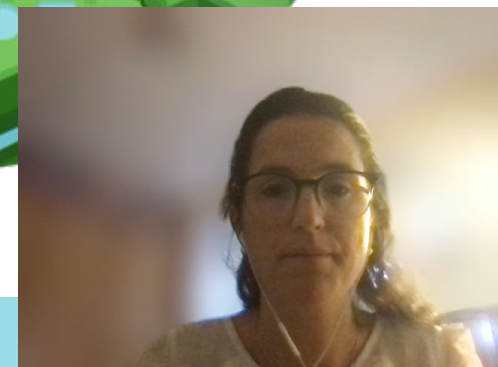
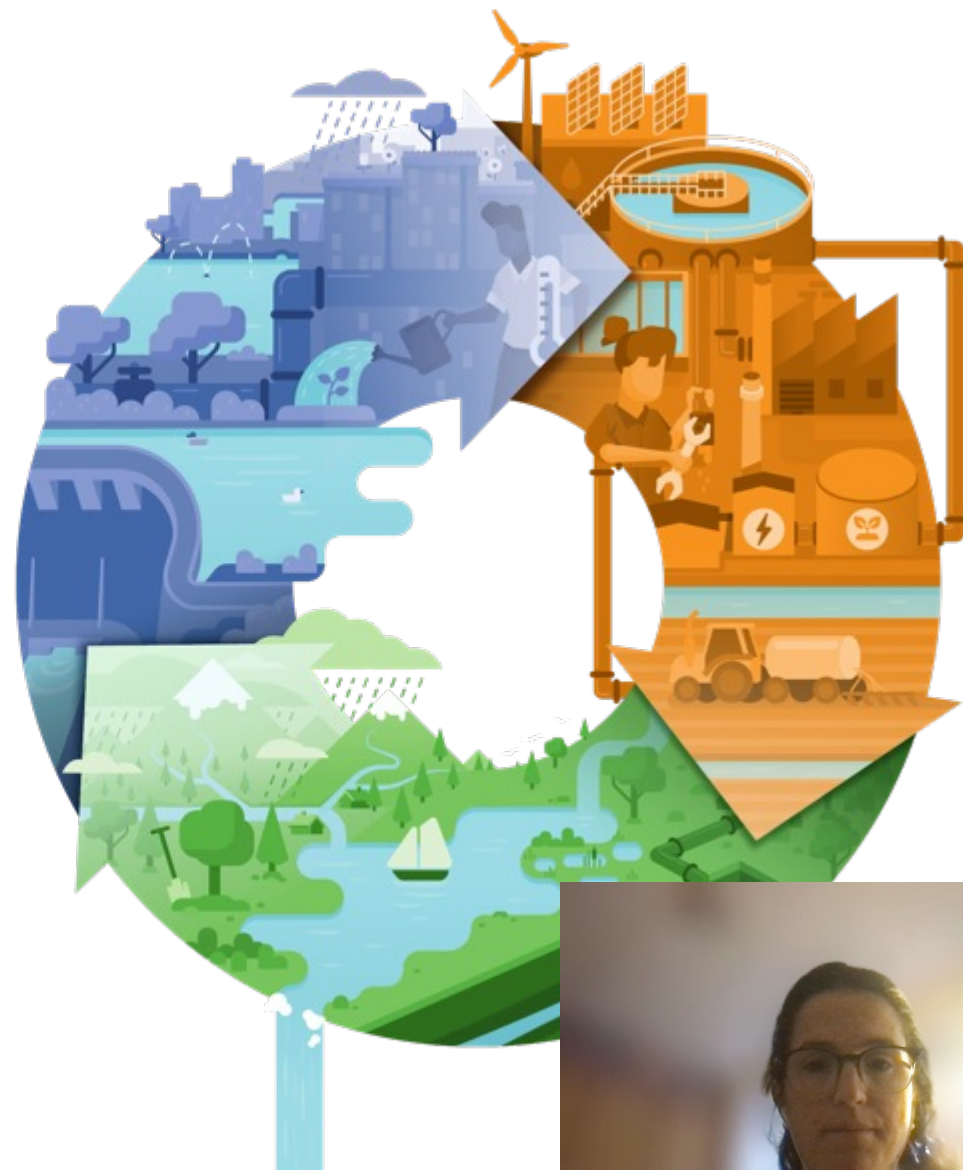


Water in Circular Economy and Resilience (WICER) Framework

Anna Delgado, Water Specialist
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1. Circular Economy – what is it?

2. Water in Circular Economy
and Resilience Framework
(WICER)

3. WICER Activities in the World
Bank





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.



