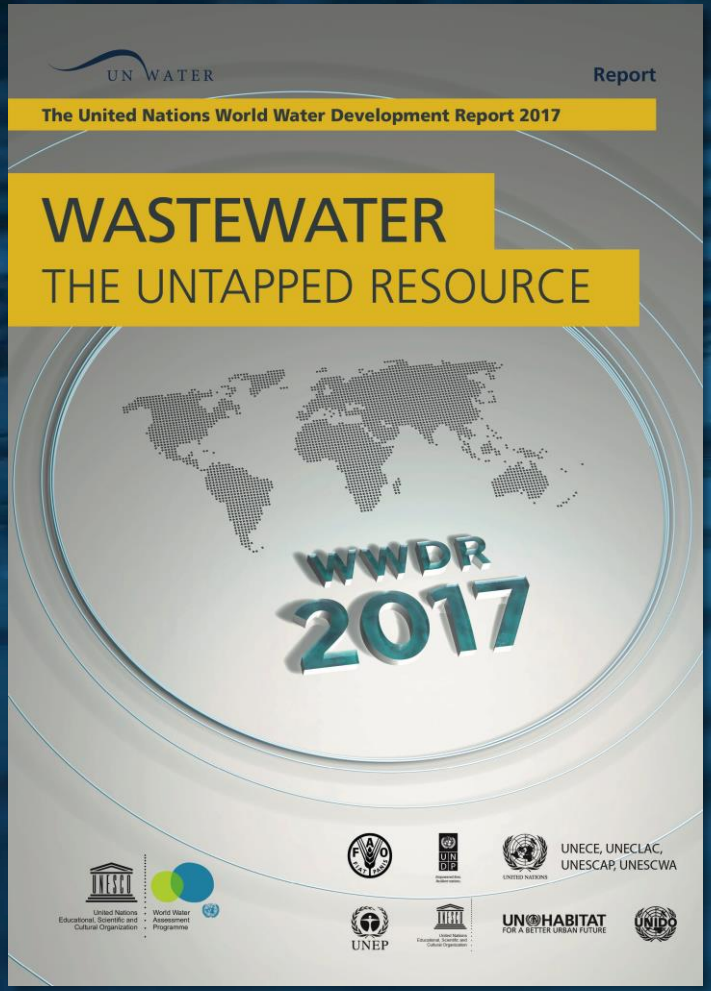
ICCG Webinar

Water, Wastewater – Center Pieces of the Circular Economy

Stefan Uhlenbrook – Director and Coordinator of the UN World Water Assessment Programme (WWAP) of UNESCO

April 13th, 2017



UN WATER

United Nations Educational, Scientific and Cultural Organization

World Water Assessment Programme

IMPROVED WASTEWATER MANAGEMENT GENERATES SOCIAL, ENVIRONMENTAL AND ECONOMIC BENEFITS ESSENTIAL TO ACHIEVING SUSTAINABLE DEVELOPMENT

Stefan Uhlenbrook

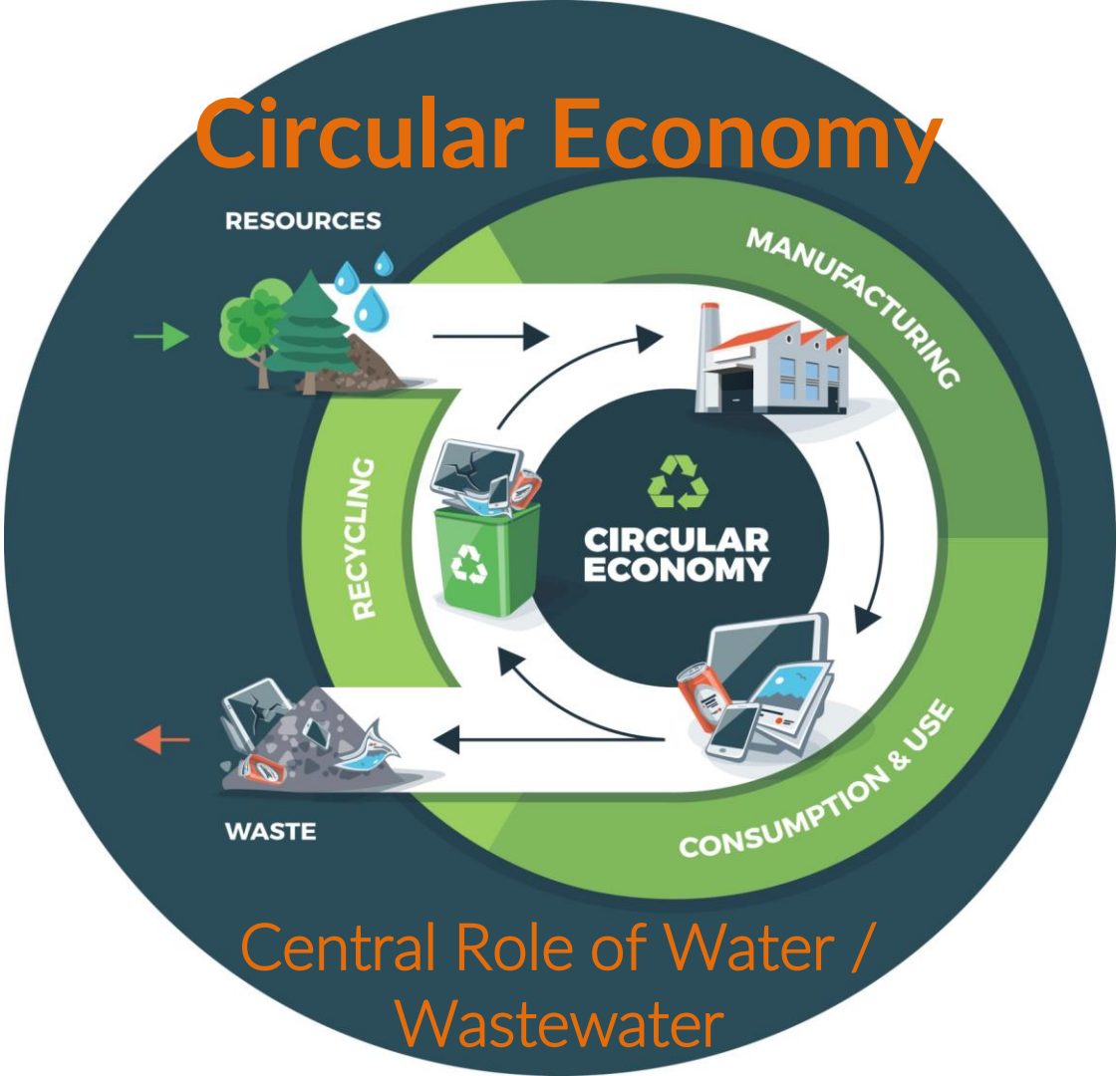
UN World Water Assessment Programme (WWAP), UNESCO

