TOWARDS A CIRCULAR ECONOMY THROUGH SUSTAINABLE MANAGEMENT OF WASTEWATER AND RE-USE

Keynote Speech

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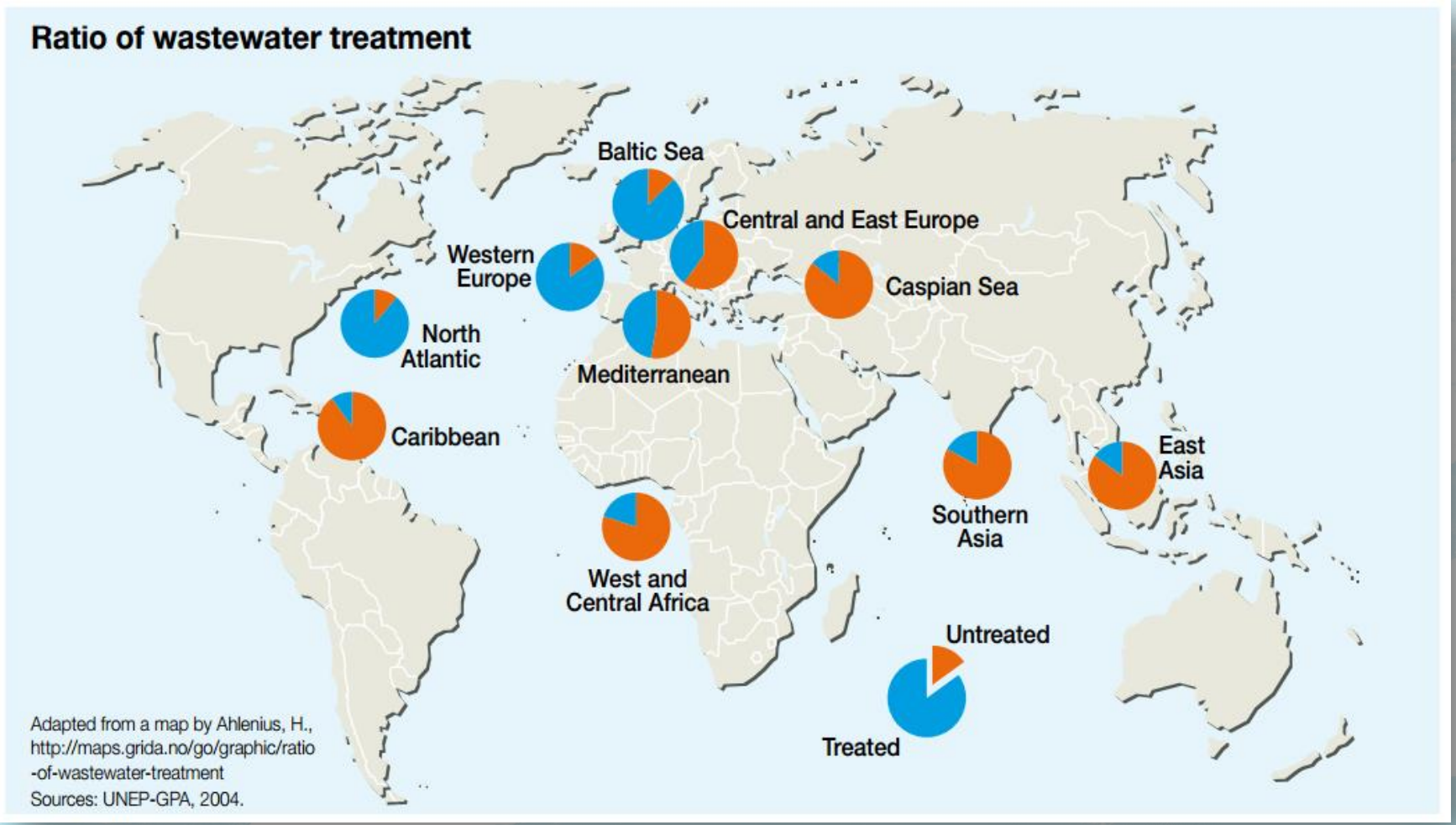
SUEN-Project Development & Implementation Coordinator

Wastewater: Facts & Issues



Almost 900 million people lack access to safe drinking water, and an estimated 2.6 billion people lack access to basic sanitation.

