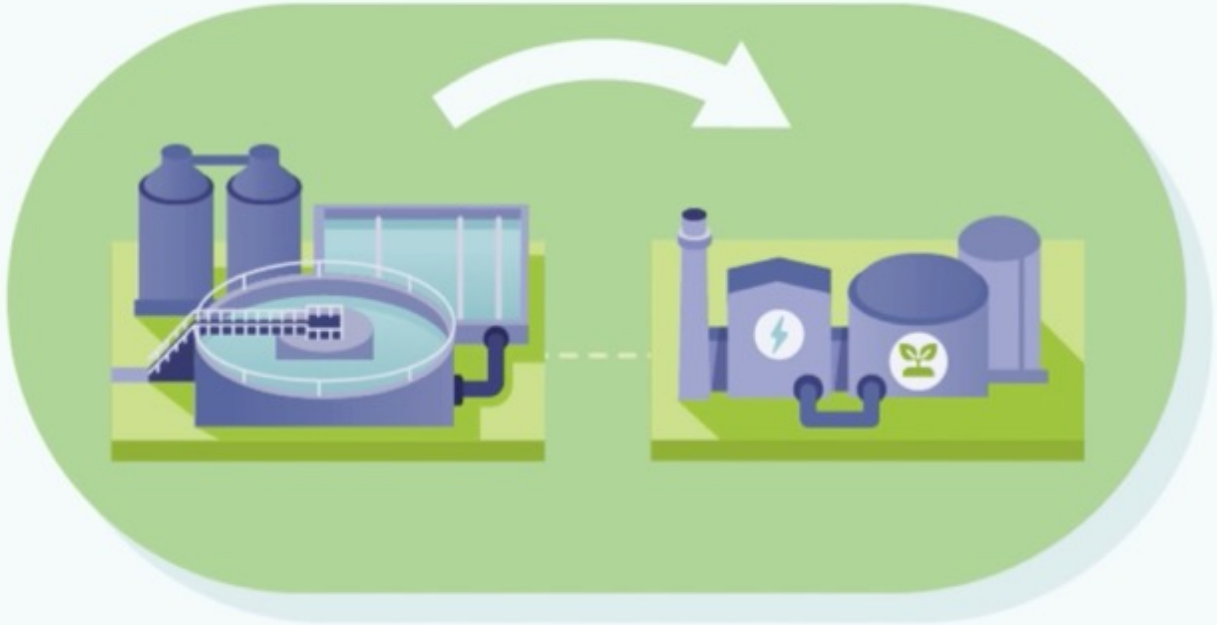
We need to plan and invest (differently) for climate and non-climate uncertainties



OUTCOME 1: DELIVER RESILIENT AND INCLUSIVE SERVICES

Maximize the use of existing infrastructure





Case of Brazil: Optimizing WWTPs in São Paulo

OUTCOME 1: DELIVER RESILIENT AND INCLUSIVE SERVICES

Diversify supply sources

- Diversification of water supply sources (water balance)
  - including sources with different risk and cost profiles, and low vulnerabilities
- Protecting those water supply sources
- Including integrated water storage

Case of Chennai:

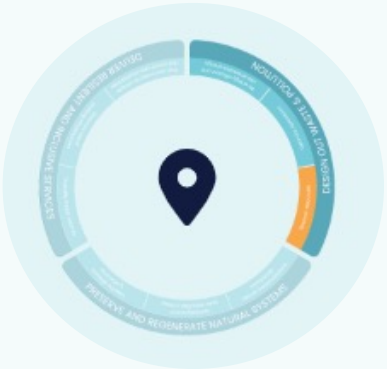
OUTCOME 2: DESIGN OUT WASTE AND POLLUTION

Recover resources from water and wastewater

Energy

Water

Nutrients



OUTCOME 2: DESIGN OUT WASTE AND POLLUTION

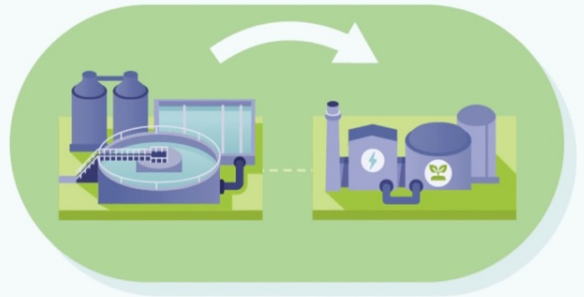
Optimize operations

- Reduce NRW
- Increase overall efficiency of processes
- Optimize the amount of energy, minerals, and chemicals used in the operation of water systems