Director and Coordinator

13 April 2017

WATER as KEY AGENT in the CIRCULAR ECONOMY

Circular Economy



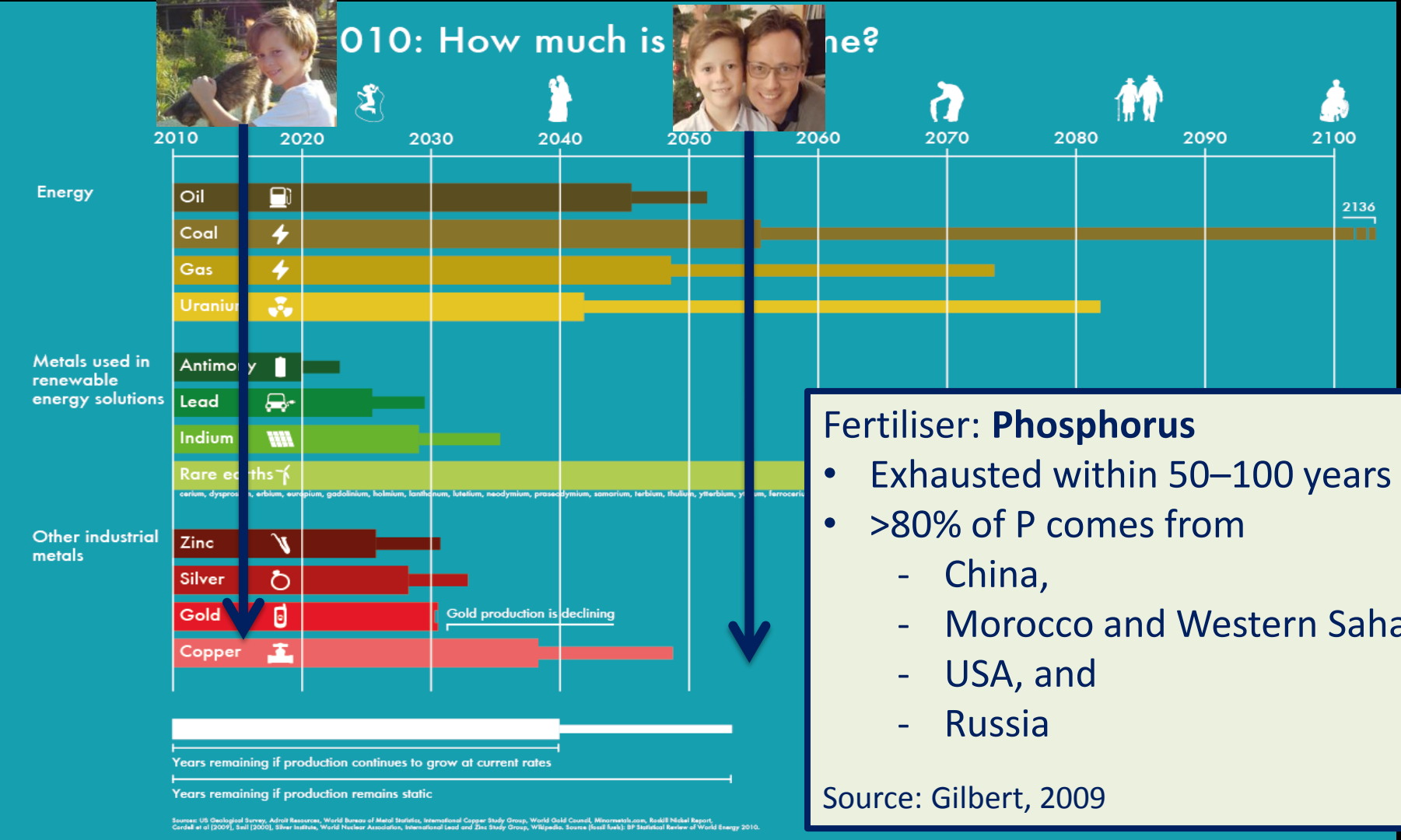
Central Role of Water / Wastewater

Characteristics of a CE

- Preserve and enhance natural capital
- Maintain value of products, materials and resources as long as possible
- Minimize waste
- Low carbon, resource efficient
- Reshaped value chain from, establish feedback loops

Benefits of a CE

- Sustainable economic growth
- Economical, cost savings
- New business opportunities
- Job creation (local)
- Energy savings
- Reduction GHG and pollution
- Resource efficiency and saving
- Geopolitical advantages

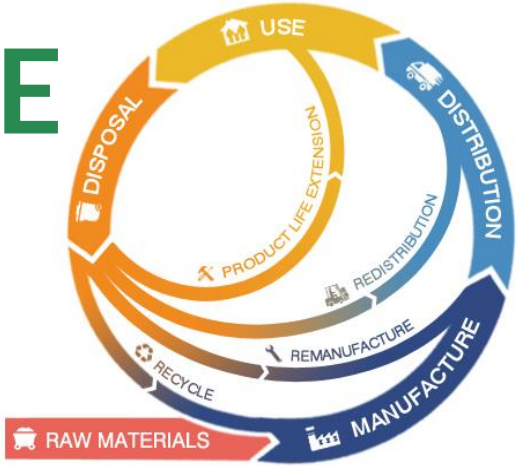


Fertiliser: **Phosphorus**

- Exhausted within 50–100 years
- >80% of P comes from
  - China,
  - Morocco and Western Sahara,
  - USA, and
  - Russia

Source: Gilbert, 2009

Water/Wastewater in CE



- Wastewater management '4 R's':
  - *reducing* pollution at the source;
  - *removing* contaminants from wastewater flows;
  - *reusing* reclaimed water; and
  - *recovering* useful by-products
- Wastewater can be a reliable, cost-effective and sustainable source of energy, nutrients and other recoverable by-products, with direct benefits to food and energy security.
- Land and water conservation and pollution control, natural infrastructure investments
- Rainwater harvesting, leakage control
- Accelerating urbanisation: adopt alternative, decentralised and low-cost approaches
- Barriers are often economic (incl. prizing, market-oriented approaches) and regulatory, rather than technical
- Overcome negative public perceptions ('yuck factor') is critical for reuse
- Greywater use and recycling for non-potable reuse (local)

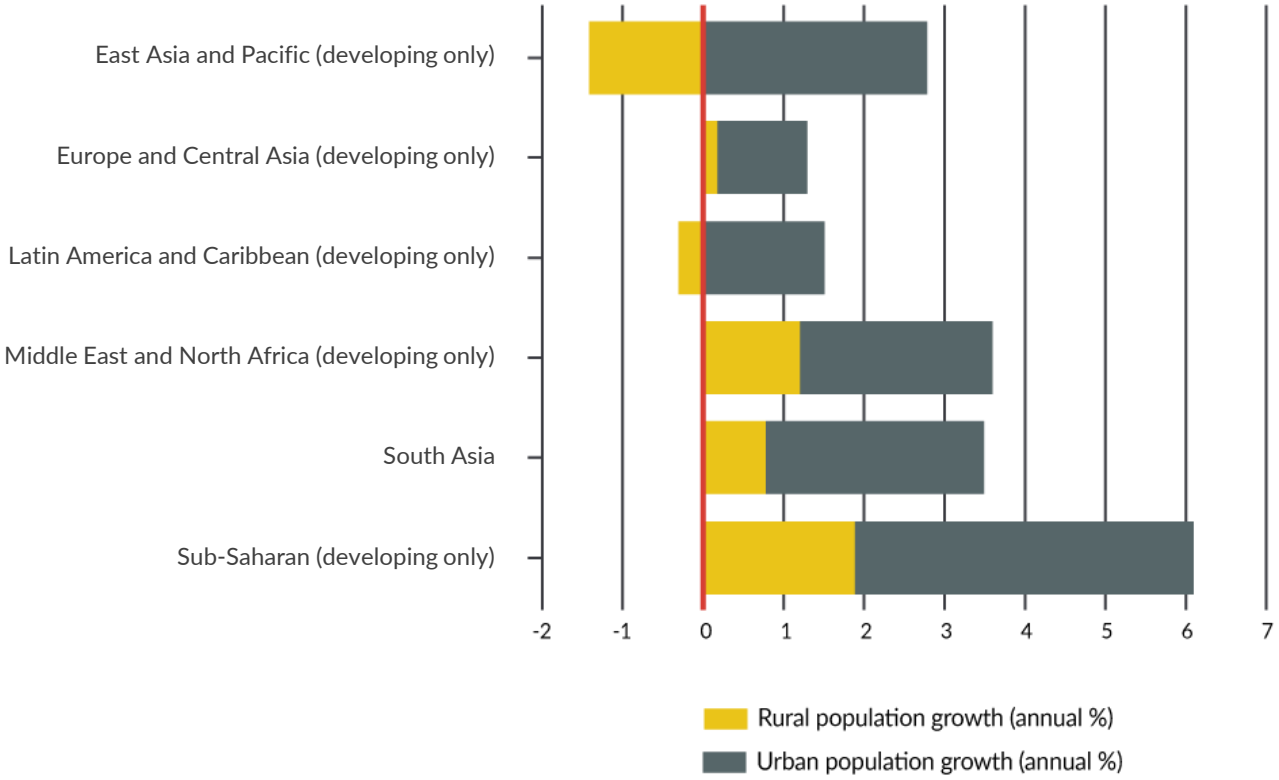

SAVE THE DATE
World Water Day - 22 March 2017
Launch of THE UN WORLD WATER DEVELOPMENT REPORT 2017
WASTEWATER
The Untapped Resource
UN WATER
22 MARCH WORLD WATER DA