Over 80% of wastewater worldwide is not collected or treated.

Wastewater: Facts & Issues

1 liter of wastewater pollutes 8 liters of freshwater!

~ 20 million hectares of crops are irrigated with untreated/partially treated wastewater.

At least 1.8 million children under 5 years old die every year due to water related diseases.

The need for GW²I

Wastewater is a global concern!

Poorly managed wastewater:

- Loss of ecosystem services & of economic opportunities
- Affects climate change → Wastewater-related emissions of methane (CH_4) & nitrous oxide (N_2O) **more harmful than CO_2.**

Properly managed wastewater:

- Huge source of water and nutrients for crop production
- Wastewater sludge can be used as:
  - soil conditioner/fertiliser/construction materials,
  - to generate biogas & biofuel
- **But, there is a common perception that managing wastewater is a waste of energy and money.**
- **or Wastewater: a resource not a waste**

What is GW²I?

Global Wastewater Initiative (2013)

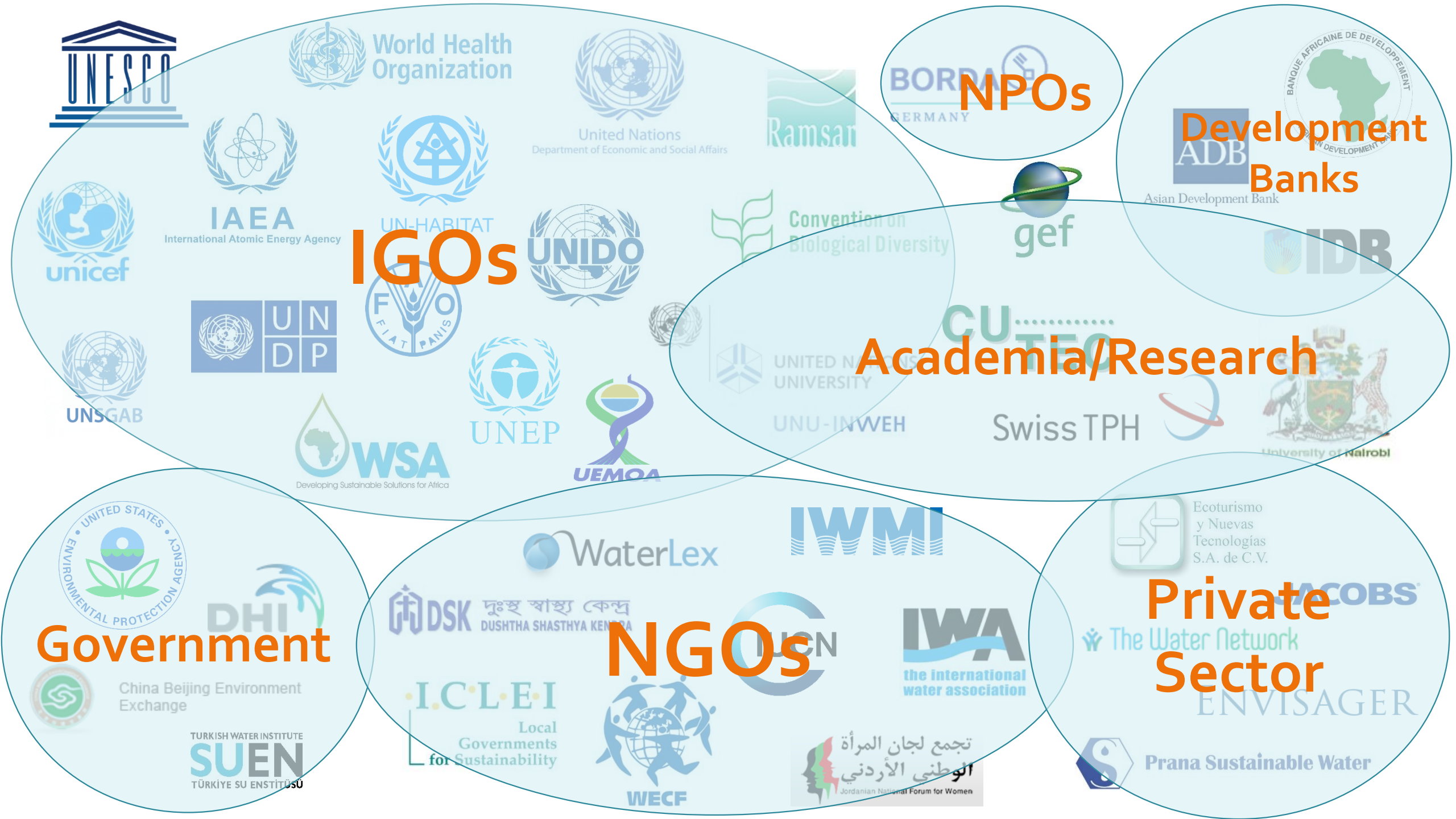
- Respond to the GPA's Manila Declaration
- Bring a paradigm shift in world water politics, prevent further pollution and emphasize that wastewater is a valuable resource for future water security
- Chaired by **TURKEY** & Co-Chaired by **UN-Habitat**
- Global & voluntary platform
- Multi-stakeholder partnership

