

3rd Symposium on Circular Economy and Sustainability

Chania, Greece

27-29 June, 2022

Organised by:



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URJC



How to measure circular economy in water cycle?

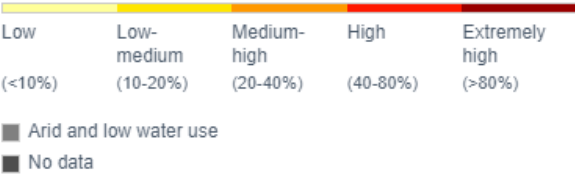
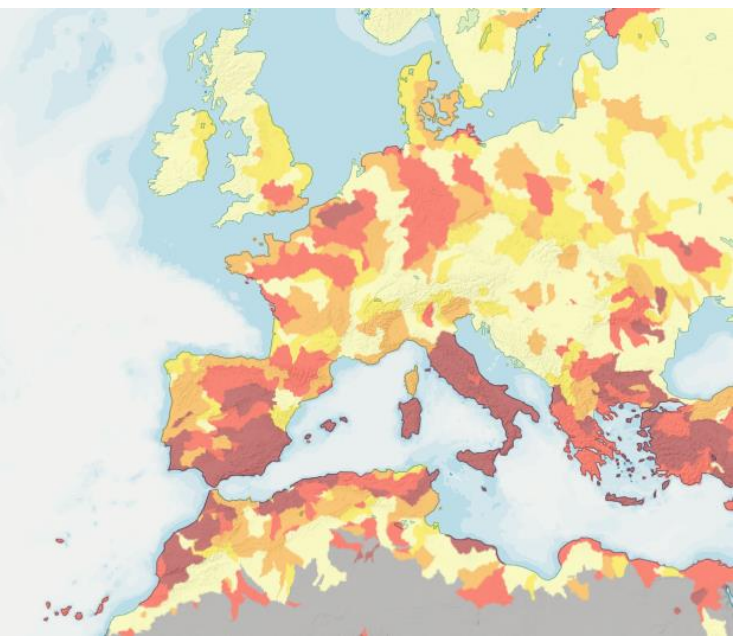
Sofía Tirado Sarti

Aquae Chair in Water Economics

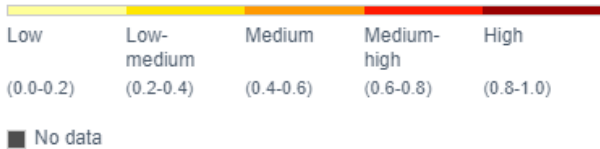
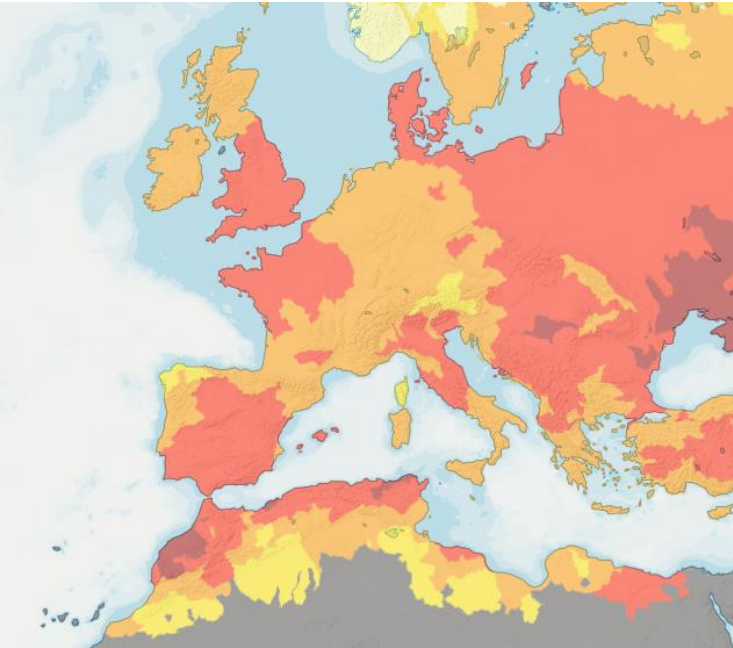
UNESCO Chair on Water and Peace, UNED

Introduction

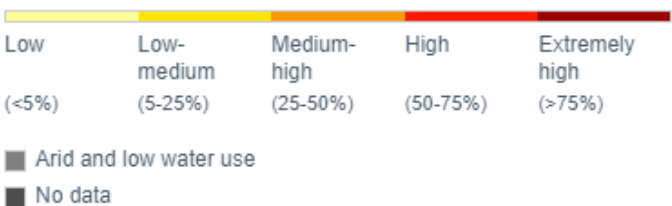
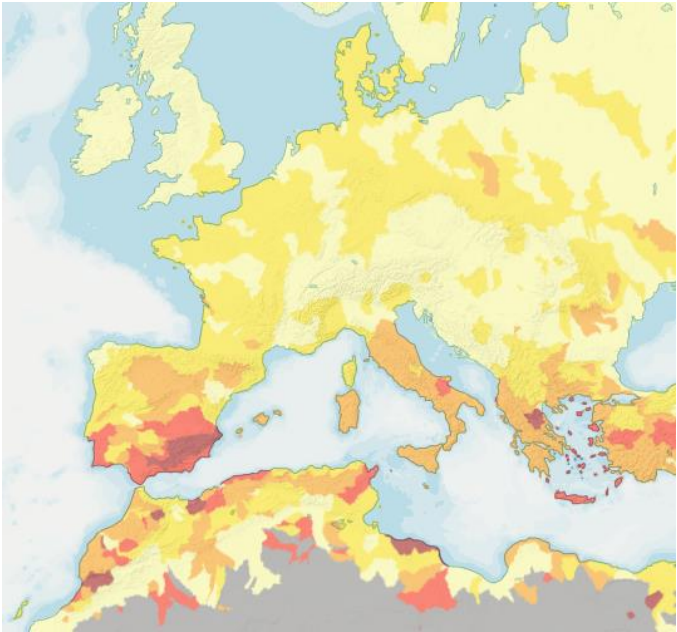
Water stress