REPUBLIC OF SOUTH
REPUBLIC OF SOUTH AFRICA
WASTEWATER
2017

PART 1

THE STATE OF THE WORLD'S WATER RESOURCES

THE DEMAND FOR WATER HAS BEEN CONSISTENTLY INCREASING (+1% PER YEAR) AND WILL CONTINUE TO DO SO OVER THE COMING DECADES

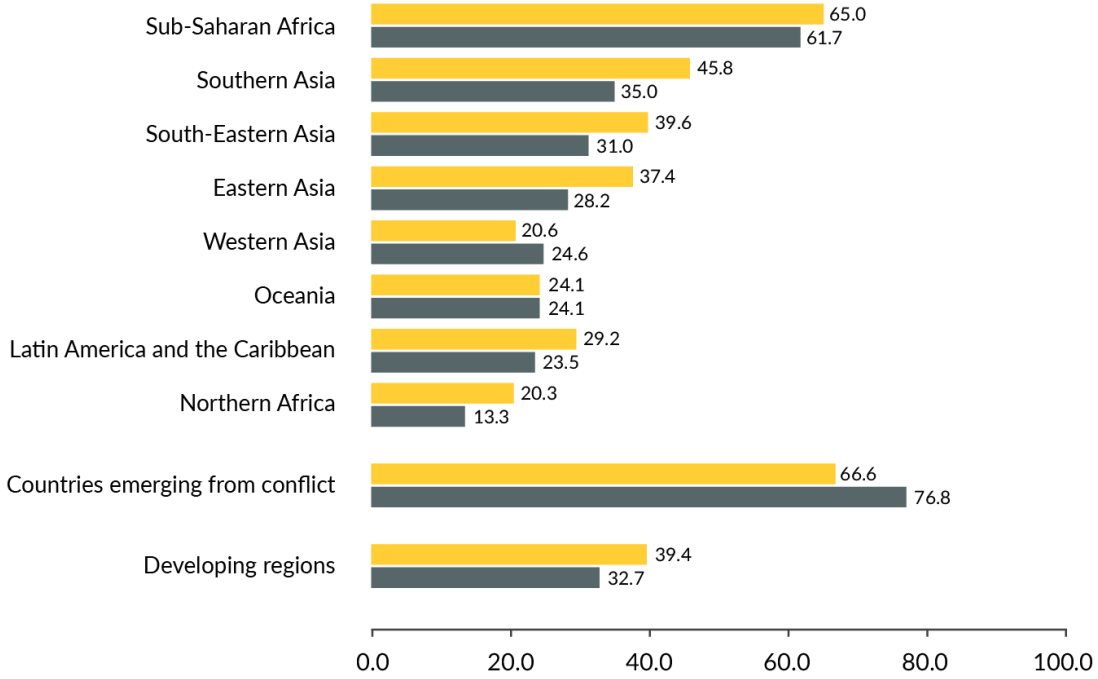


Source: Based on data from the World Bank (n. d.), for 2013

ACCELERATING URBANIZATION

Additional 2.3 billion people living in cities by 2050

Figure 5.2 Proportion of urban population living in slums 2000–2012



Note: Countries emerging from conflicts included in the aggregate figures as: Angola, Cambodia, Central African Republic, Chad, Democratic Republic of the Congo, Guinea-Bissau, Iraq, Lao People's Democratic Republic, Lebanon, Mozambique, Sierra Leone, Somalia and Sudan.

Source: Based on data from UN-Habitat (2012)

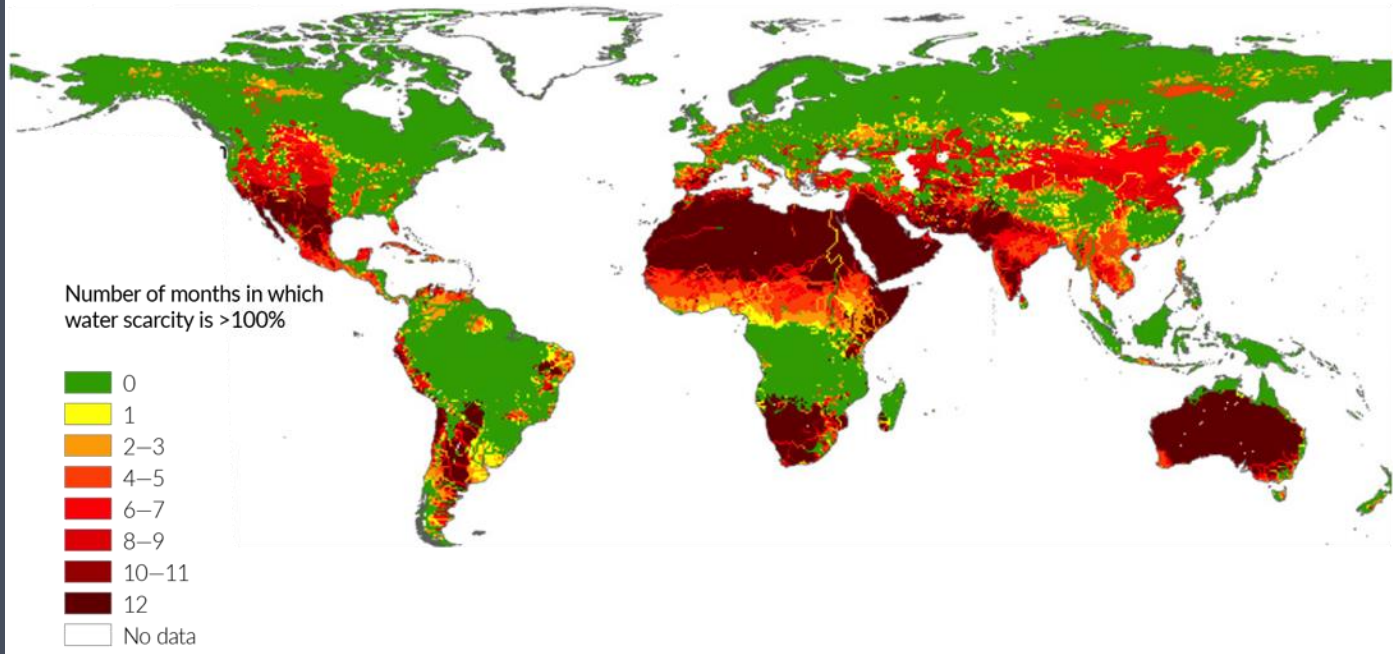
ACCELERATING URBANIZATION

Additional 2.3 billion people living in cities by 2050

… many in slums

INCREASING WATER SCARCITY

Two thirds of the world's population currently live in areas that experience water scarcity for at least one month a year