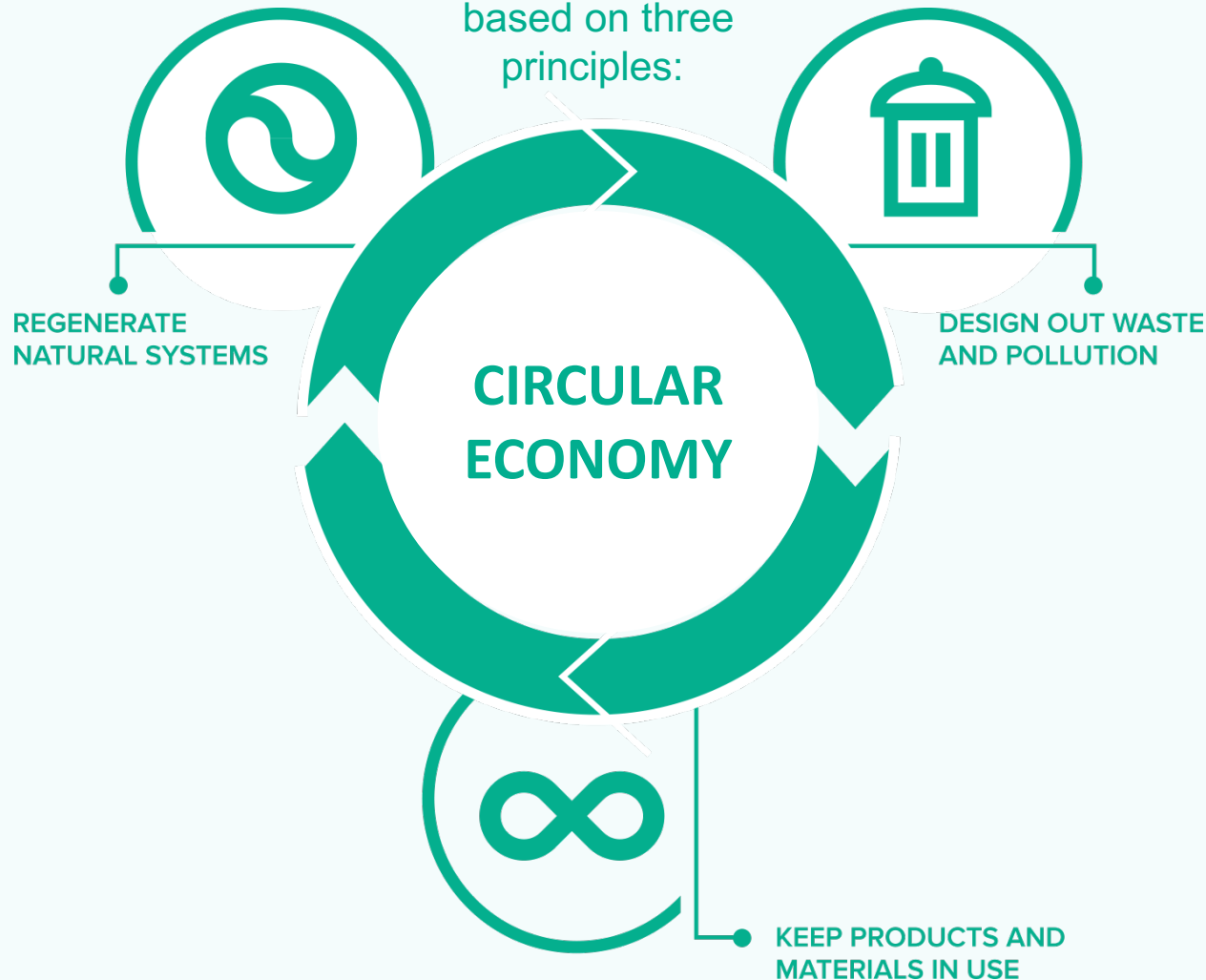
Climate change is challenging the sustainability of water resources, which are already under severe pressure in many regions of the world.



What are the principles of Circular Economy?



Circular Economy is based on three principles:

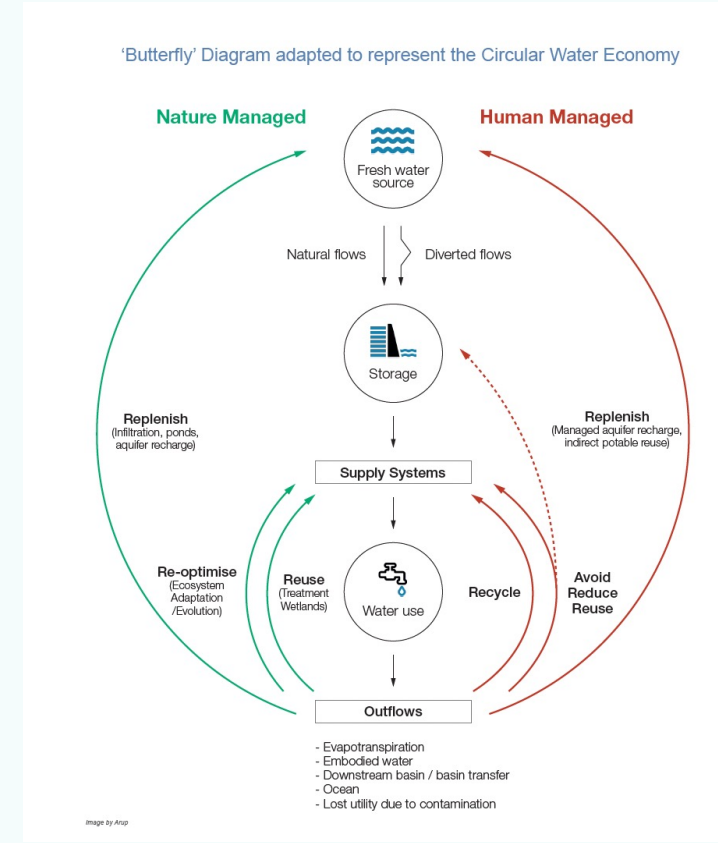
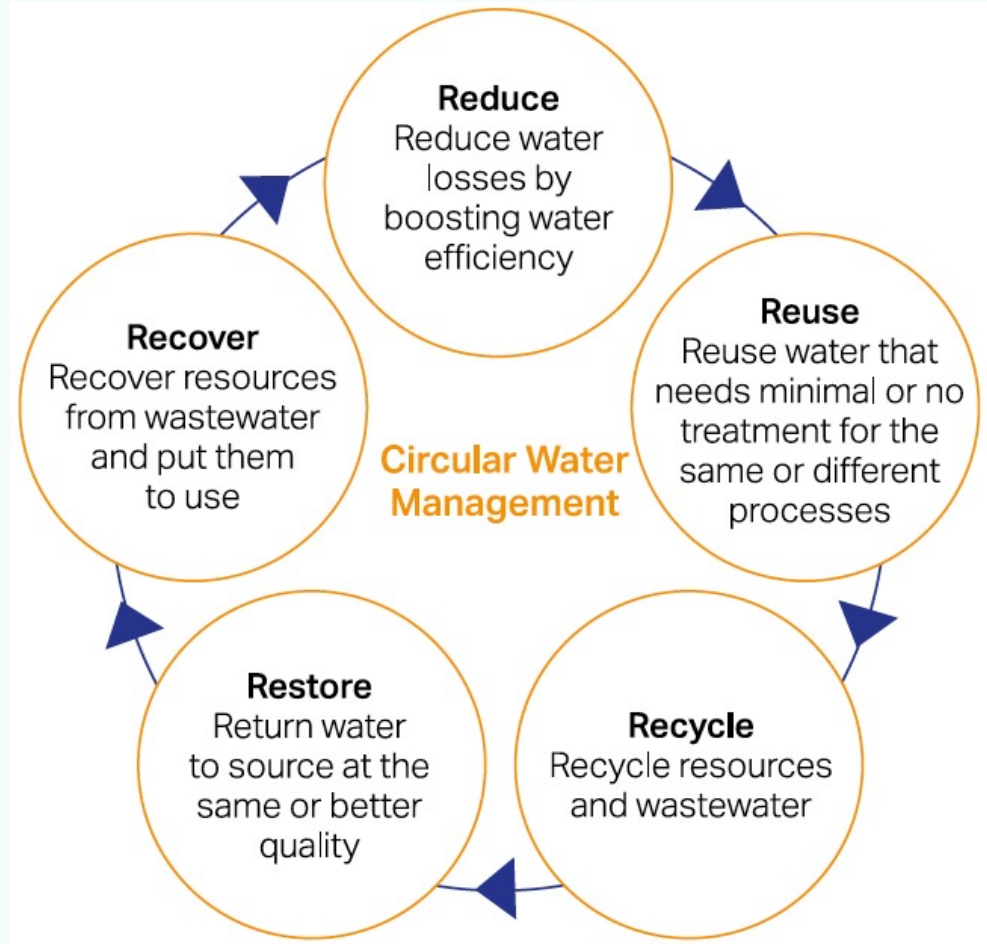
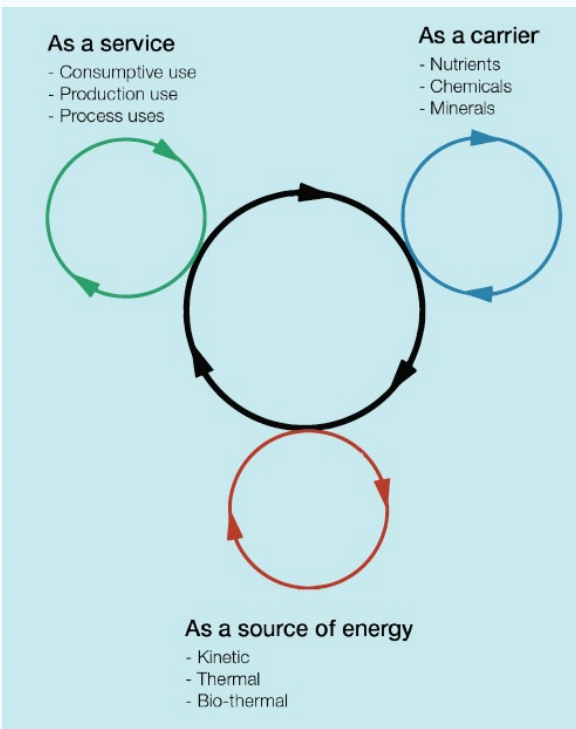


- decoupling economic activity from the consumption of finite resources and from environmental degradation
- replacing the end-of-life concept with restoration
- restoring and regenerating ecosystems by intention and design,
- eliminating waste through superior design—of materials, products, systems,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