Drought risk

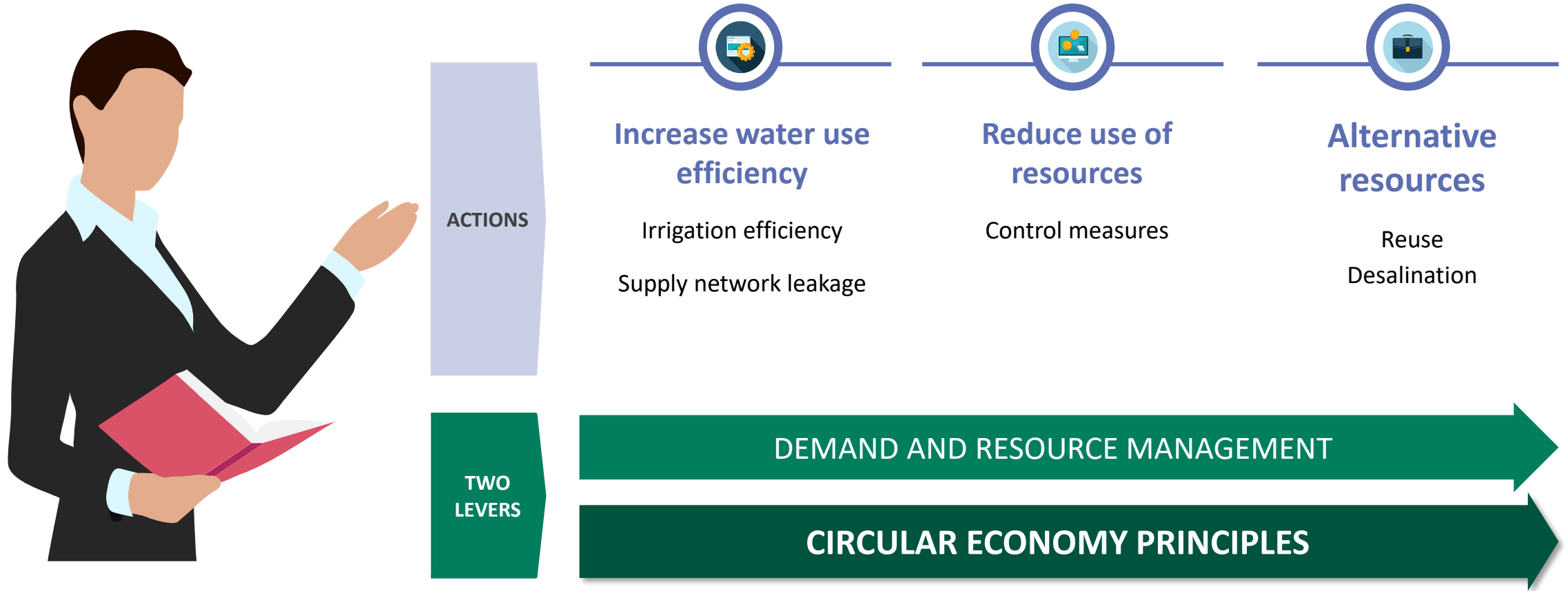


Water depletion

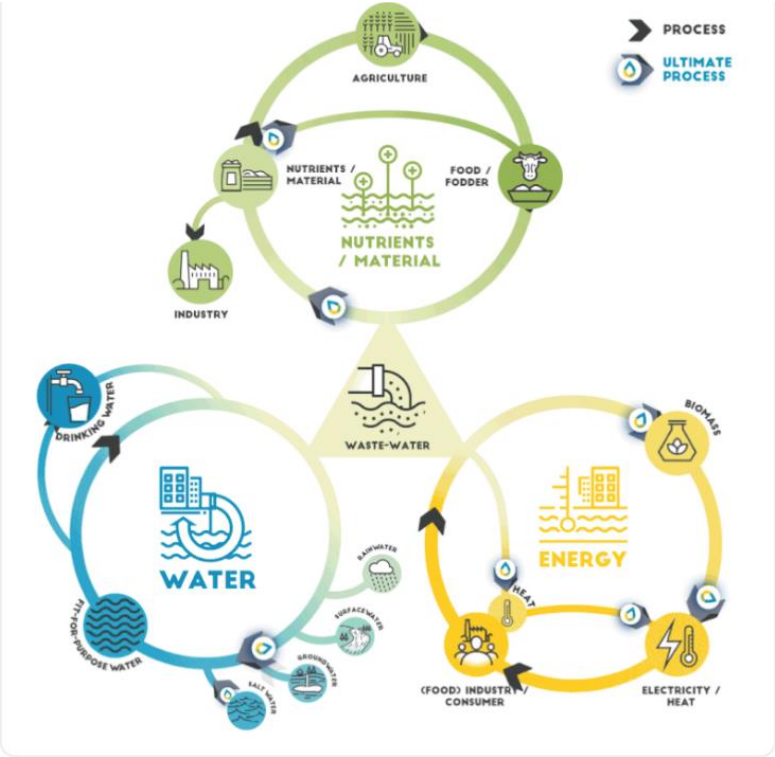


Source: [WRI Aqueduct 2019](#)