Case of Indonesia

OUTCOME 2: DESIGN OUT WASTE AND POLLUTION

Be energy efficient and use renewable energy



Case of Australia

OUTCOME 3: PRESERVE AND REGENERATE NATURAL SYSTEMS

- Restore degraded land and watersheds
- Manage and recharge groundwater
- Incorporate nature-based solution

Cross-cutting Issues

- Manage water demand & decrease water use
- Leverage the power of digitalization
- Create the right Policy, Institutional and Regulatory (PIR) environment
- Ensure solutions are inclusive
- Funding and financing

Implementing circular economy principles also makes economic and financial sense

Investments in energy efficiency and reducing NRW can be recovered in less than 3 years

Self-generating renewable energy can reduce energy costs and increase system resiliency

Investments in nature-based solutions such as upstream reforestarion, can reduce treatment needs and costs

Utilities are creating additional revenue streams to cover O&M costs

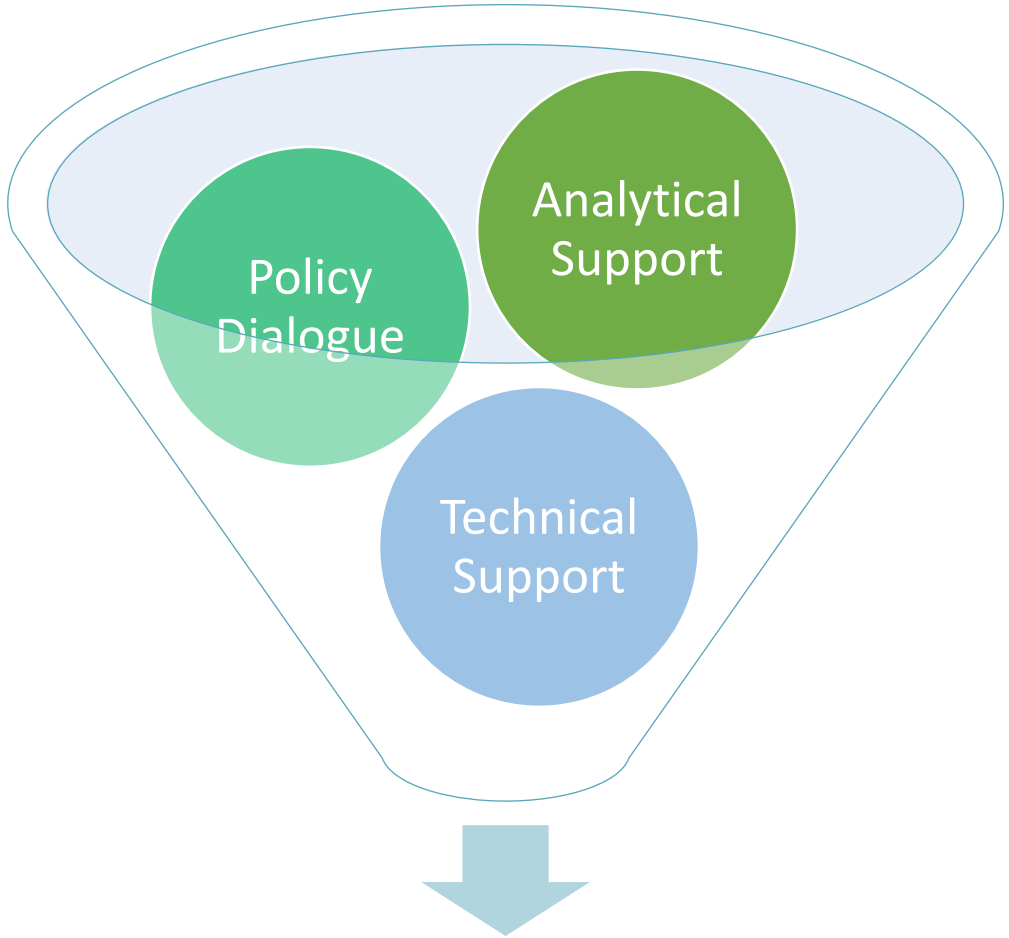
Disclaimer about the WICER framework

- The proposed framework tries to bring forward the latest thinking on the subject and it is informed by practical examples from around the world
- **Offers a long-term vision** for planning water supply and sanitation services
- **Does not mean that everything needs to be done** – raise awareness of the opportunities provided by circular economy principles to make the sector more financially sustainable and innovative (need to shift the mentality in the water sector)
- Low- and middle-income countries can **leapfrog** high-income countries, which are locked into linear systems, and develop circular systems from the start
- Need to choose which intervention of the framework is more suitable for your context - need to start somewhere

Both high- and low-income countries can benefit from Circular Economy by capturing the full value of water

WICER in practice - How is World Bank working with clients to promote a WICER approach?