UNEP's Role:

- Facilitate and use its convening power to bring together the various stakeholders
- Coordinate with relevant initiatives, e.g. UN-Water; Global Partnership on Waste Management, Global Partnership for Oceans, Global Water Partnership

51 members

UNESCO
World Health Organization
United Nations
Department of Economic and Social Affairs
Ramsar
BORDA
GERMANY
BANQUE AFRICAINE DE DEVELOPPEMENT
AFRICAN DEVELOPMENT BANK
IAEA
International Atomic Energy Agency
UN-HABITAT
ADB
Asian Development Bank
unicef
Convention on Biological Diversity
gef
IDB
UNIDO
UNDP
UNSGAB
UNEP
UEMOA
UNU-INWEH
Swiss TPH
University of Nairobi
WSA
Developing Sustainable Solutions for Africa
WaterLex
IWMI
Ecoturismo y Nuevas Tecnologías S.A. de C.V.
UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
DHI
DSK দুঃস্থ স্বাস্থ্য কেন্দ্র DUSHTHA SHASTHYA KENDRA
IUCN
IWA the international water association
JACOBS
The Water Network
China Beijing Environment Exchange
TURKISH WATER INSTITUTE SUEN TÜRKİYE SU ENSTİTÜSÜ
ICLEI Local Governments for Sustainability
WECF
تجمع لجان المرأة الوطني الأردني Jordanian National Forum for Women
ENVISAGER
Prana Sustainable Water


IGOs
NPOs
Development Banks
Academia/Research
Government
NGOs
Private Sector
UNESCO
World Health Organization
United Nations
Department of Economic and Social Affairs
Ramsar
BORDA
GERMANY
ADB
Asian Development Bank
IAEA
International Atomic Energy Agency
UN-HABITAT
unicef
UNIDO
Convention on Biological Diversity
gef
IDB
UNDP
FAO
FIAT PANIS
UNSGAB
UNEP
UEMOA
WSA
Developing Sustainable Solutions for Africa
UNITED NATIONS UNIVERSITY
UNU-INWEH
CUTEC
Swiss TPH
University of Nairobi
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The Water Network
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Prana Sustainable Water

SUSTAINABLE DEVELOPMENT GOALS

- **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**

- **6.a** By 2030, **expand international cooperation** support to developing countries in water- and sanitation-related activities and **capacity-building and programs**, including water harvesting, desalination, water efficiency, wastewater treatment, recycling and reuse technologies

- **6.b** Support and strengthen the **participation of local communities** in improving water and sanitation management

SUSTAINABLE DEVELOPMENT GOALS

Technology

- 17.6 Enhance North-South, South-South and triangular regional and **international cooperation on and access to science, technology and innovation and enhance knowledge sharing** on mutually agreed terms, including through improved coordination among existing mechanisms, in particular at the United Nations level, and through a global technology facilitation mechanism