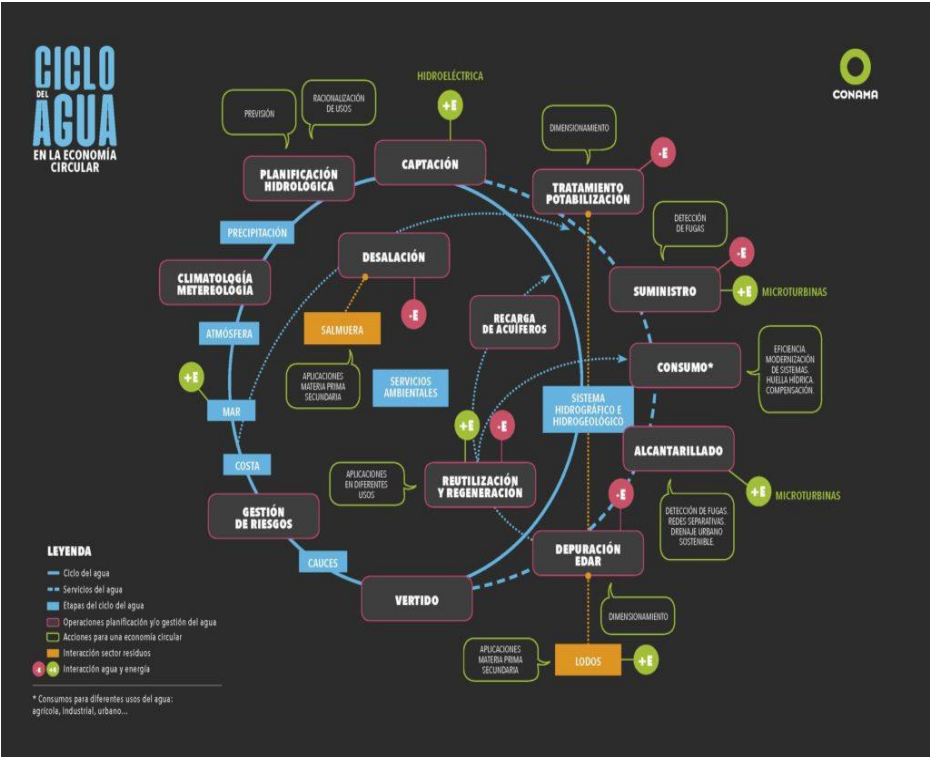
Introduction



Introduction



WATER-ENERGY-NUTRIENTS NEXUS

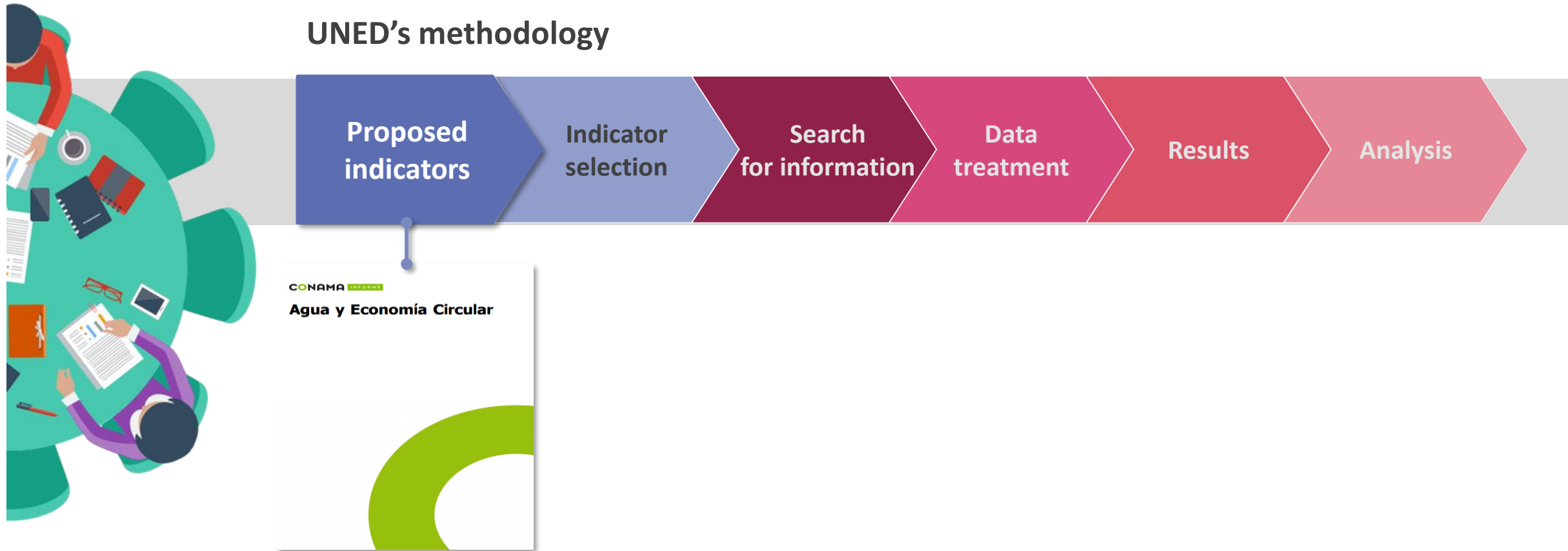


WATER CYCLE AND CIRCULAR ECONOMY

Introduction

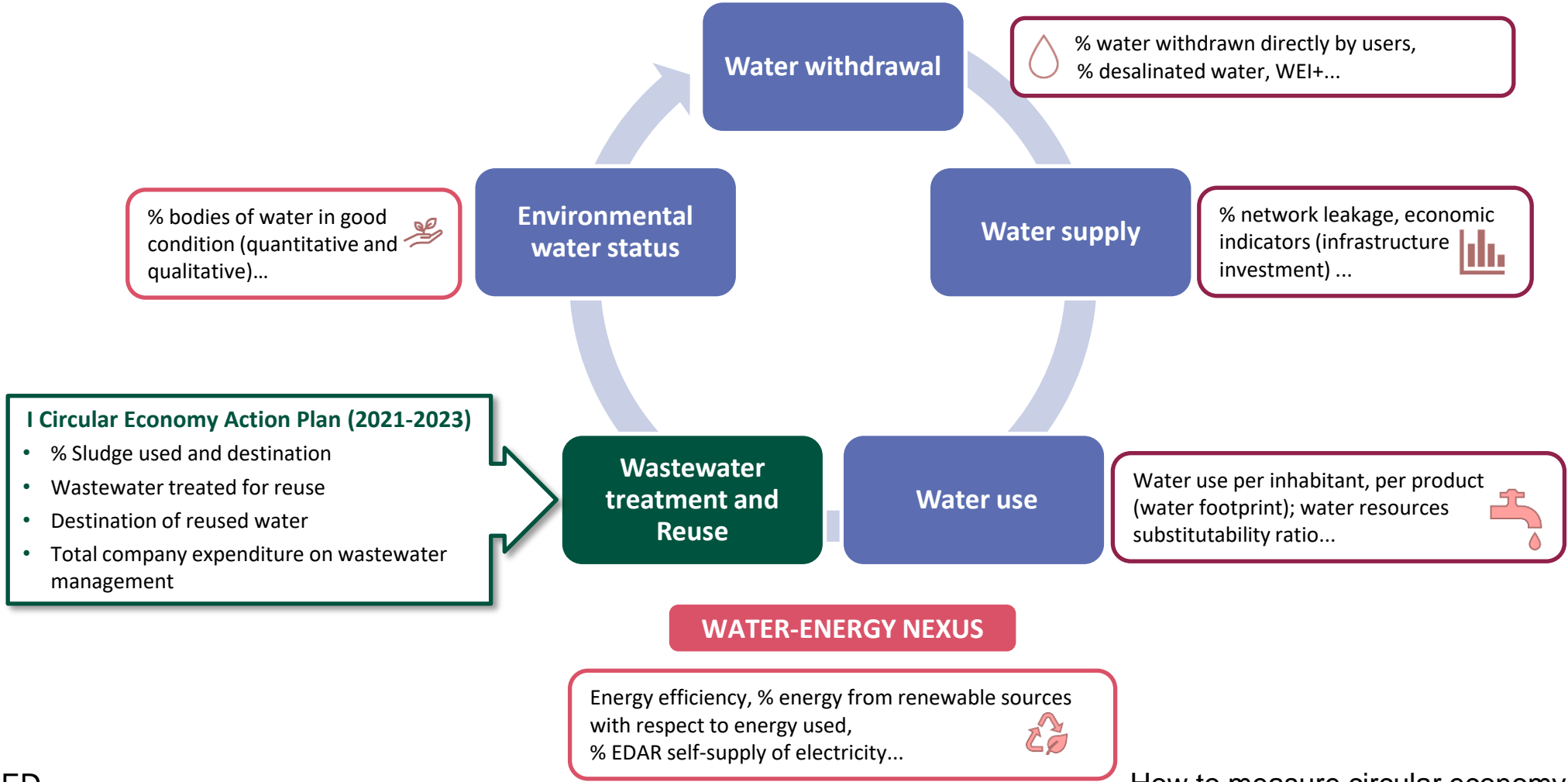


Introduction

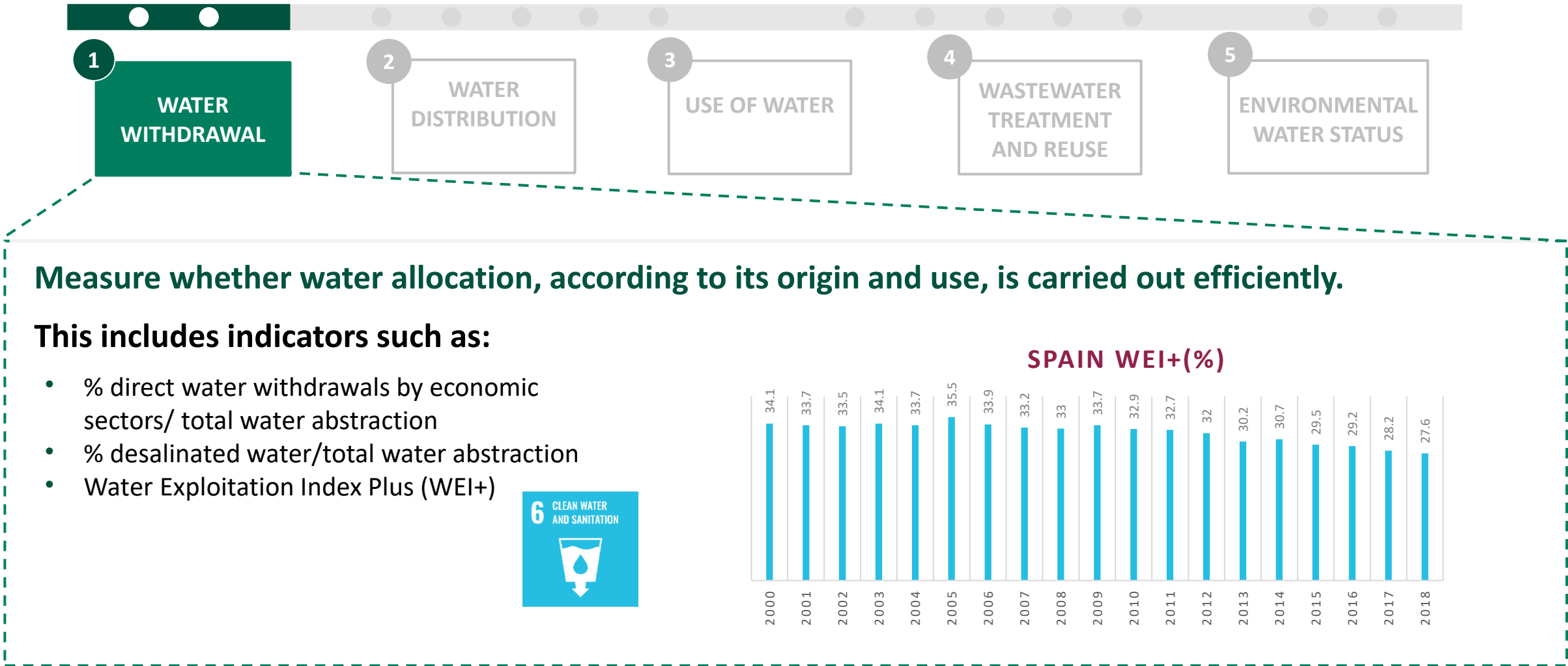


Circular Water Indicators

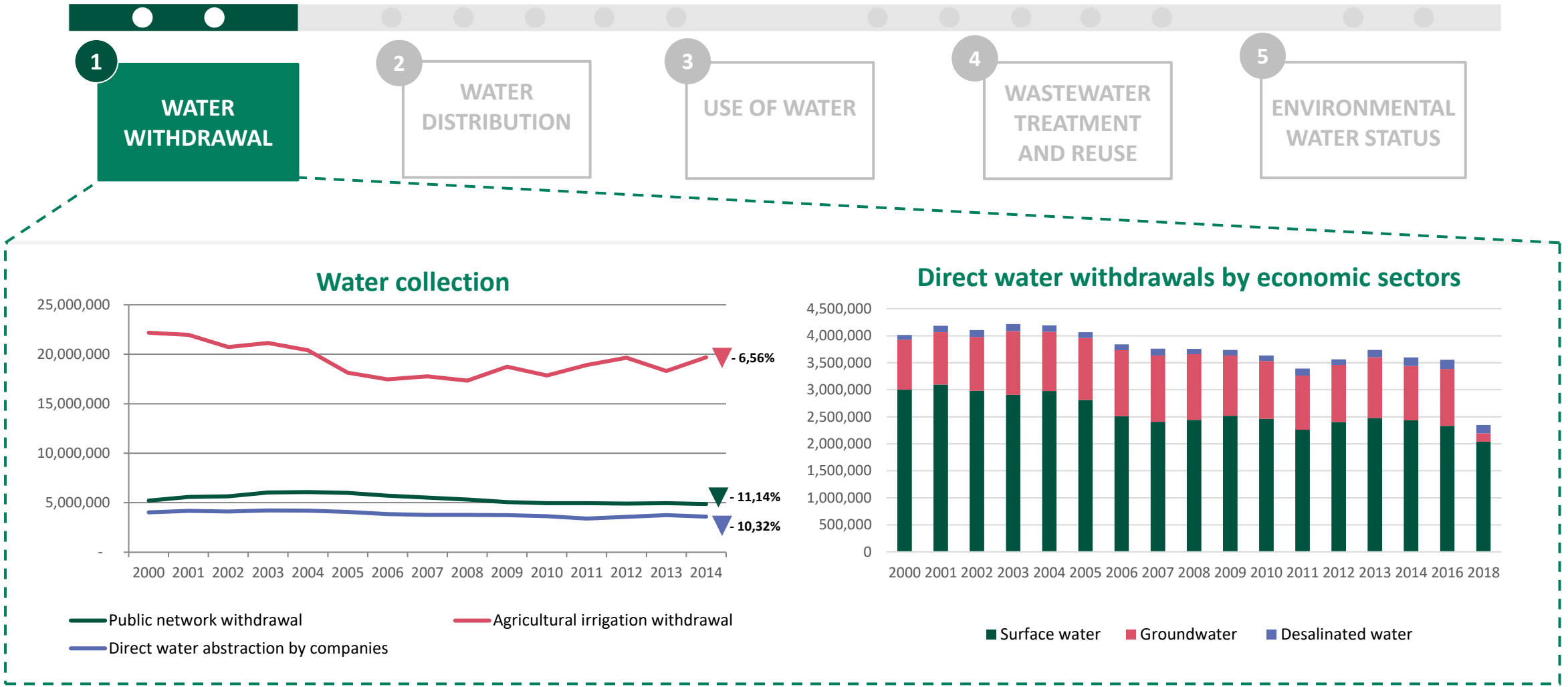
Indicators to measure water circularity



Circular Water Indicators



Circular Water Indicators



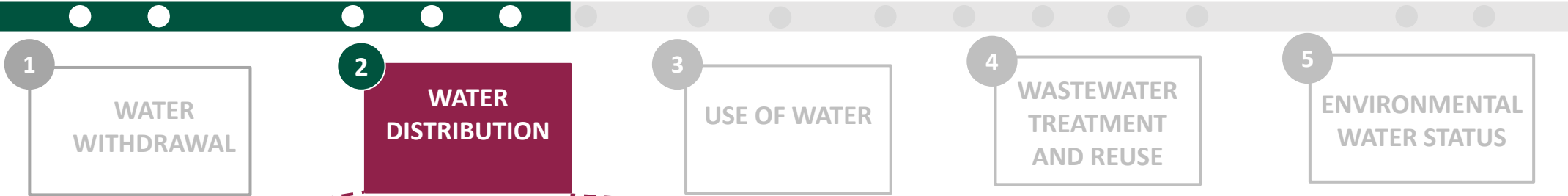
Water collection

Year	Agricultural irrigation withdrawal	Public network withdrawal	Direct water abstraction by companies