a circular model builds economic, natural, and social capital



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

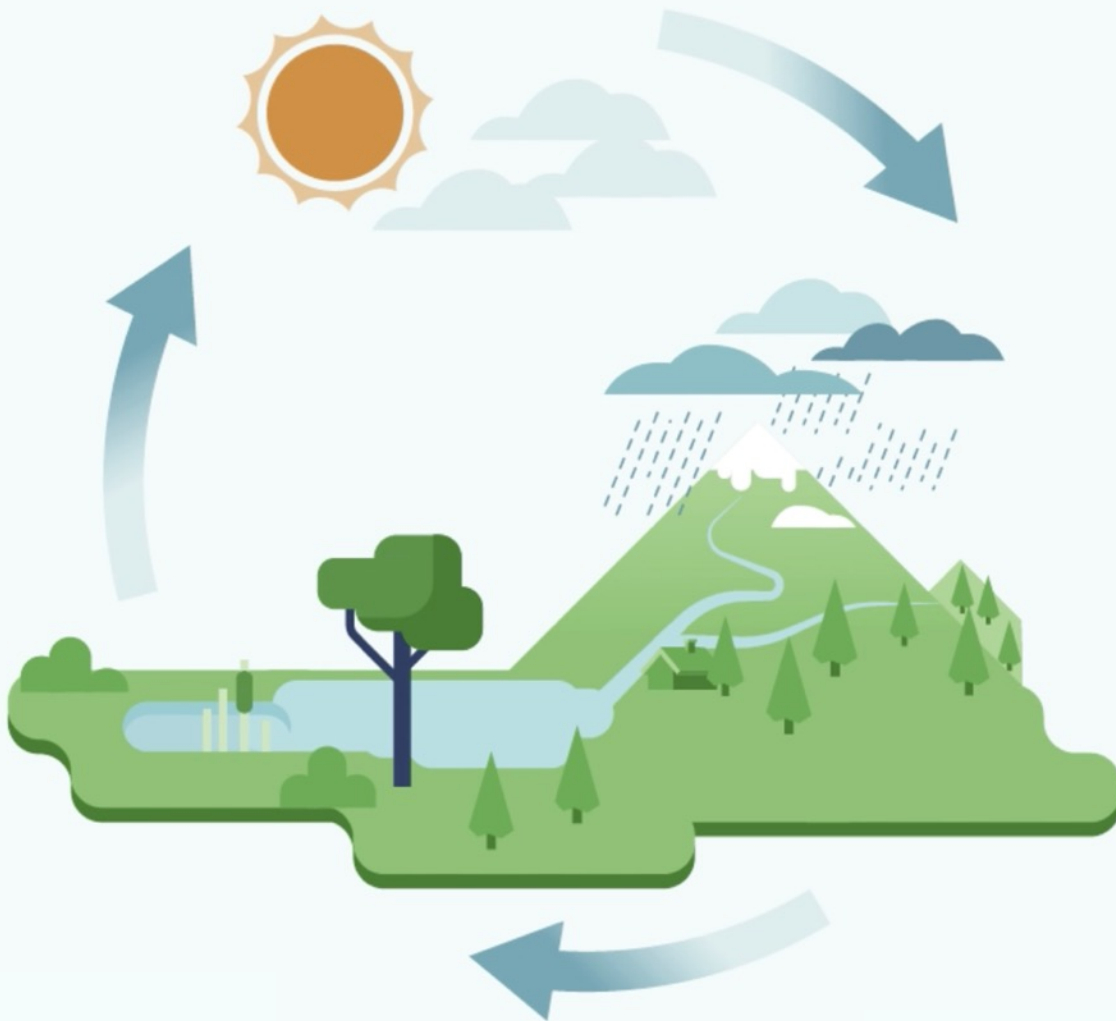
Inspired by the circularity of the water cycle in nature...



+ resilience



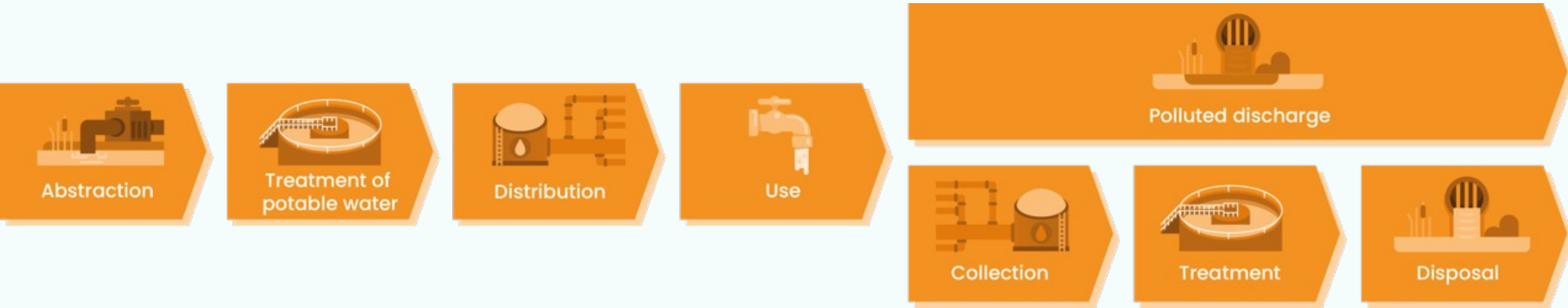
+ inclusivity



We must shift from...



A LINEAR SYSTEM ...