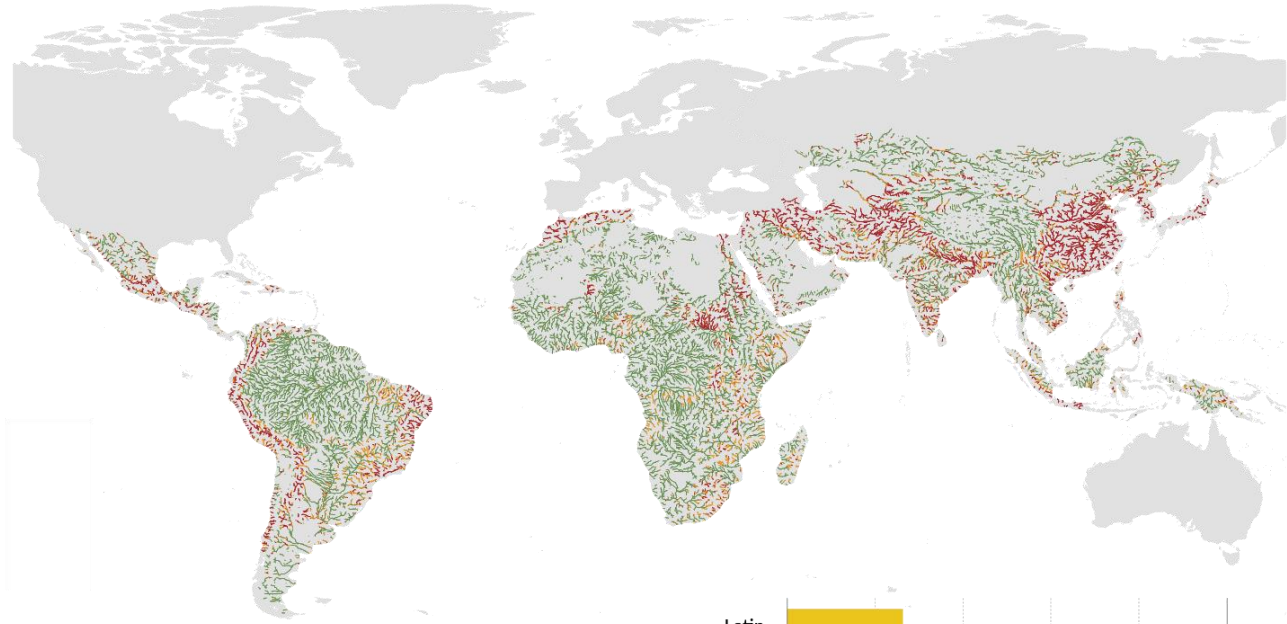
Source: Mekonnen and Hoekstra (2016)

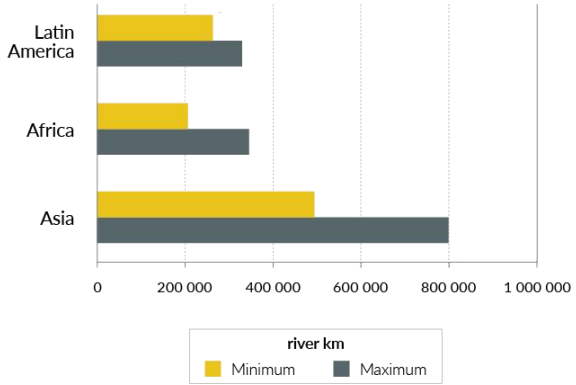
INCREASING WATER SCARCITY

Climate change will exacerbate the frequency and severity of floods and droughts

DEGRADATION OF WATER QUALITY

Severe pathogen pollution affects around one-third of all river stretches in Latin America, Africa and Asia, putting the health of millions of people at risk



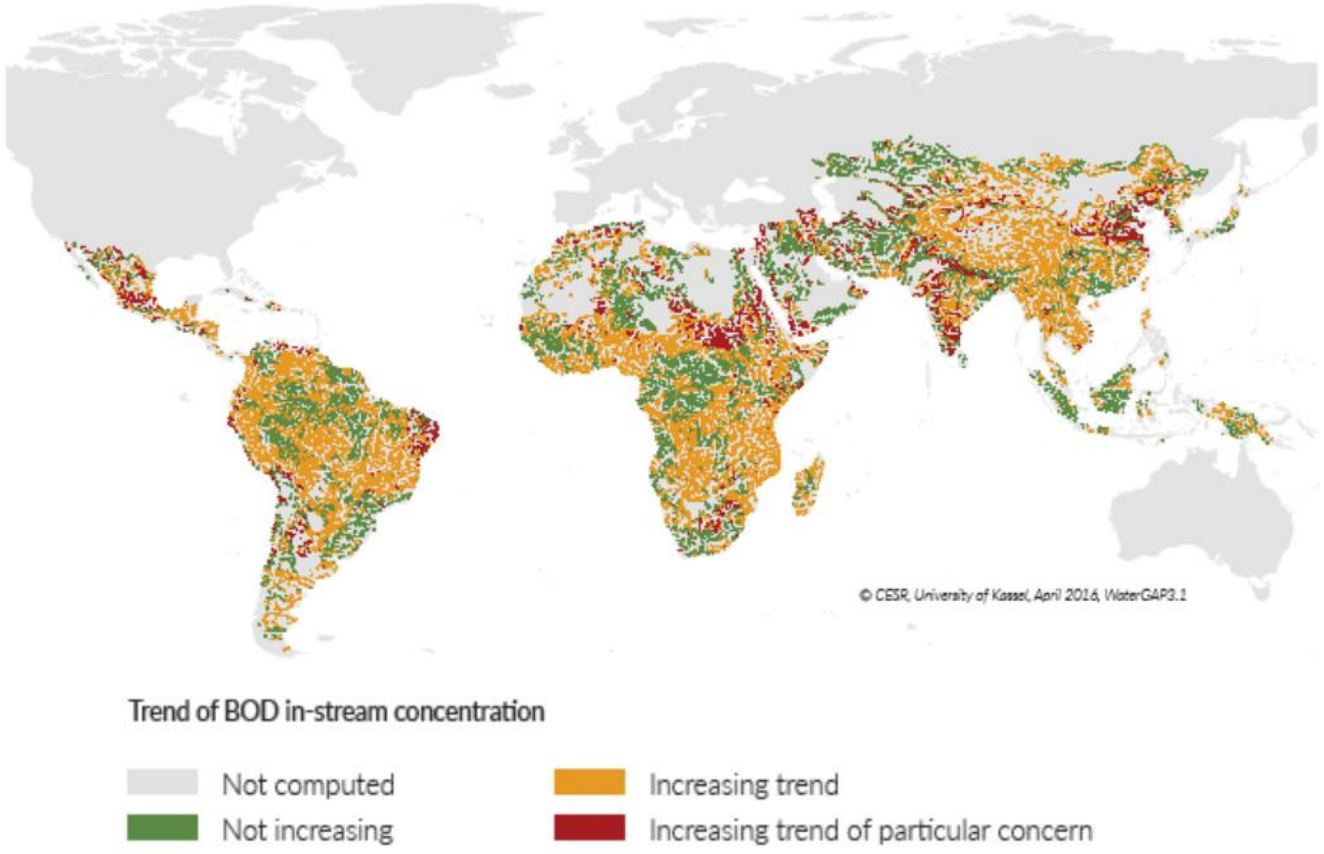


© CESR, University of Kassel, April 2016, WaterGAP3.1

Source: UNEP (2016)