2000	22,000,000	5,000,000	4,000,000
2001	22,000,000	5,500,000	4,000,000
2002	21,000,000	5,500,000	4,000,000
2003	21,000,000	6,000,000	4,000,000
2004	20,000,000	6,000,000	4,000,000
2005	18,000,000	6,000,000	4,000,000
2006	17,000,000	5,500,000	4,000,000
2007	17,000,000	5,500,000	4,000,000
2008	17,000,000	5,500,000	4,000,000
2009	19,000,000	5,500,000	4,000,000
2010	18,000,000	5,500,000	4,000,000
2011	19,000,000	5,500,000	4,000,000
2012	20,000,000	5,500,000	4,000,000
2013	18,000,000	5,500,000	4,000,000
2014	20,000,000	5,000,000	4,000,000

Direct water withdrawals by economic sectors

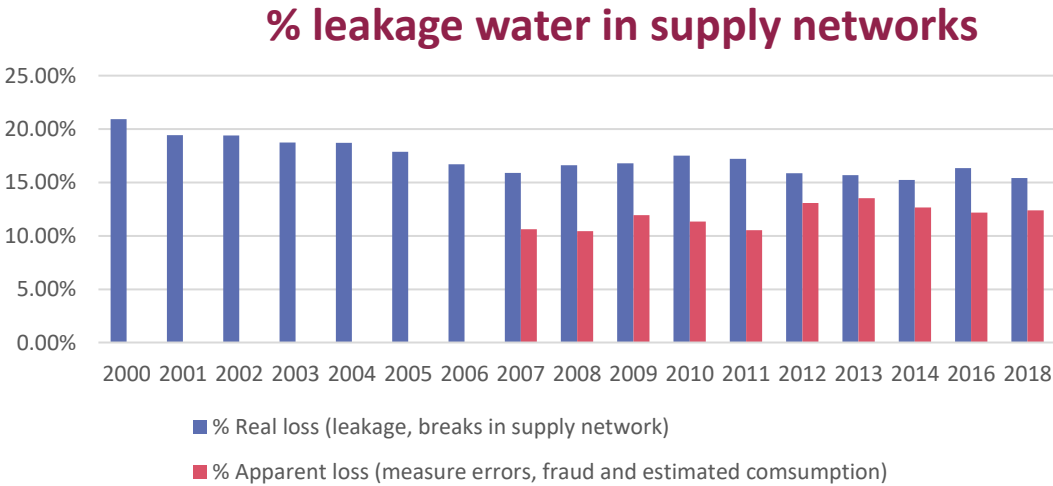
Year	Surface water	Groundwater	Desalinated water
2000	3,000,000	1,000,000	100,000
2001	3,100,000	1,000,000	100,000
2002	3,000,000	1,000,000	100,000
2003	3,000,000	1,000,000	100,000
2004	3,000,000	1,000,000	100,000
2005	2,800,000	1,200,000	100,000
2006	2,500,000	1,500,000	100,000
2007	2,400,000	1,600,000	100,000
2008	2,400,000	1,600,000	100,000
2009	2,500,000	1,500,000	100,000
2010	2,400,000	1,600,000	100,000
2011	2,200,000	1,800,000	100,000
2012	2,400,000	1,600,000	100,000
2013	2,500,000	1,500,000	100,000
2014	2,400,000	1,600,000	100,000
2016	2,300,000	1,700,000	100,000
2018	2,000,000	1,500,000	100,000