The Water in Circular Economy and Resilience (WICER) FRAMEWORK

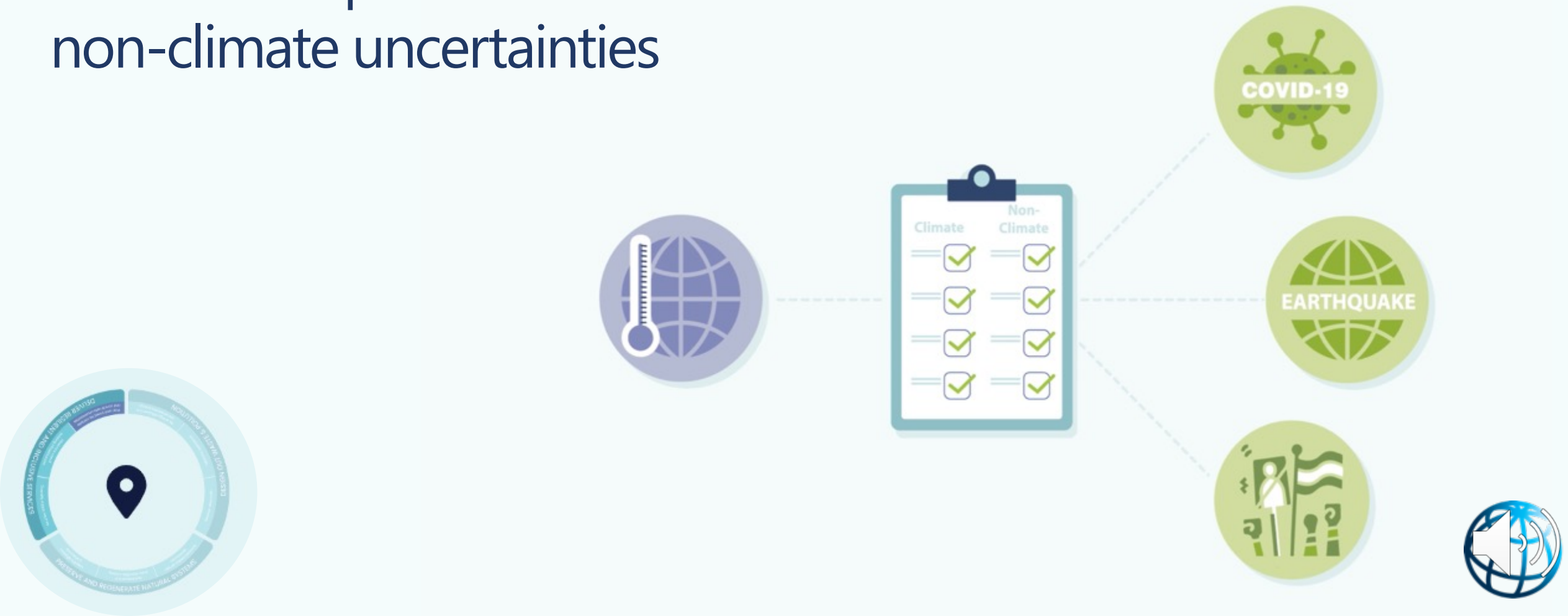


- Water
- Energy
- Nutrients



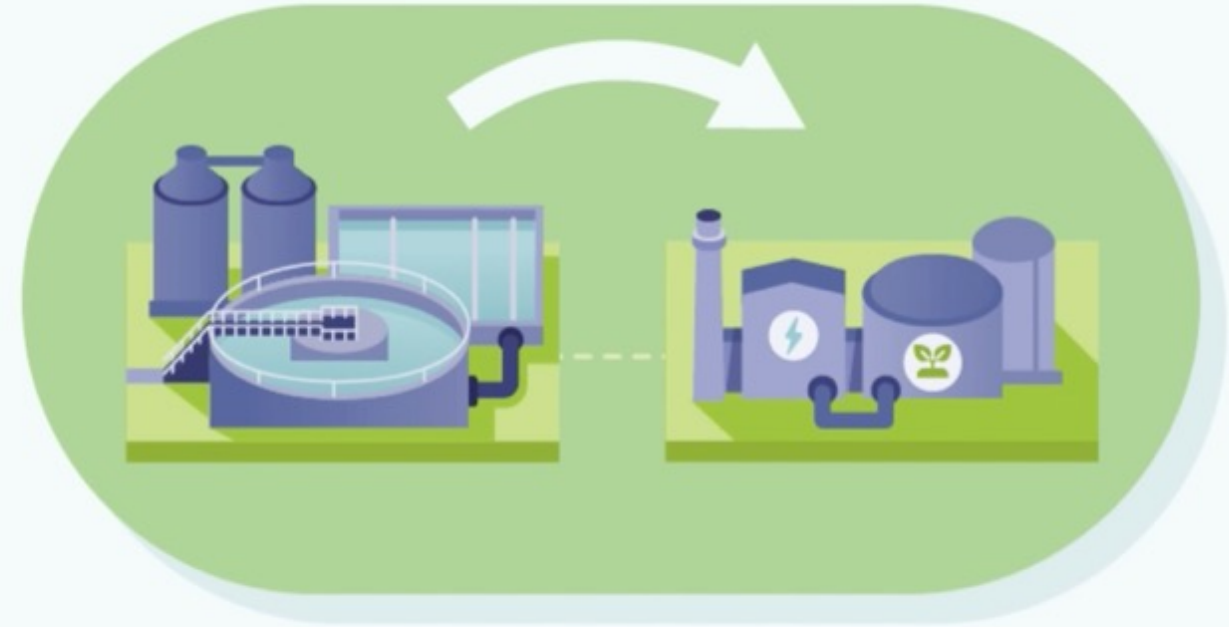
OUTCOME 1: DELIVER RESILIENT AND INCLUSIVE SERVICES

We need to plan and invest for climate and non-climate uncertainties



OUTCOME 1: DELIVER RESILIENT AND INCLUSIVE SERVICES

Maximize the use of existing infrastructure



OUTCOME 1: DELIVER RESILIENT AND INCLUSIVE SERVICES

Diversify water 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



OUTCOME 2: DESIGN OUT WASTE AND POLLUTION

Recover resources from water and wastewater



Energy



Water



Nutrients



OUTCOME 2: DESIGN OUT WASTE AND POLLUTION



Water

Industrial processes (paper, textile, etc.)