DEGRADATION OF WATER QUALITY

Trend in BOD concentrations in rivers is increasing
1990-1992 vs. 2008-2010



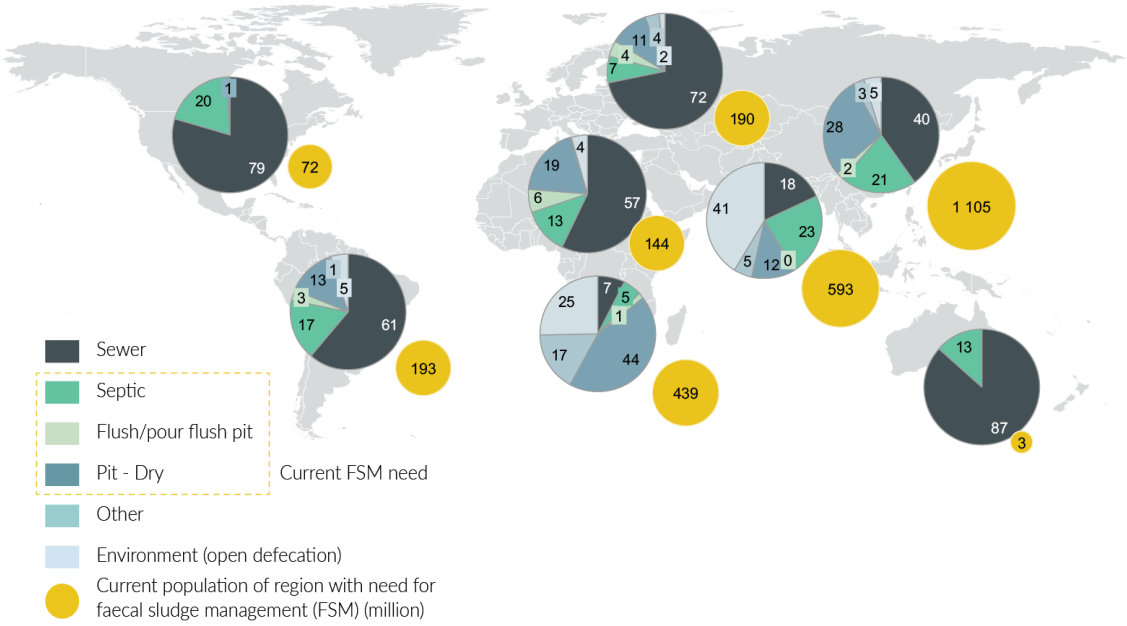
© CESR, University of Kassel, April 2016, WaterGAP3.1

Source: UNEP (2016)

SANITATION SYSTEMS

Only 26% of urban and 34% of rural sanitation and wastewater services effectively prevent human contact with excreta along the entire sanitation chain (Hutton and Varughese, 2016).

Percentage of population served by different types of sanitation systems



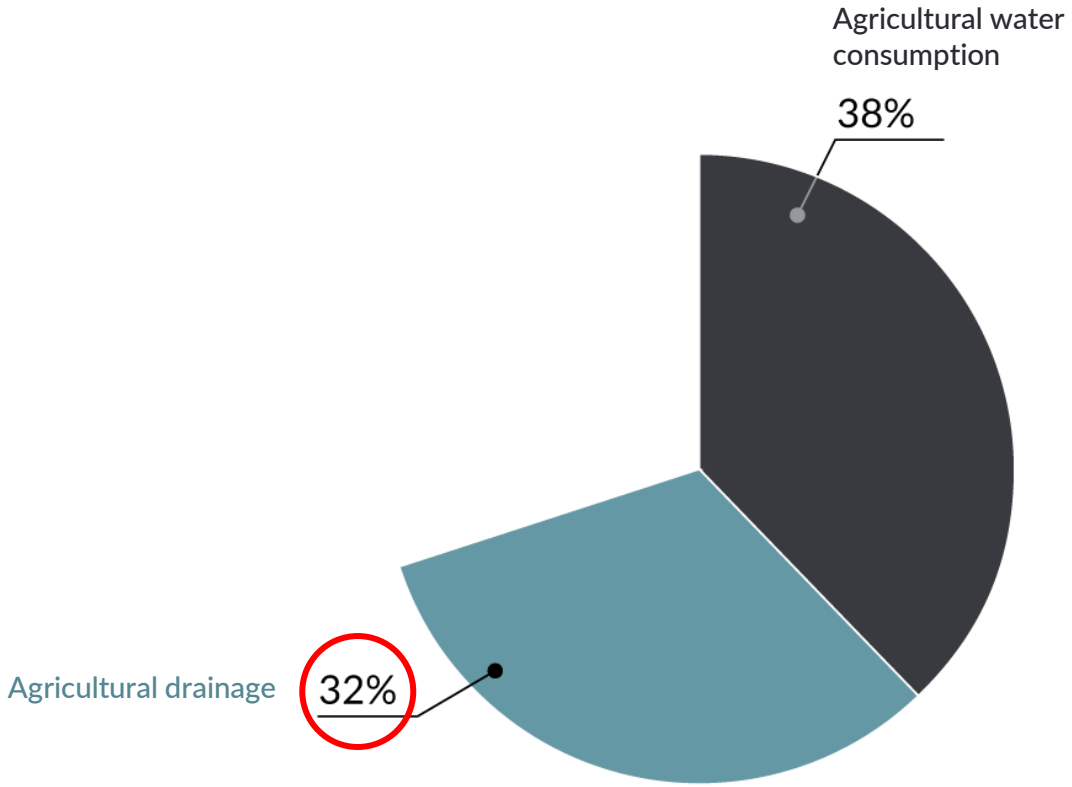
Source: Cairns-Smith et al. (2014, Fig. 8, p. 25, based on data from WHO/UNICEF JMP). Courtesy of the Boston Consulting Group.

MORE WASTEWATER THAN EVER

The quantity of wastewater produced and its overall pollution load are increasing worldwide

MORE WASTEWATER THAN EVER

As the overall demand for water grows, the quantity of wastewater produced and its overall pollution load are increasing worldwide



Source: FAO, based on data from AQUASTAT (n.d.a.), Mateo-Sagasta et al. (2015), and Shiklomanov (1999)

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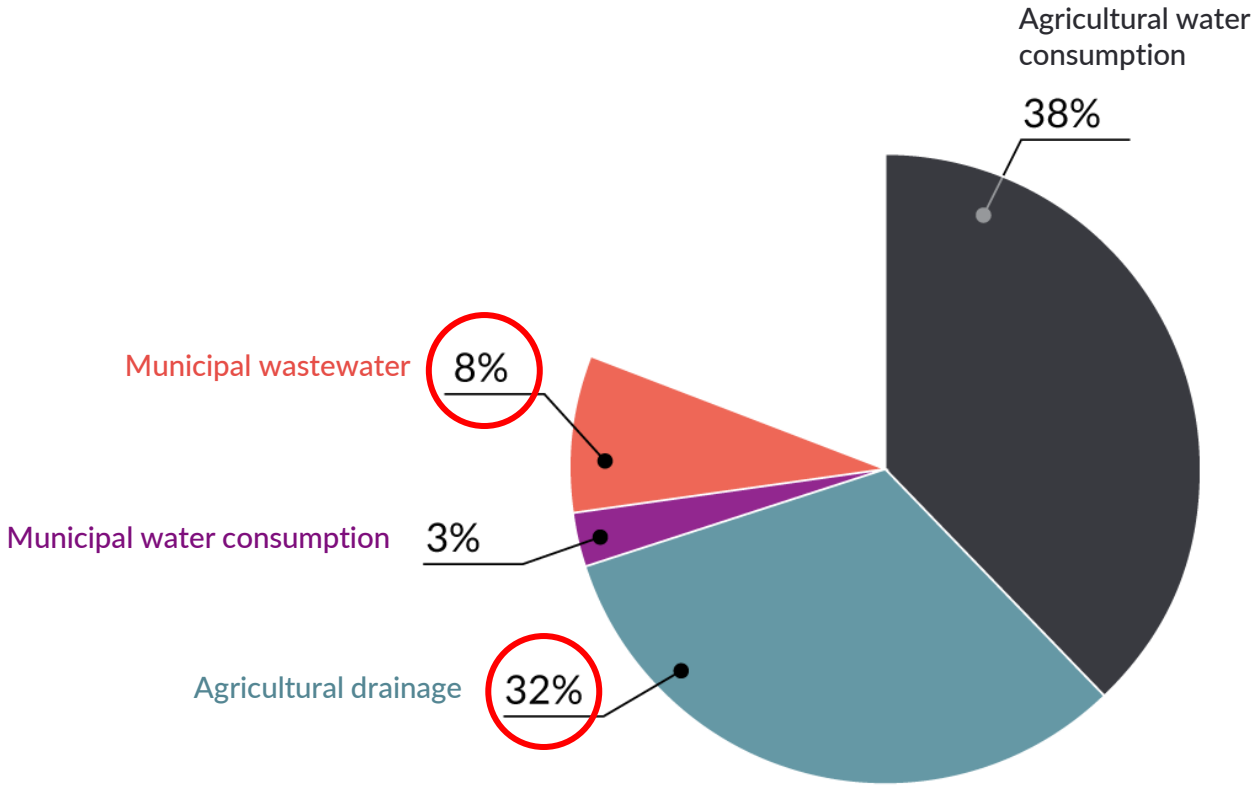