WICER



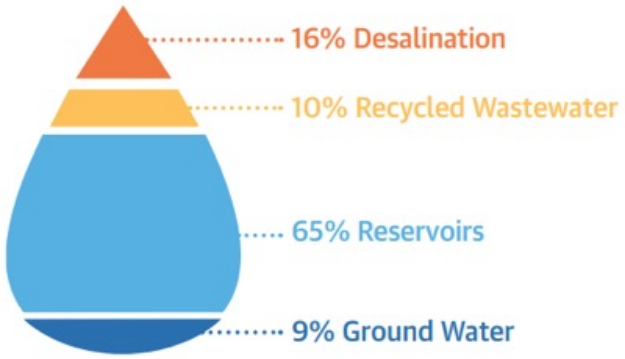
Operational Support

Policy Dialogue

- Review of existing regulatory frameworks in Middle East and North Africa Region (wastewater reuse and desalination)
- Dialogue on regulating reuse and circular economy in Colombia & Turkey
- Advice to Senegal on revision of Water and Sanitation Codes
- Policy, Institutional and Regulatory (PIR) assessment to promote unconventional sources of water in South Africa

Targeted project activities and investments

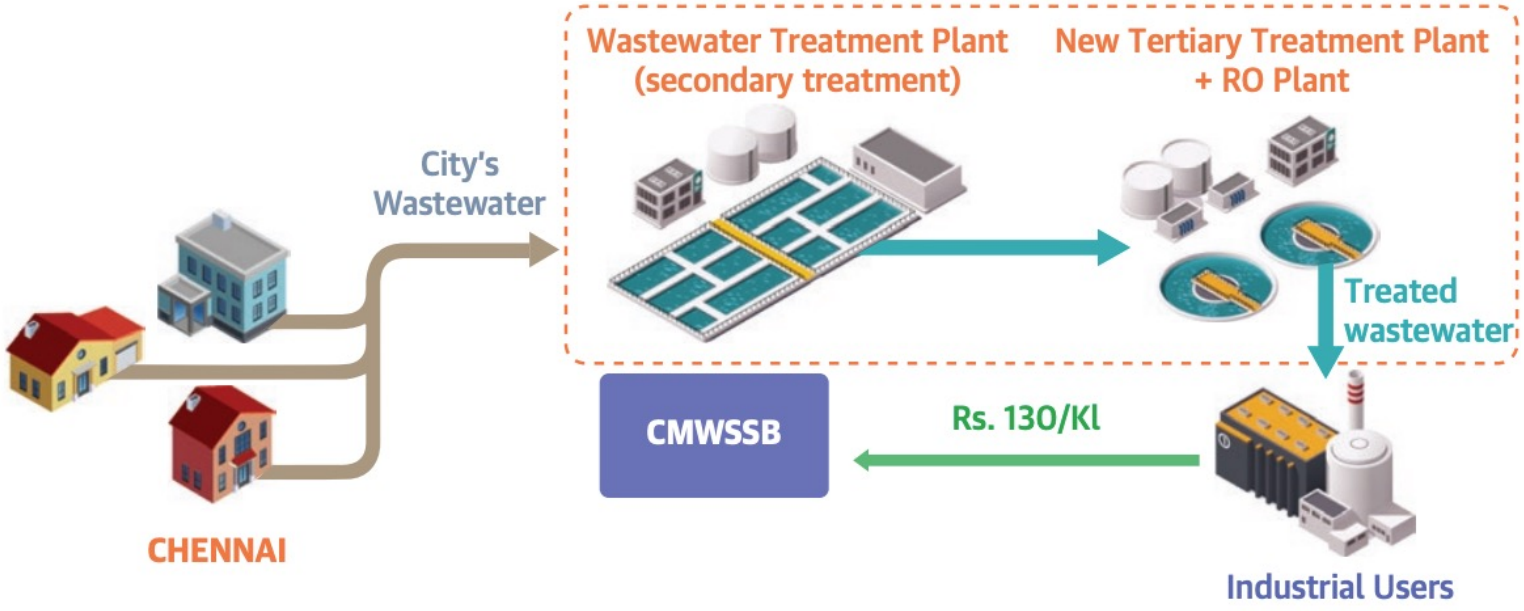
Applying circular economy principles in Chennai, India. The Tamil Nadu Sustainable Urban Development Project