Capacity-Building

- 17.9 Enhance international support for implementing effective and targeted **capacity-building in developing countries to support national plans** to implement all the sustainable development goals, including through North-South, South-South and triangular cooperation

Systemic issues

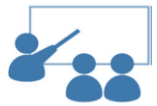
- 17.16 **Enhance the global partnership** for sustainable development, complemented by multi-stakeholder partnerships that mobilize and share knowledge, expertise, technology and financial resources, to support the achievement of the sustainable development goals in all countries, in particular developing countries

GW²I Focal Areas

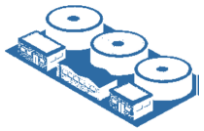
1. **Data: Status & Trends** – ***SDGs 6.3 / 17.6***
   - Compile, analyze & verify available data; develop monitoring mechanisms & tools

2. **Research and knowledge generation** – ***SDGs 6.3 / 6a / 17.6 / 17.16***
   - Design collaborative research projects and programs to address knowledge gaps

3. **Individual capacity development (or training)** – ***SDGs 6a / 6b / 17.9***
   - Develop methods to formulate appropriate policies; select suitable and cost-effective technologies for different target groups



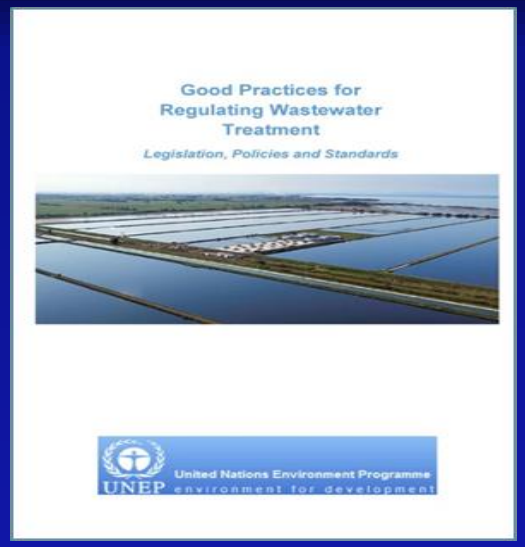
4. **Promotion of best practices and technologies** – ***SDG 6.3***
   - Demonstrate & promote successful research-based & field-tested practices

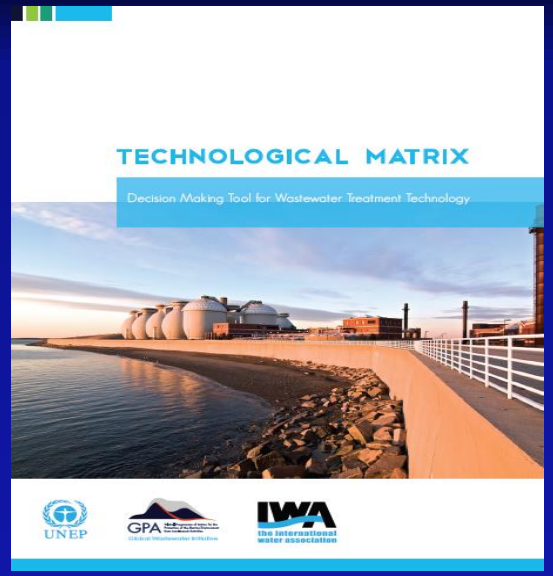


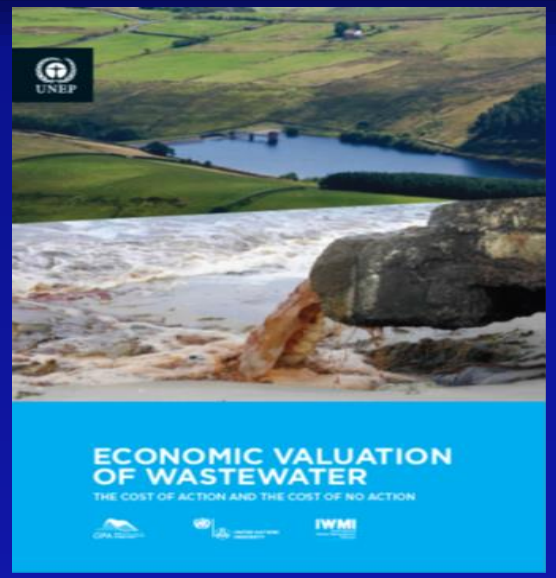
5. **Promotion of successful policies and institutions** – ***SDG 6b***
   - Document & promote successful regulations, plans, programs, economic instruments & institutional arrangements