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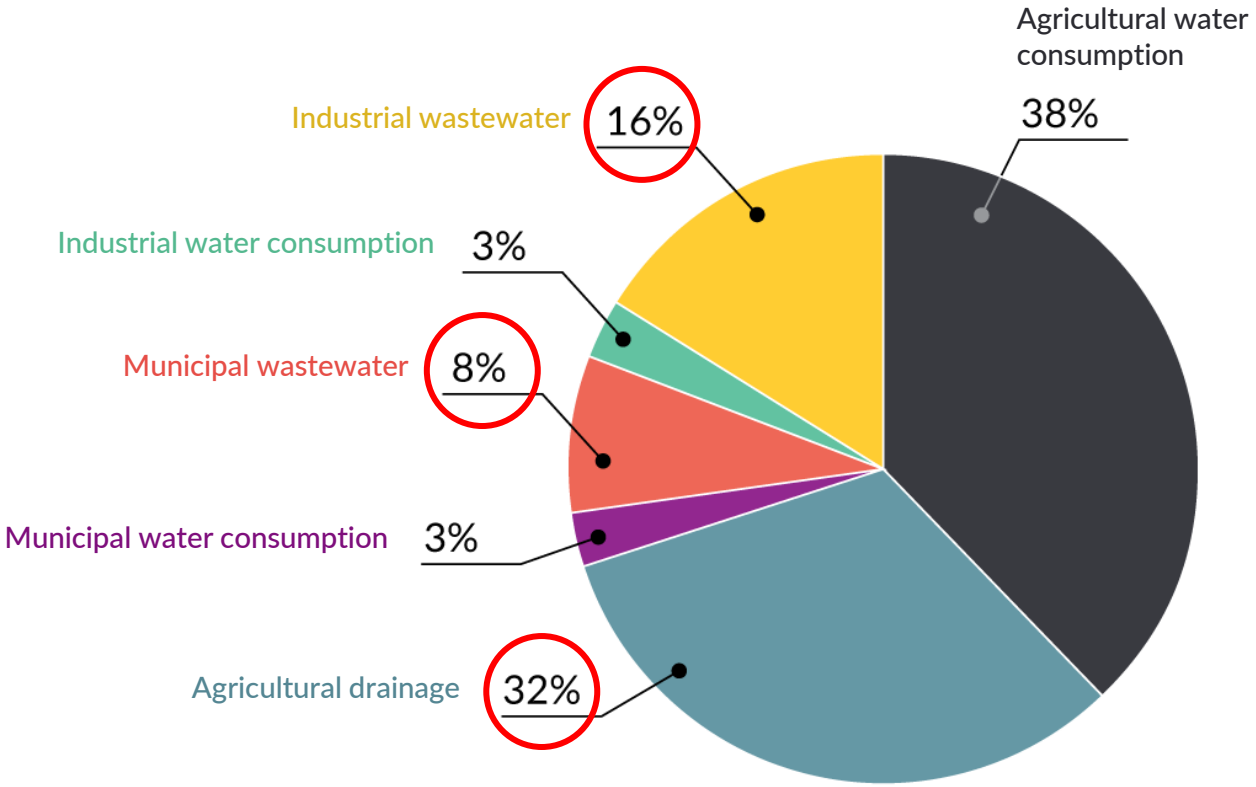

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MORE WASTEWATER THAN EVER

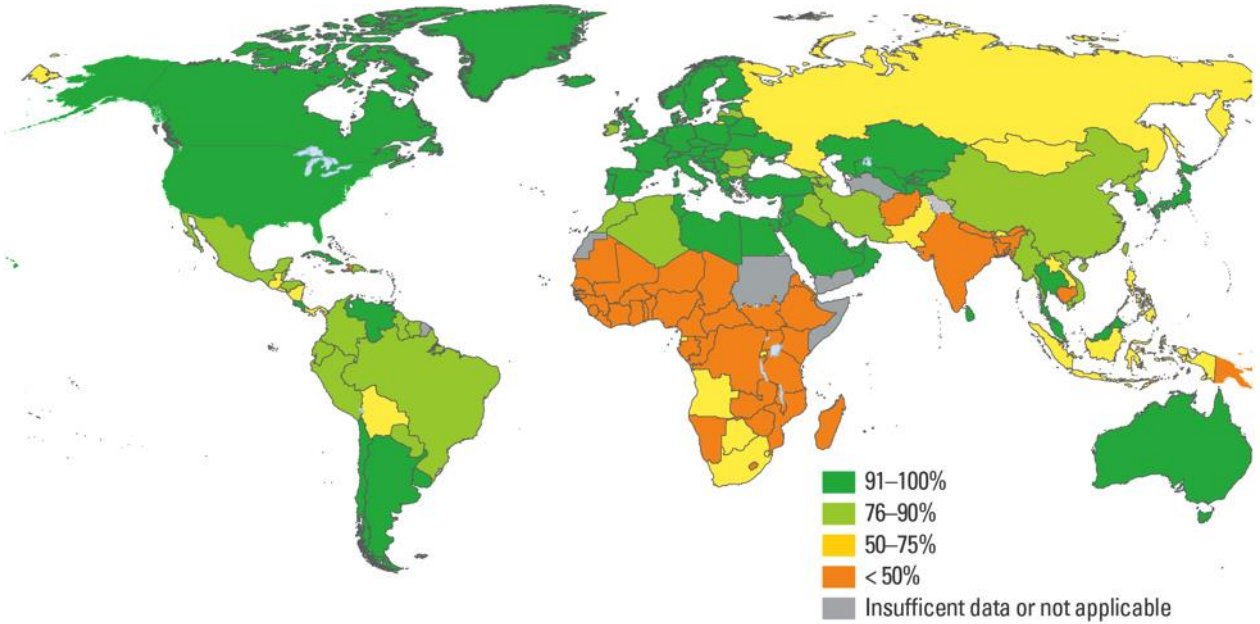
PART 2 HUMAN HEALTH, SANITATION AND THE SUSTAINABLE DEVELOPMENT AGENDA

HUMAN HEALTH AND IMPROVED SANITATION

2.4 billion do not have access to improved sanitation

Nearly 1 billion people worldwide still practice open defecation

Access to improved sanitation



Source: UNICEF and WHO 2015

THE 2030 AGENDA FOR SUSTAINABLE DEVELOPMENT

SDG Target 6.3: By 2030, improve water quality by reducing pollution, eliminating dumping and minimizing release of hazardous chemicals and materials, halving the proportion of untreated wastewater and substantially increasing recycling and safe reuse globally