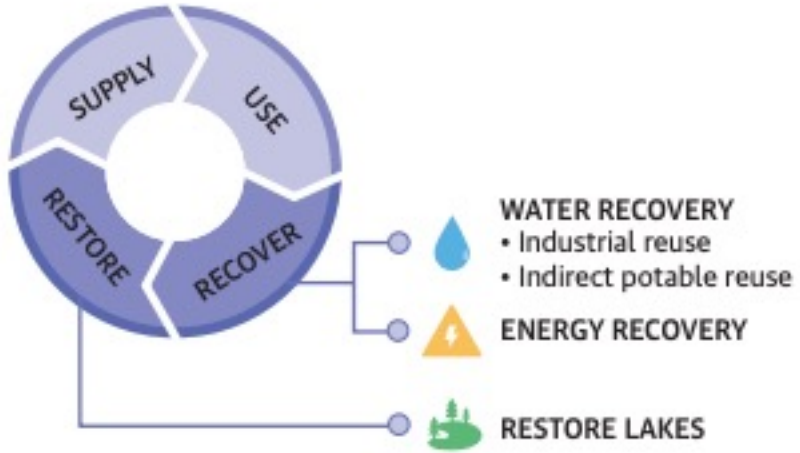
Source: CMWSSB, 2020.

Benefits:

- Tariff for water reused in industry covers O&M costs
- Lower operating costs and decreased risks of water scarcity for industrial users
- Recovering energy in WWTP –50 % of the energy needs of all the plants



CIRCULAR ECONOMY ELEMENTS



Notes: CMWSSB = Chennai Metropolitan Water Supply and Sewerage Board; RO = reverse osmosis.

Improving Resiliency, Sustainability and Efficiency in Uruguay´s National Water Supply and Sanitation Company

Uruguay OSE (State Water Utility) Sustainable and Efficient Project

CIRCULAR ECONOMY ACTIVITIES

Enhancing Resilience:

- rebuilding two water treatment plants to protect against periodic floods
- Enhancing the water intake at a third plant by increasing redundancy and incorporating preventive features into the existing system.
- An asset management system and water safety plans were developed, and risk management incorporated in daily operations.

Improving Energy Efficiency & Reducing NRW:

- Cumulative savings of: 89.3 million cubic meters of water and energy savings of nearly 26,250 megawatt hours over the lifetime of the project.

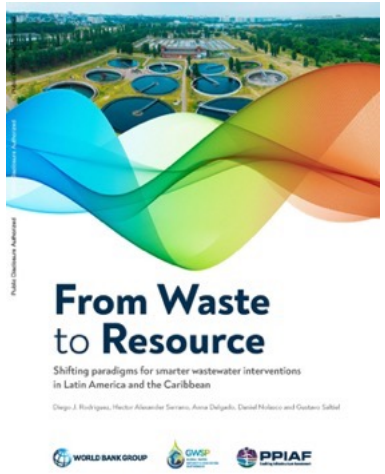
Recovering resources:

- a prototype for biosolid drying and a process for applying biosolids to fodder crops was developed.

Creating and sharing knowledge

PUBLICATIONS:

WICER - Report



From waste to resource - Report

Animated Video

Infographics, Blogs, etc.

www.worldbankgroup.org/wicer

Conferences, Webinars and other events

- Launch of the WICER Report and Initiative – webinar (Sept 2021)
- Keynote at Karachi International Water Conference
- USAID Middle East and Northern Africa (MENA) Infrastructure and Environment virtual workshop
- WaterReuse symposium 2022 session with USEPA
- World Water Forum 2022
- Singapore International Water Week (SIWW) Water Convention 2022
- IWA World Water Congress 2022
- Co-leading session at AWWA ACE22 with USEPA
- Latinosan 2022

www.worldbank.org/wicer

www.worldbank.org/wastetoresource

Documenting relevant case studies

WICER

Waste to Resource

www.worldbank.org/wicer

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Wastewater: From Waste to Resource

The Case of Santiago, Chile

Generation and Sale of Biogas

Context

In 2005, only 3.6% of the wastewater of the city of Santiago was treated (United Nations Climate Change, n.d.) The remaining wastewater was discharged untreated into the Mapocho river, an important source of irrigation and potable water for the region. In order to treat more than 50% of the wastewater generated by the city, Aguas Andinas, the company managing water and sanitation for the Santiago metropolitan region,

View of La Farfana Wastewater Treatment Plant.
Source: Anna Delgado Martin / World Bank.