Irrigation (agriculture, parks, etc.)

Replenish aquifers

Recreational use

Cooling water (power plants)

Indirect potable water



beer with reclaimed water



biogas



phosphate fertilizer



bricks



cellulose



Biofuels (algae)



OUTCOME 2: DESIGN OUT WASTE AND POLLUTION

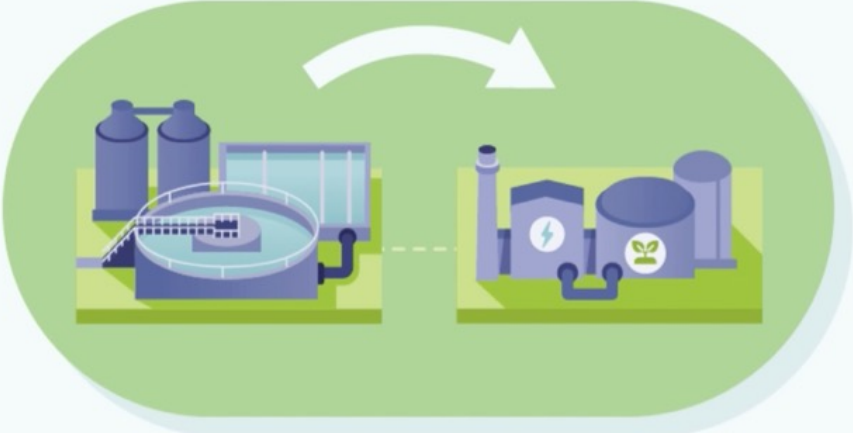
Optimize operations

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



OUTCOME 2: DESIGN OUT WASTE AND POLLUTION

Be energy efficient and use renewable energy



OUTCOME 2: DESIGN OUT WASTE AND POLLUTION



Solar panels in roof of
Recycled Water
Treatment Plant
Tuncurry, Australia



Solar panels in WWTP
Lianyungang, China



Floating Solar panels in
WWTP
Kraaifontein, South
Africa

Image: University of Cape Town (UCT)



OUTCOME 3: PRESERVE & REGENERATE NATURAL SYSTEMS

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



OUTCOME 3: PRESERVE AND REGENERATE NATURAL SYSTEMS



Sponge cities



Upstream reforestation



Constructed wetlands as part of the wastewater treatment



Fotos: Jose Luis Valverde



Recover degraded watersheds and land



Green roofs



CROSS-CUTTING ISSUES

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



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 reforestation, can reduce treatment needs and costs



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



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



Documenting relevant case studies



● WICER

www.worldbank.org/wicer

● Waste to Resource

www.worldbank.org/wastetoresource



From Waste to Resource

Shifting paradigms for smarter wastewater interventions in Latin America and the Caribbean

Diogo J. Rodrigues, Hector Alexander Sanchez, Anna Djalali, Daniel H. Abreu and Ousama Salim

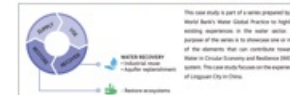


WATER GLOBAL PRACTICE

Water in Circular Economy and Resilience (WICER)

The Case of Lingyuan City, China

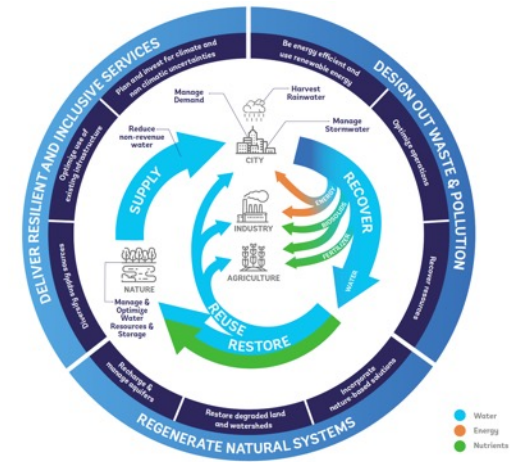
Unconventional Water Resources in a Water Scarce City: Recycling Treated Municipal Wastewater for Industrial Users and to restore the ecosystem



Context
Lingyuan City in Liaoning Province, China, is a coastal city with a population of around 600,000 people who have been facing water scarcity. The water scarcity and hydrological data indicate a decline in groundwater in Lingyuan. Municipality over the past three decades installed freshwater per capita in only one-year water meters systems, which is one fourth the national average and one twentieth the world average. The falling flow, which flows through the city, now dry for about seven months a year.

Challenge
The limited availability of surface water, combined with pollution of the Baihe River, has led to the marginalization of groundwater resources. Between 2000 and 2010, exploitable groundwater resources diminished by 50 percent.