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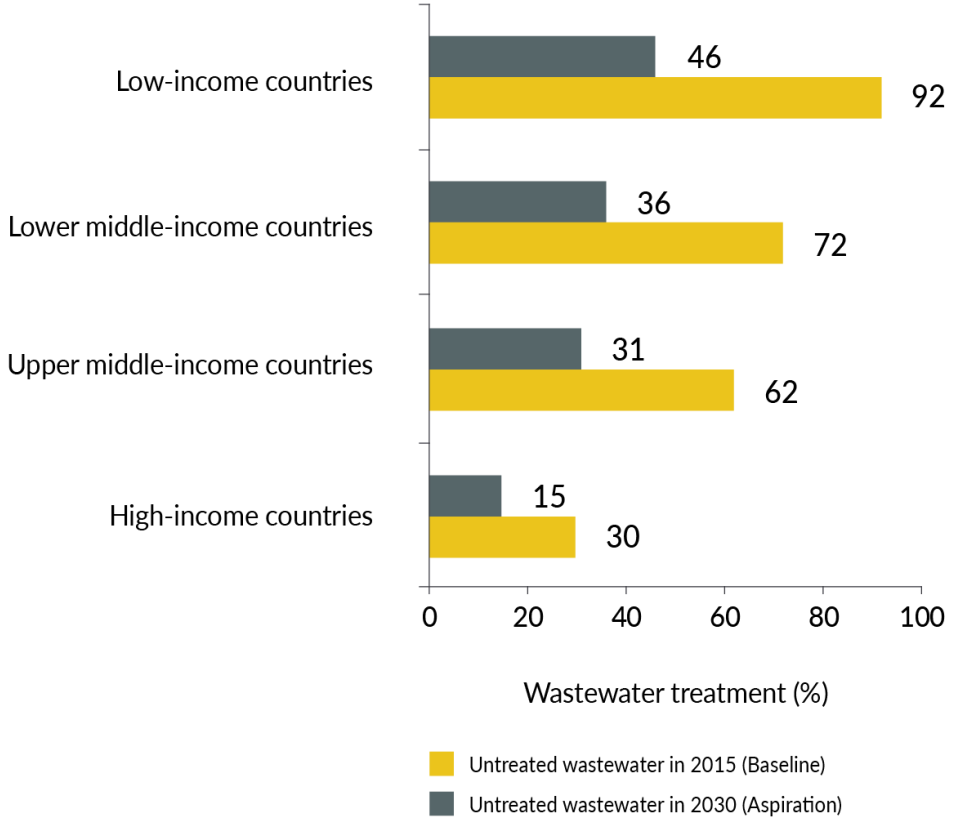


Source: Based on data from Sato et al. (2013)

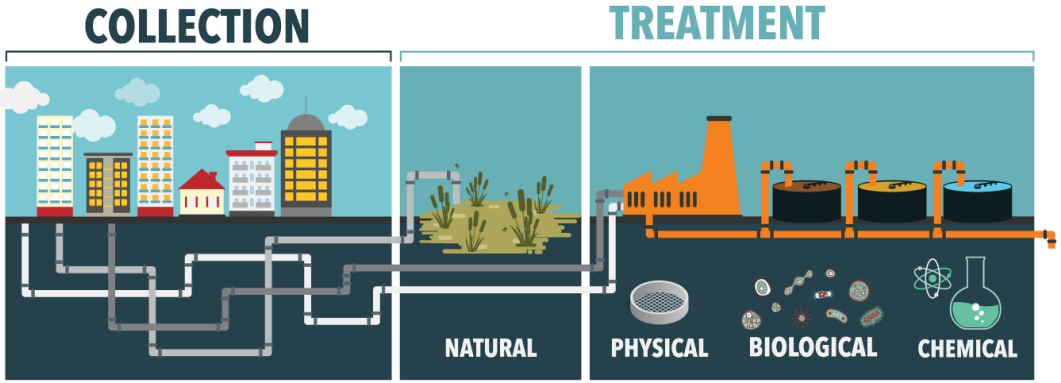
PART 3 MEETING THE CHALLENGE OF IMPROVING WASTEWATER MANAGEMENT

WASTEWATER:
Not a
BURDEN
but a
VALUABLE RESOURCE

REDUCING or PREVENTING POLLUTION at the SOURCE

Pollution prevention and the minimization of wastewater flows should be given priority over traditional ‘after-use’ treatment whenever possible

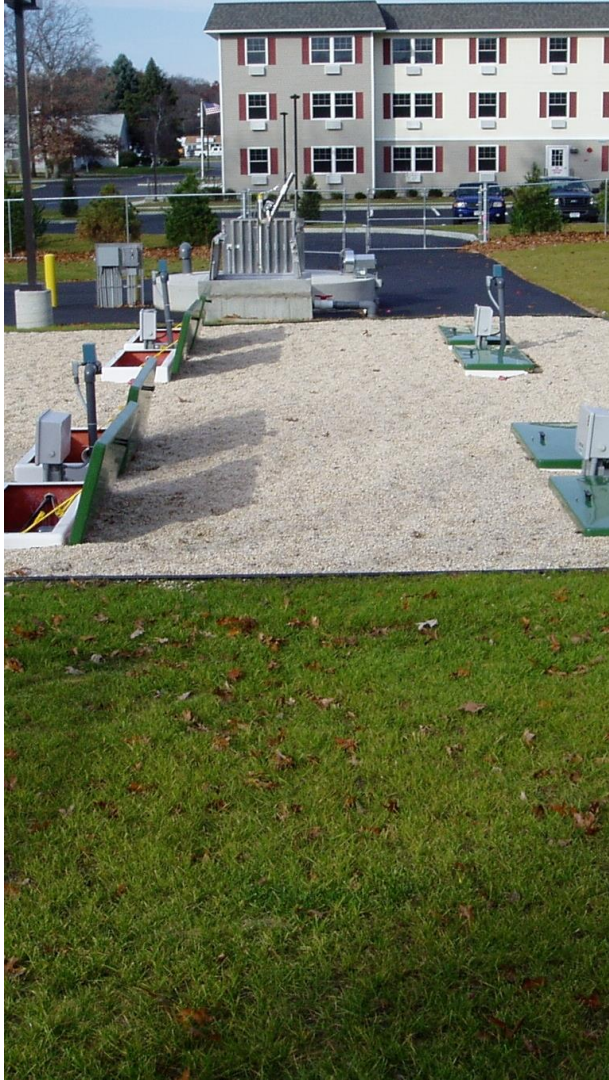
REMOVING CONTAMINANTS from WASTEWATER: COLLECTION and TREATMENT



In Brazil, the cost of simplified sewerage (a type of low-cost sewerage) per person has been shown to be twice lower than the cost of conventional sewerage (i.e. US$170 *vs.* US$390)

CENTRALIZED *vs.* DECENTRALIZED SYSTEMS

It depends ….
a combination of both can also offer benefits.