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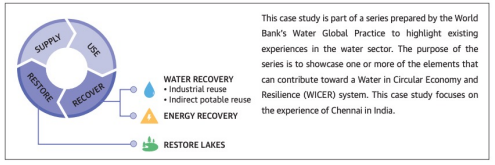
WATER GLOBAL PRACTICE

Water in Circular Economy and Resilience (WICER)

The Case of Chennai, India

Recovering Water and Energy from Wastewater



This case study is part of a series prepared by the World Bank's Water Global Practice to highlight existing experiences in the water sector. The purpose of the series is to showcase one or more of the elements that can contribute toward a Water in Circular Economy and Resilience (WICER) system. This case study focuses on the experience of Chennai in India.

Context

Chennai, a city on the southeastern coast of India and the state capital of Tamil Nadu, has one of the world's fastest-growing economies. Chennai is the automotive hub for India and is also home to several other industries ranging from petrochemicals to hardware manufacturing, textiles, and apparel. Besides industries, Chennai's economic activities include medical tourism, software, and financial services. Recent estimates of the economy of the Chennai Metropolitan Area have ranged from US$79 million to US$86 billion (purchasing power parity [PPP] gross domestic product [GDP]), ranking it as India's fourth- to sixth-most-productive metropolitan area. Because of urbanization and economic growth, Chennai's population has increased more than 50 percent over the past two decades. With over 10 million people and covering more than 426 square kilometers (km²), Chennai is the fourth-largest city in India.

The city's rapid growth has created several water challenges:

- ***Water supply has not kept up with demand.*** Chennai has historically relied on groundwater, which has

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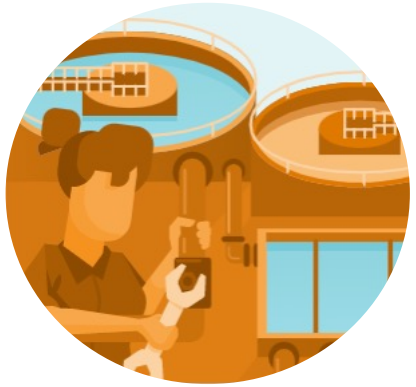
Circularity is not the end goal, but the means to achieve greater outcomes

Sustainability



Jobs created

Restored Ecosystems

Universal access

Equity

Urban prosperity

Online quick assessment WICER tool

WATER IN CIRCULAR ECONOMY AND RESILIENCE (WICER)

START

A quick Assessment Tool

THE WORLD BANK
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Purpose and audience of the tool