Circular Water Indicators

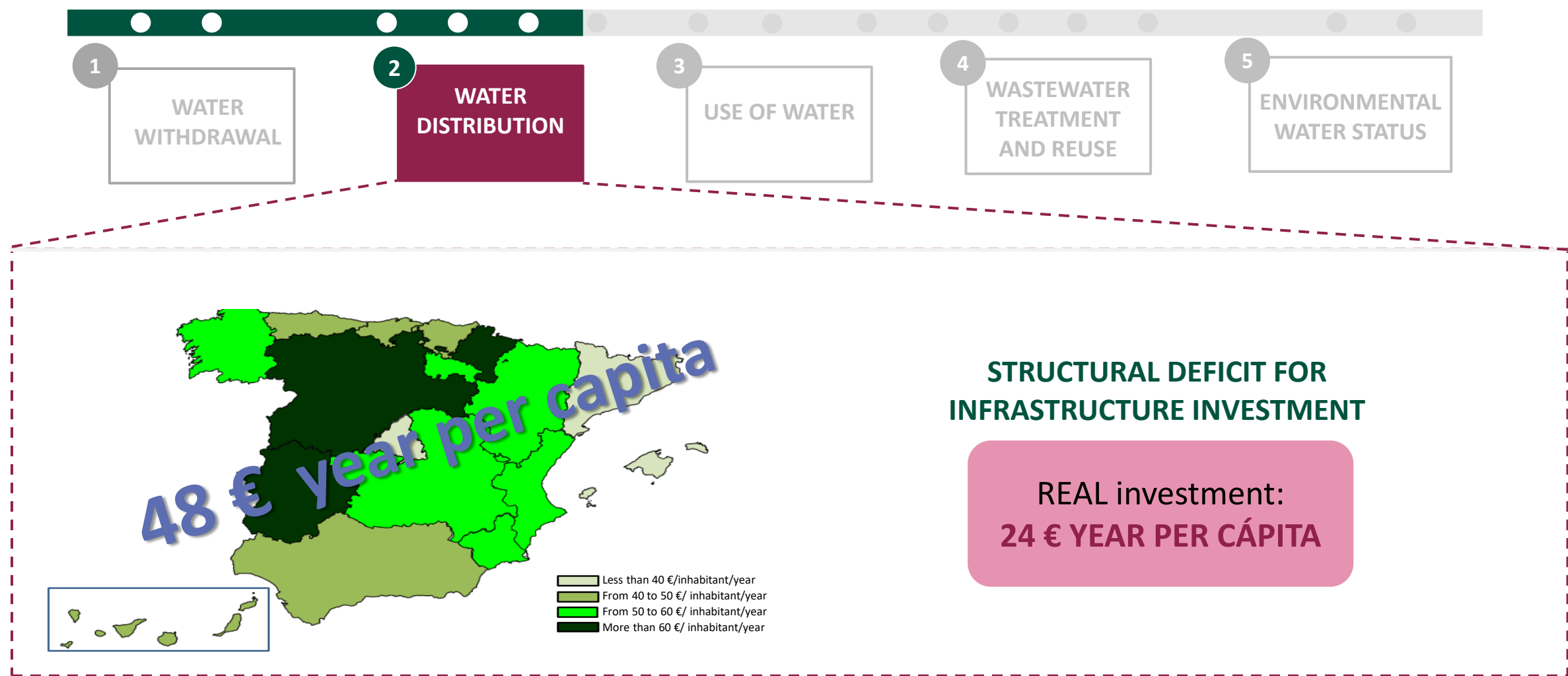


Measure the efficiency in the water supply service (including transport, treatment, storage and distribution):

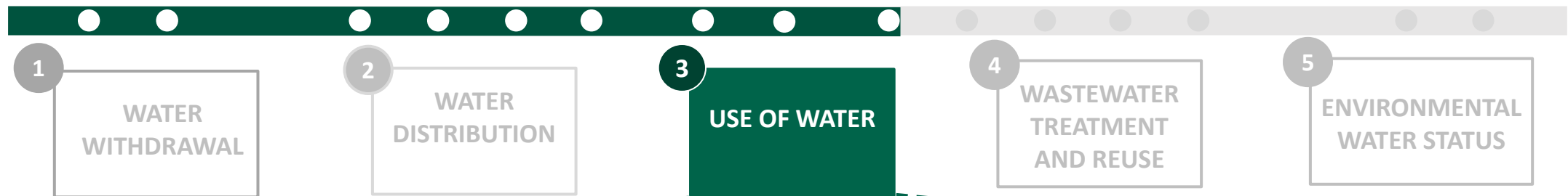
- **Efficiency indicators:** % leakage water in supply networks; energy consumption per cubic meter of distributed water.
- **Economic indicators:** % on investment in new and updated infrastructure



Circular Water Indicators



Circular Water Indicators

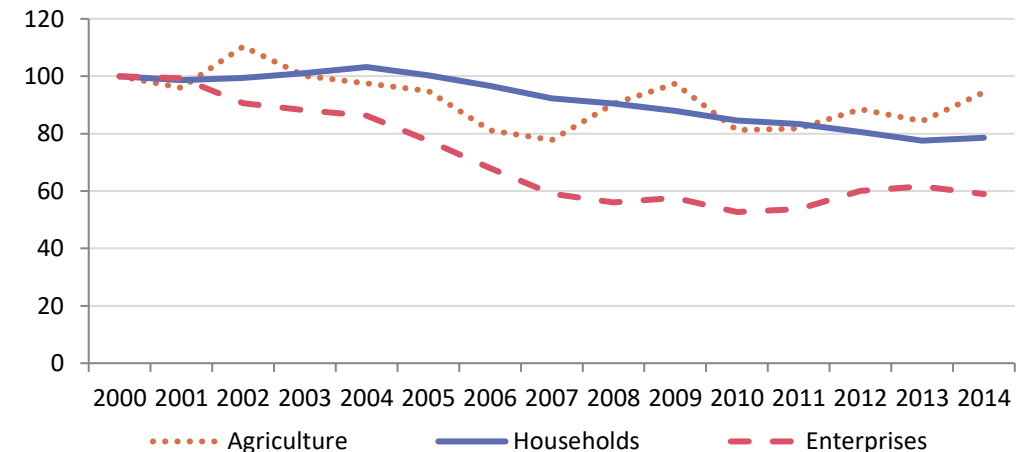


Assess the use of water by user type, its evolution and whether the resource is used efficiently:

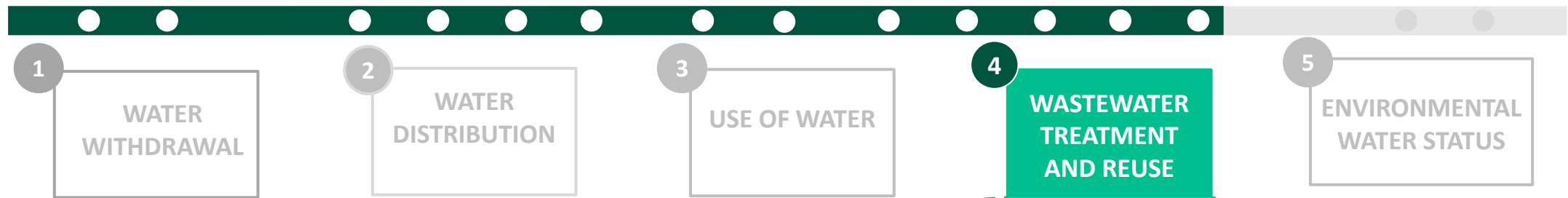
- **Water use efficiency:** water consumption per unit (inhabitant, economic sectors...), water footprint, etc
- **Water productivity**
- **Substitution ratio between non-conventional & conventional water resources**



WATER USE EFFICIENCY



Circular Water Indicators

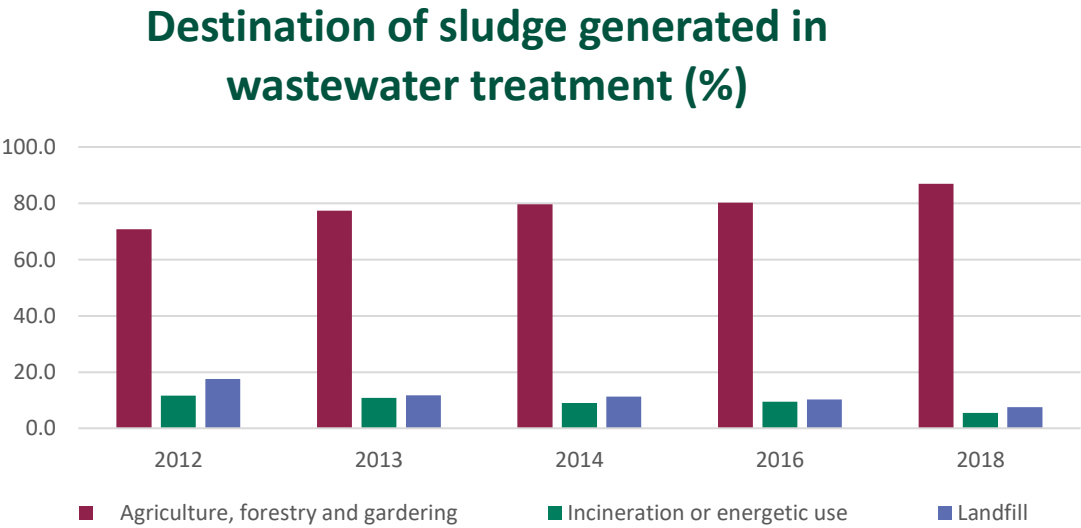
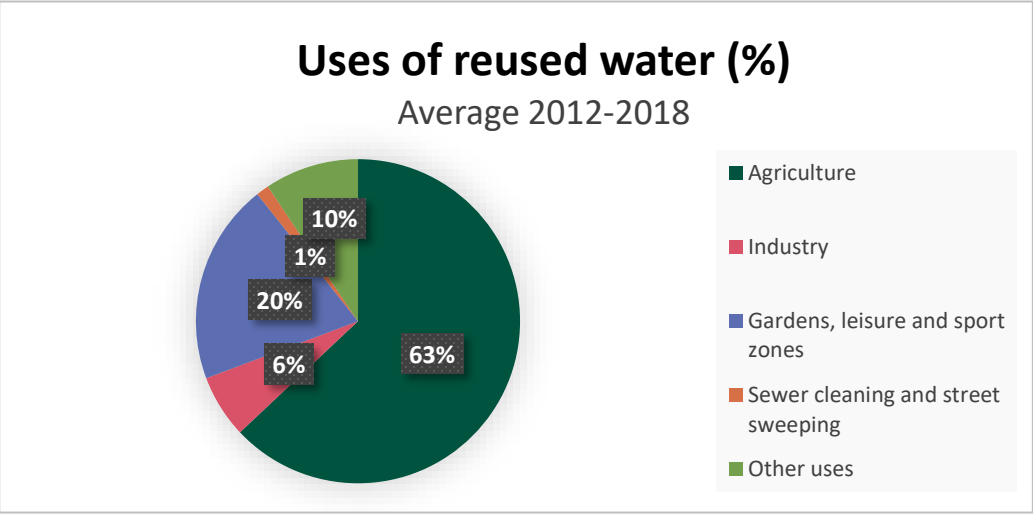
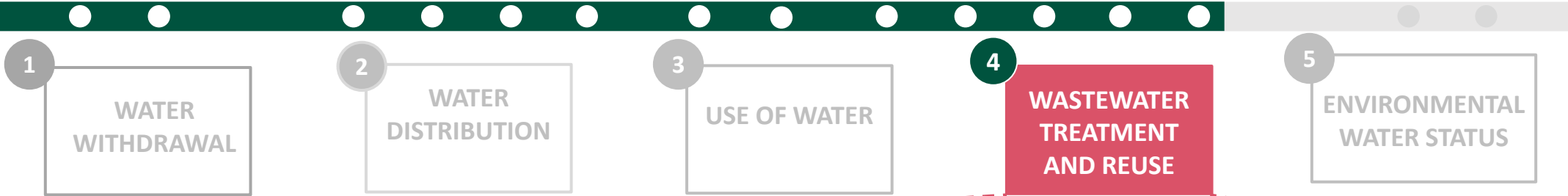


Assess the impact and efficiency of these phases, as well as the investment in this type of infrastructure:

- **Incidence indicators:** % reused treated wastewater, % reused water destined for each use
- **Efficiency indicators:** % use of by-products from wastewater treatment, % separated sanitation networks, % energy consumption per cubic meter of treated water, % electrical self-supply wastewater treatment plants
- **Economic indicators:** % new and renewal infrastructure investment, % investment in water treatment and reuse and its costs.