REMOVING CONTAMINANTS from WASTEWATER: COLLECTION and TREATMENT

Healthy ecosystems can also complement engineered solutions to wastewater treatment in a cost-effective manner

WASTEWATER:

Not a

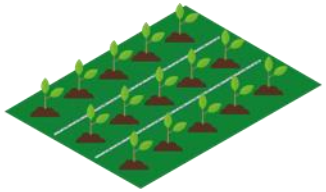
BURDEN

but a

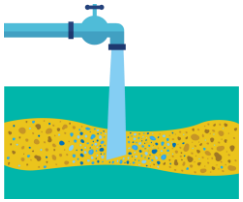
VALUABLE RESOURCE

REUSING WATER

IRRIGATION



AQUIFER RECHARGE



INDUSTRIAL PROCESSES

HEATING/COOLING

POTABLE WATER

Treated ('fit-for-purpose') wastewater is a safe and reliable source of water that can be used to offset water scarcity

Source: Lorem ipsum dolor sit amet

Example
ACCRA, Ghana

Central WWTP are barely functional

Untreated wastewater used to irrigate 15 kinds of vegetables

Average annual income of US$ 400–800 per farmer

Annual market value of US$ 14 million

Around 200,000 urban dwellers benefit from this production

RECOVERING USEFUL BY-PRODUCTS

Wastewater's vast potential as a source of recoverable resources remains largely underexploited, e.g. nutrients, metals, bio-energy

The recovery of nutrients and energy can add significant revenue streams to help cover the investment and operational costs of wastewater treatment and sanitation

SOURCE: OSTARA, 2016

Not a BURDEN but a VALUABLE RESOURCE

PART 4 CREATING AN ENABLING ENVIRONMENT FOR CHANGE

1. SUITABLE LEGAL and REGULATORY FRAMEWORK

At least 11 out of 22 Arab States have adopted legislation permitting the use of treated wastewater

2. COST RECOVERY and APPROPRIATE FINANCING MECHANISMS

The costs of improved wastewater management are usually outweighed by benefits in terms of human health, socioeconomic development and environmental sustainability

3. MINIMIZING RISKS to PEOPLE and the ENVIRONMENT

Exposure of vulnerable groups, especially women and children, to partially treated or untreated wastewater requires specific attention

4. BUILDING CAPACITY and KNOWLEDGE

Capacity building, research and development aimed at improving wastewater management generate employment opportunities and promote green growth

5. RAISING PUBLIC ACCEPTANCE and SOCIAL AWARENESS

Water reuse schemes can fail if planners do not account for the dynamics of social acceptance

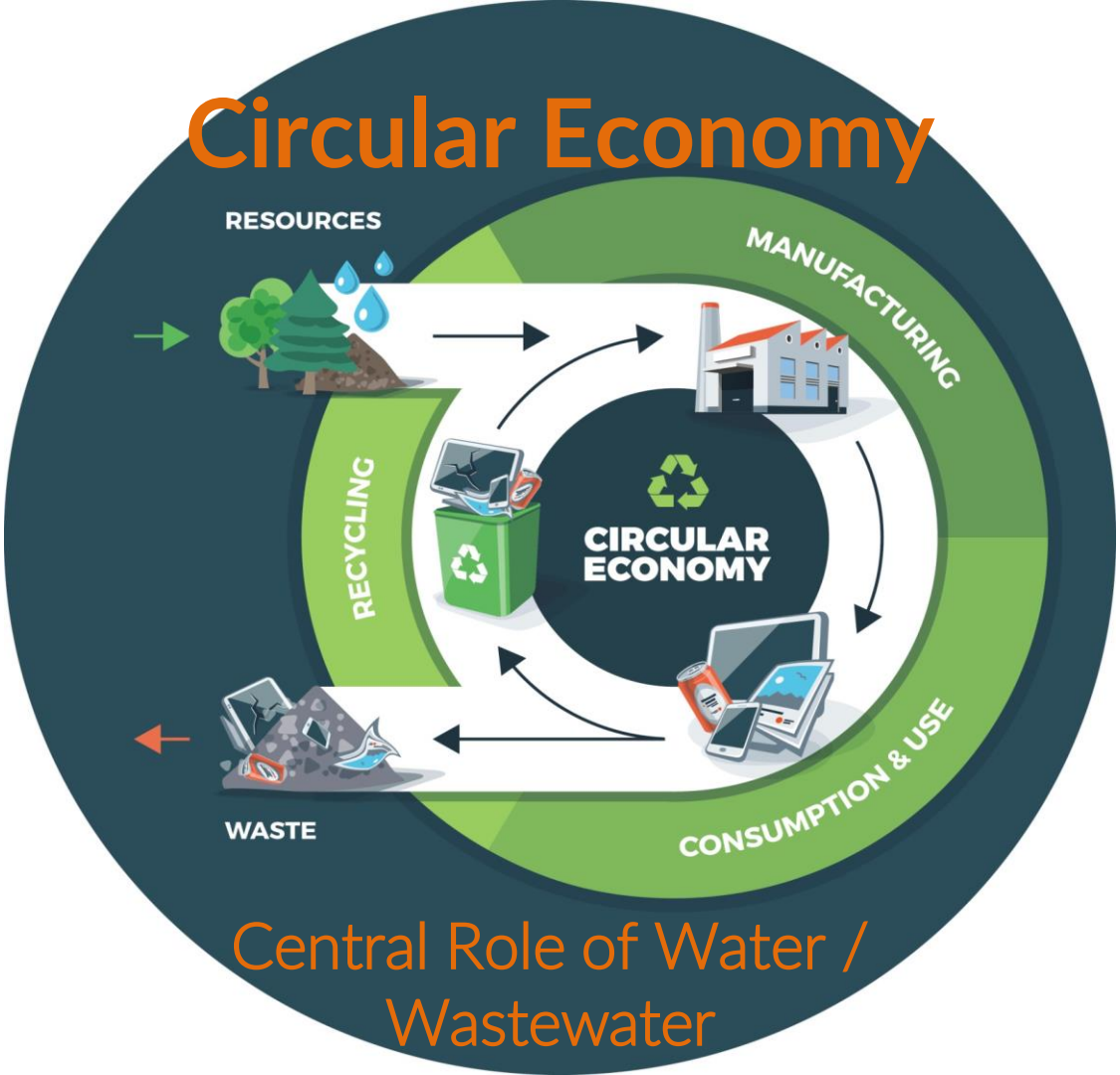
5. RAISING PUBLIC ACCEPTANCE and SOCIAL AWARENESS

Extensive information campaigns and participation by the public are required to build trust and overcome the so-called ‘yuck’ factor

TAKE HOME MESSAGES
WWDR 2017

1. Wastewater increasing worldwide
2. Vast majority released without treatment
3. Affordable ('low-cost') treatment options are available
4. Reliable and sustainable source of water
5. Sustainable source of energy, nutrients and other recoverable by-products
6. In a circular economy, wastewater use and by-product recovery can generate new business opportunities while helping finance sanitation services
7. The costs of improved wastewater management are outweighed by benefits in terms of human health, socioeconomic development and environmental sustainability
8. Essential for achieving the 2030 Agenda for Sustainable Development

Circular Economy



Central Role of Water / Wastewater

"In a world where demands for freshwater are ever growing, and where limited water resources are increasingly stressed by over-abstraction, pollution and climate change, neglecting the opportunities arising from improved wastewater management is nothing less than unthinkable in the context of a circular economy"

Thank you

Contact: Stefan Uhlenbrook, s.uhlenbrook@unesco.org

Special thanks to Rick Connor, Engin Koncagul,
Angela Ortigara and all contributing partner organizations
(UN-Water members and partners, (co-)authors).

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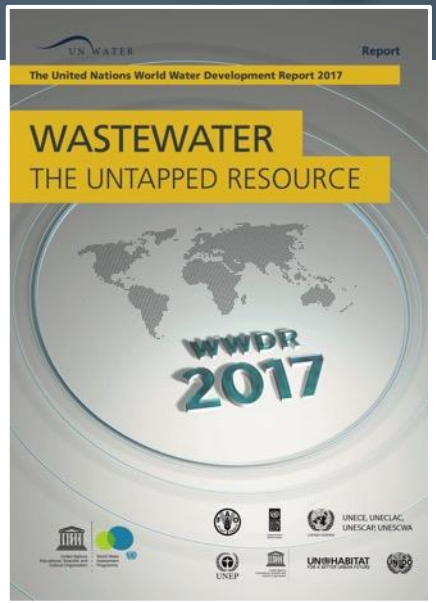

Download the Report at:
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Q&A

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