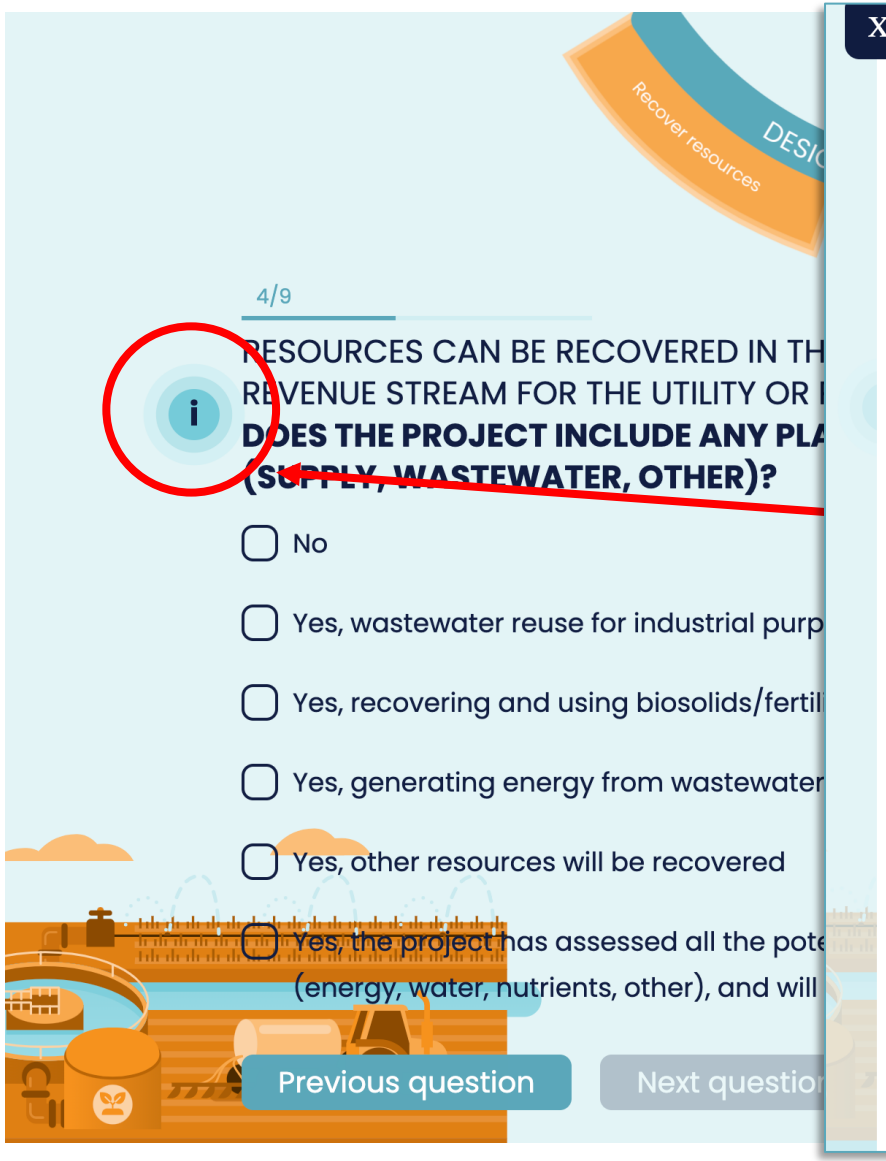
PURPOSE

- Familiarize the user with the idea of circularity & resilience (WICER) and expose the user to solutions that they might have not considered / oportinities
- Quick assessment of the project/city/region according to WICER – is the system WICER?
- Present solutions, guidelines and resources to become circular and resilience

SCOPE

- Project Level: assess a specific project
- Utility / City Level: assess a specific project/city, inform a strategy/long-term plan, create awareness of WICER solutions
- Regional or Federal Level– inform regional/country long-term strategy and policy goals and create awareness of WICER solutions
- General: The tool can also be used in workshops with key stakeholders bringing several sectors together to assess and identify WICER actions

9 questions with resources



X

MORE INFORMATION

Resources can be recovered over the entire water cycle. Understanding the flow of resources in and out of their systems allows water supply and sanitation operators to identify opportunities to recover resources that are being underutilized or wasted at every phase of the water cycle. Ideally, a circular system is designed in a way that no resources are wasted. The recovered resources can provide an additional revenue stream for the utility or reduce operations and maintenance costs, making the utility more financially and environmentally sustainable. Resource recovery can be done at different scales and may include centralized and decentralized solutions. The right solution depends on the context.

Tips & resources | Benefits | Potential Indicators

- Resources such as energy, nutrients and water can be recovered from wastewater. Check *Wastewater: from waste to resource report* and *Sanitation, Wastewater Management and Sustainability: from Waste Disposal to Resource Recovery*
- For small towns: *Wastewater Treatment and Reuse: A Guide to Help Small Towns Select Appropriate Options*
- For rural areas: Safely Managed Sanitation in High-Density Rural Areas: Turning Fecal Sludge into a Resource through Innovative Waste Management
- Water: If planned with reuse in mind, wastewater can be treated to different quality levels and adapted to the requirements of each potential end user (a concept known as “fit for purpose”). Treated wastewater can be used in industrial processes (*Durban, South Africa*; *Lingyuan City, China*; *Chennai, India*); to cool power plants (*Nagpur, India*; *San Luis Potosi, Mexico*); irrigate crops (*Atotonilco de Tula, Mexico*; *Dakar, Senegal*), public gardens, and parks; recharge aquifers (*Gaza*); maintain environmental

Personalized link to go back to the results

PLEASE FILL IN YOUR PERSONAL INFORMATION TO HAVE ACCESS TO A PERSONALIZED RESULTS PAGE WITH AN ASSESSMENT OF YOUR PROJECT, RESOURCES, GUIDELINES AND CASE STUDIES TO BECOME CIRCULAR AND RESILIENT (WICER)

Your name

Anna Delgado

Name of organization

WB

Email address

adelgado@worldbank.org

Send

You will also receive by email a personalized link to go back to the results as needed.