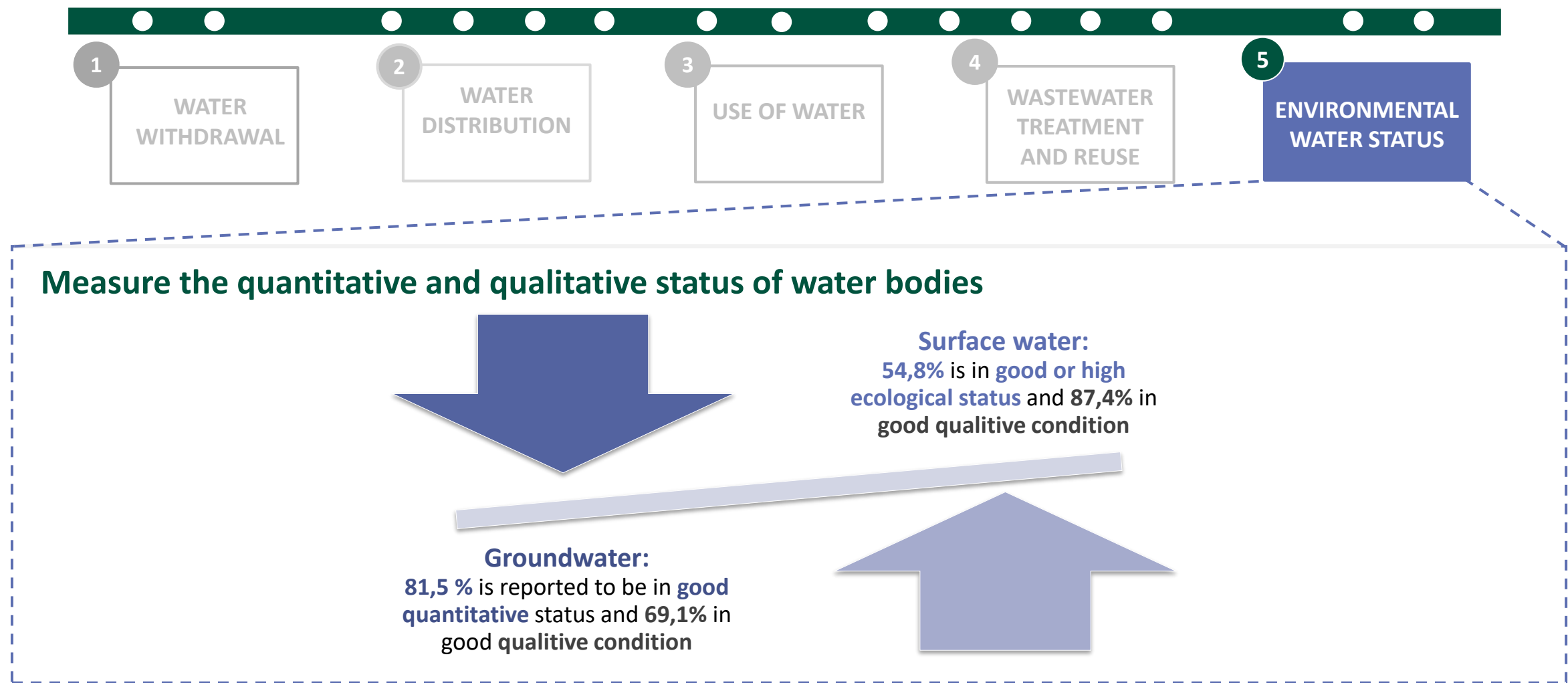


Circular Water Indicators

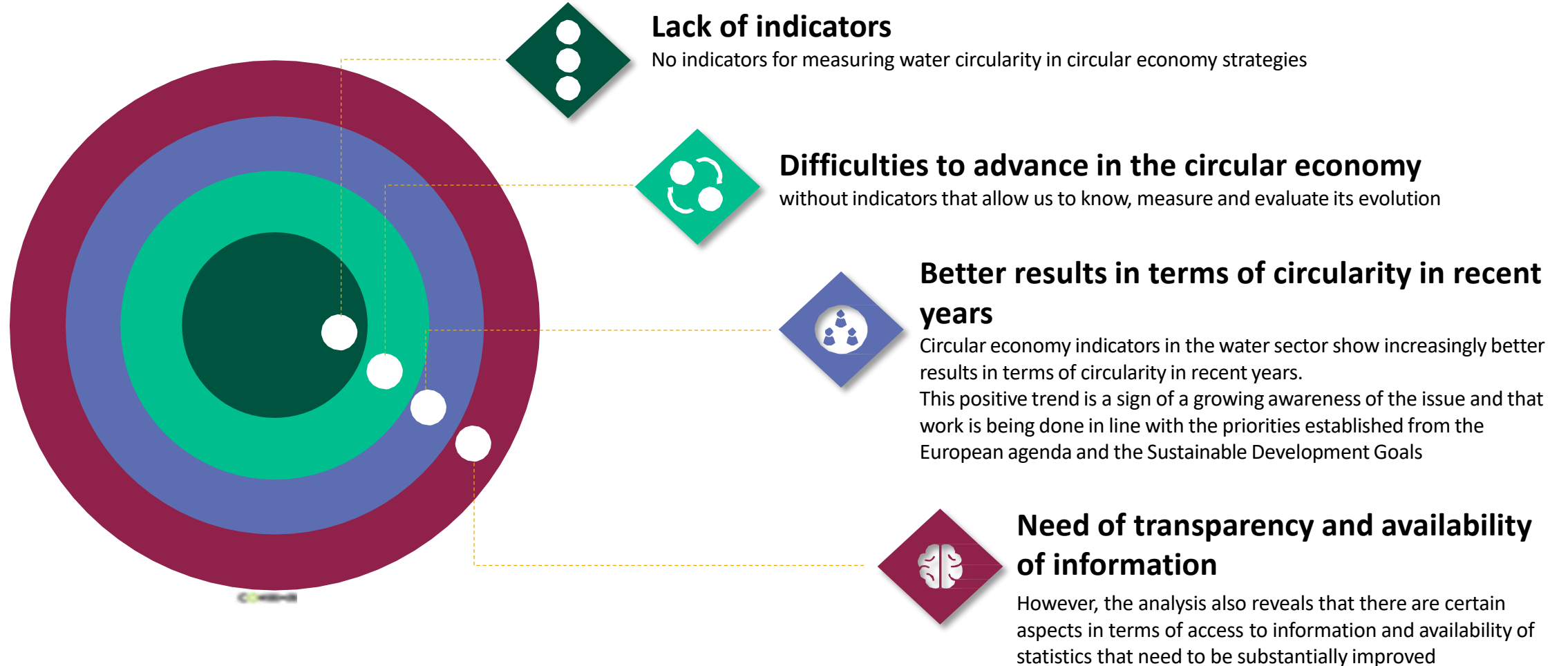


92,5% of sludge generated in WWTP is used

Circular Water Indicators



Conclusions



THANK YOU

If you have any questions, please
don't hesitate to contact me by email:
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