Opportunity
Circular water as a vital water supply source for the city allowed to generate of total water use, which exceeds to 100 percent, groundwater, surface water, municipal effluent, and reuse three other industries (including several large industrial users that consume one million m³ per year). To adapt the local applica-



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



Support to Bolivia's National Strategy for Wastewater Management and Reuse



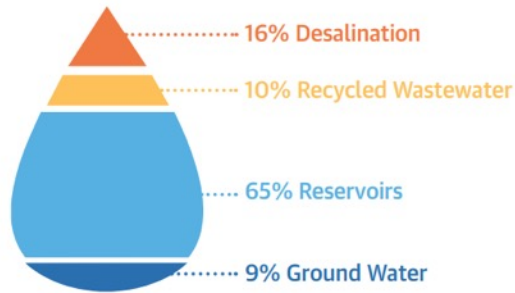


Targeted project
activities and
investments

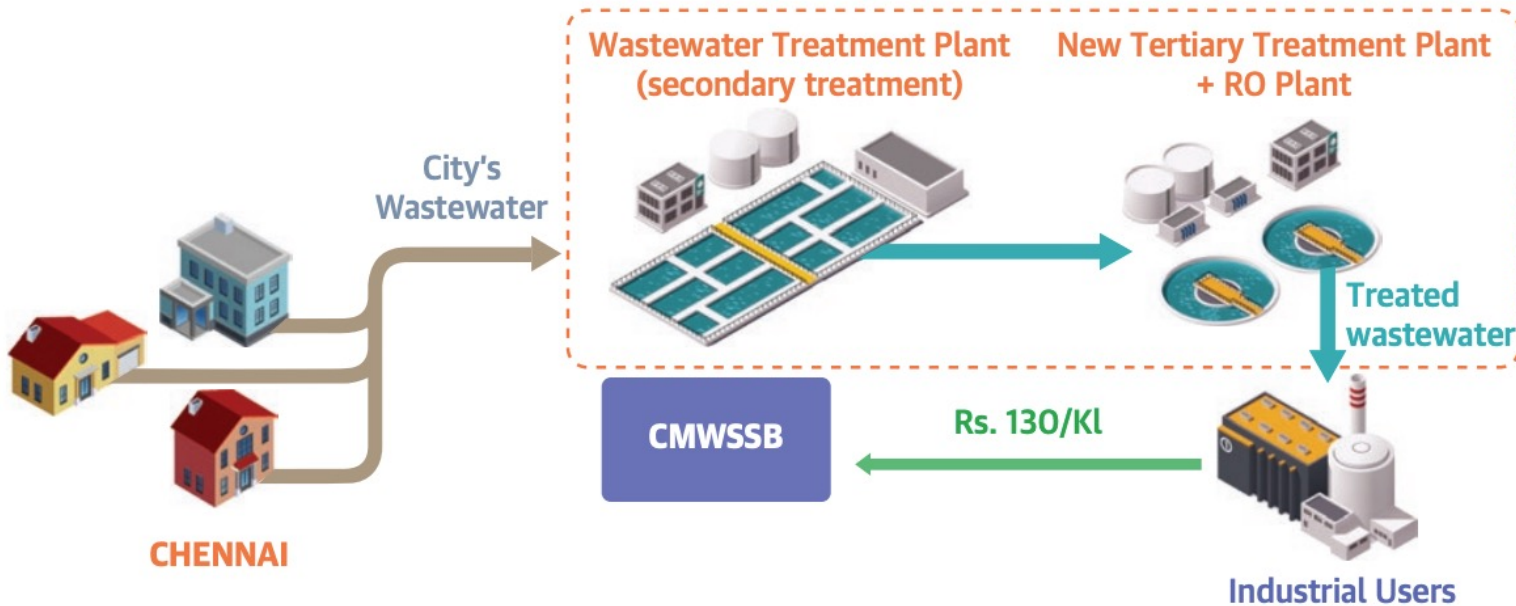


Applying circular economy principles in Chennai, India

Tamil Nadu Sustainable Urban Development Project



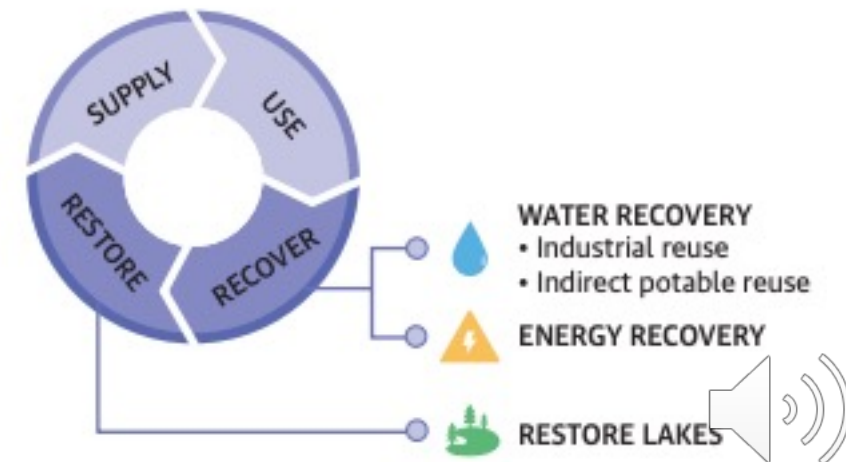
Source: CMWSSB, 2020.