Be sure to check your spam folder if you don't receive a mail.

- Fill in your email
- Get a personalized link by email (check spam folder if you don't receive it)
- Go back to the results and resources as many times as needed

Hello Anna Delgado,

Is your project WICER?

Click the button to see if your project is WICER and recommendations.

See if your project is WICER

More about the WICER initiative: www.worldbank.org/wicer

Thank you for using the online WICER assessment tool!

Results page and resources (1/2)

- When you fill in the email, and click send, it will also take you directly to the results page
- Simple color coded results
- List of resources: guidelines, reports, case studies available

Results page and resources 2/2

To start doing/exploring

- Plan and invest for climate and nonclimate uncertainties >
- Diversify supply sources >
- Be energy efficient and use renewable energy >
- Recharge & manage aquifers >

CLICK HERE FOR RESOURCES

To be improved

- Maximize use of existing infrastructure >
- Optimise operations >
- Incoporate nature-based solutions >

To continue doing

- Recover resources >
- Restore degraded land and watersheds >

Cross cutting issues

The following four cross-cutting issues emerge as important factors in the successful adoption of the WICER framework:

- Policy, institutions, and regulations: >
- Demand management: >
- Digitalization: >
- Inclusiveness: >

Sustainable Development Goals

- WICER and the the world's Sustainable Development Goals >

- Click on the small arrows next to each topic to see the list of resources: guidelines, reports, case studies available

Relevant cross-cutting issues and link to SDGs

Ready to try the WICER tool?

GO TO: www.wicer-tool.com or use the QR provided

PICK A PROJECT TO ASSESS

- **OPTION A:** Ideally, you will assess a water project you are working on or that you worked in the past. You can also assess a small municipal utility.
- **OPTION B:** If you cannot think of a water project to assess, you can use the example provided in the sheet (Chennai).

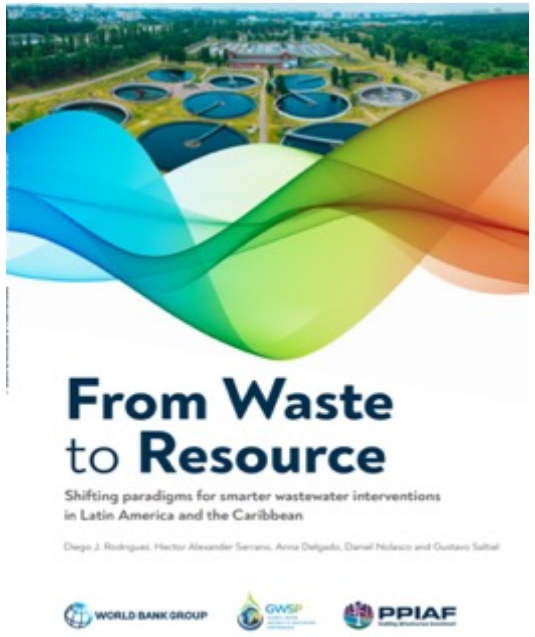
Discussion Questions

- Check the results page. Is your project WICER? Discuss with your table your results. Do you think it is a fair WICER result for your project? Why/why not? Was it easy to answer all the questions for your project?
- The purpose of this WICER quick assessment tool is to familiarize the user with the WICER concept, help assess if the project, system or city is WICER and finally present solutions, guidelines and resources to become circular and resilience while achieving economic and financial benefits. Do you think the tool achieves its purpose?
  - APPLICABILITY: Do you think the tool is useful? Can it be applied to all water projects?
  - USABILITY: Is there anything that could be improved to make it easier to use? Do you think you can use the tool in your work?
  - TOPICS: Were you familiar with all the topics introduced in the tool? Is there anything you are missing?
- What other feedback do you have for the World Bank team to improve the tool?

To learn more….

Reports with examples and guidelines to implement the concepts in the water sector

www.worldbank.org/wicer



www.worldbank.org/wastetoresource

Several case Studies

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Thank You!

Anna Delgado, Water Sector Specialist

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