Benefits:

- Sold treated wastewater covers O&M for municipality
- Lower operating costs and decreased risks of water scarcity for industrial users

CIRCULAR ECONOMY ELEMENTS



Other World Bank projects with circular economy components:

- China: Liaoning Coastal Economic Zone Urban Infrastructure and Environmental Management Project - reuse for industry and environmental restoration
- Uruguay: Uruguay OSE Sustainable and Efficient Project - Improving Resiliency, Sustainability and Efficiency in Uruguay's National Water Supply and Sanitation Company
- Brazil: The Watershed Management and Restoration of Forest Cover project - Targeted green infrastructure for source-water protection
- Senegal: Water Security and Sanitation Project - recovering resources from wastewater and fecal sludge (biosolids, water and energy)
- and others...




Development of a quick assessment tool: is your project WICER?

WATER IN CIRCULAR ECONOMY AND RESILIENCE (WICER)

START

A quick Assessment Tool



THE WORLD BANK
IBRD • IDA | WORLD BANK GROUP

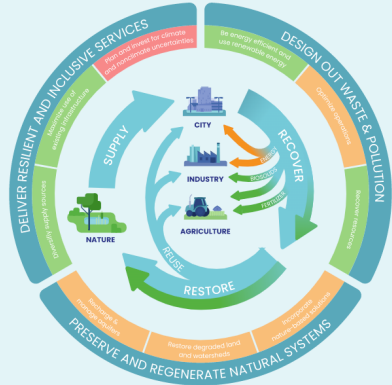
GWSP
GLOBAL WATER SECURITY & SANITATION PARTNERSHIP

www.worldbank.org/wicer

www.wicer-tool.com

IS THE PROJECT WICER?

Anna of WB



Supply
Ensure sufficient, safe, regular, and equitable access to freshwater and other natural resources

Recover
Reduce resource use, minimize waste generation, and extend the life cycle of products

Restore
Restore degraded land, soil, water, and ecosystems, and enhance resilience

Preserve and Regenerate Natural Systems
Protect and restore natural ecosystems, sustainably manage the land, oceans, forests, and other terrestrial, coastal, and marine ecosystems

Design Out Waste & Pollution
Eliminate the discharge of hazardous and non-hazardous polluting materials

Deliver Resilient and Inclusive Services
Ensure universal and equitable access to safe and sustainable freshwater and other natural resources

Specifics

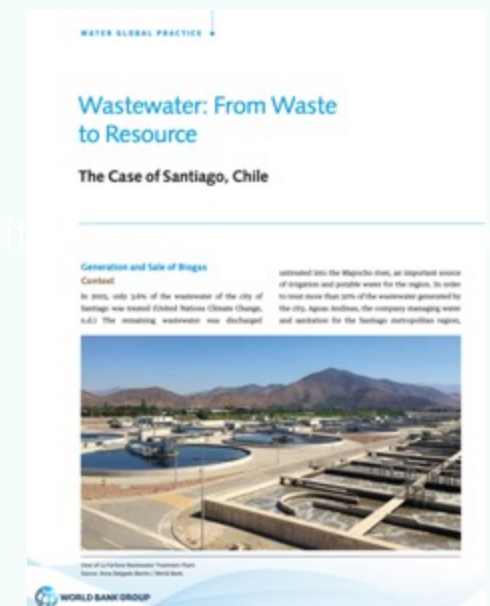
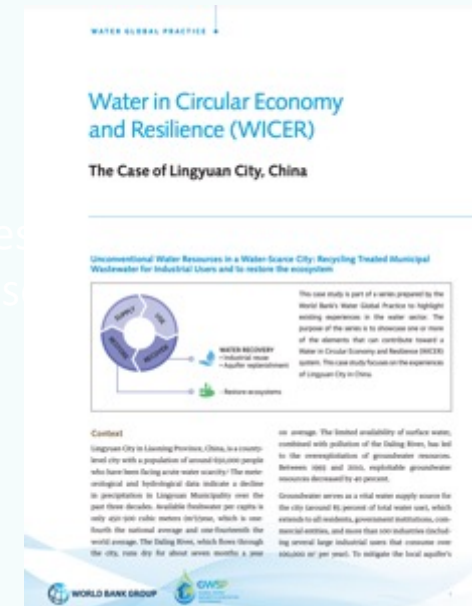
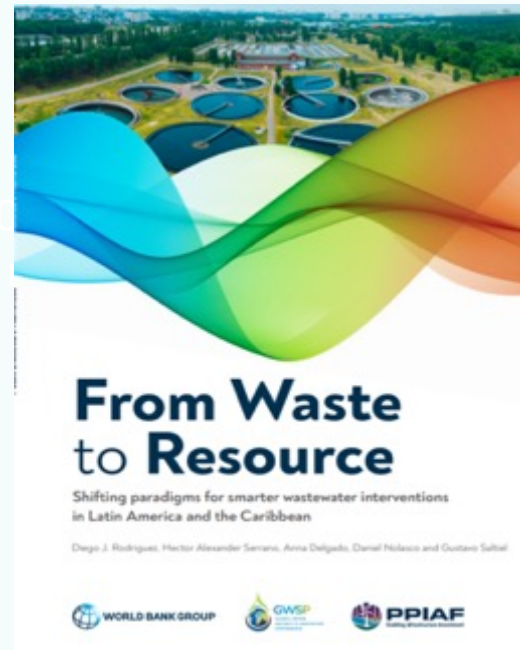
- To continue doing
- To be improved
- To start doing/exploring



To learn more:

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

Several case Studies



www.worldbank.org/wicer

www.worldbank.org/wastetoresource



Thank you!

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www.worldbank.org/wicer