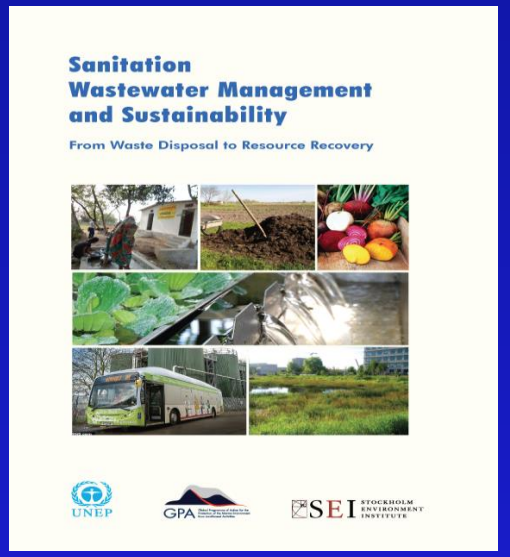
6. **Awareness raising and communication** – ***SDGs 6b / 17.9***
   - Promote key outputs on the implementation of ww management policies, technologies, etc.

GW2I Key studies & publications, responses & Solutions









What is the approach? Building Enabling environment

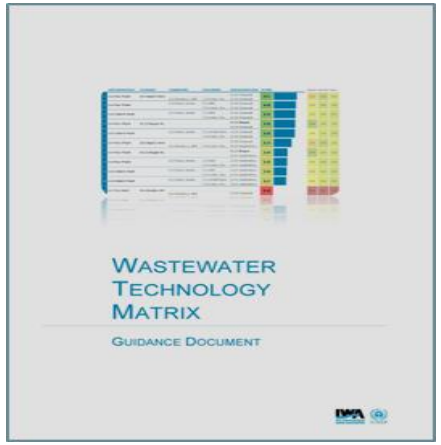
A. Adequate & tailored technology for wastewater management as a decision support tools


Photo Credit: Ben Lepper

- The wastewater technology matrix is one such tool for decision-making in selecting appropriate wastewater systems in urban areas.

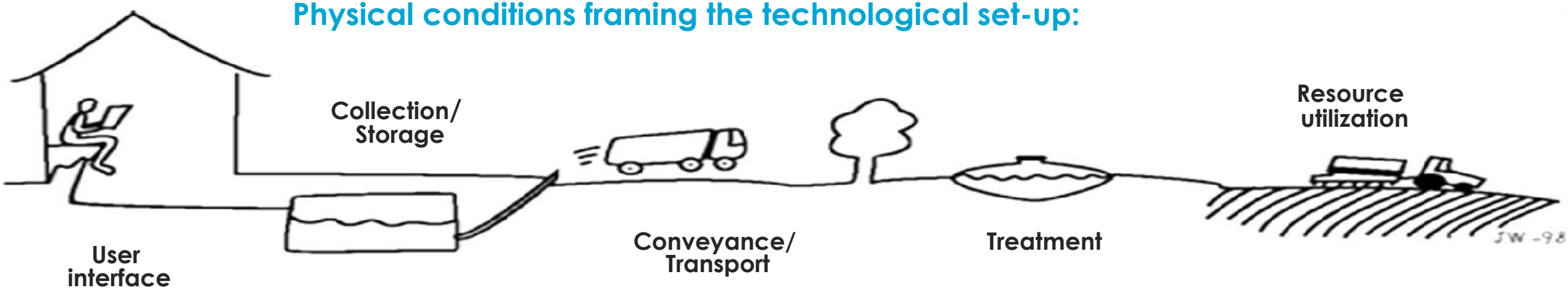
- To be successful and sustainable, waste water management technologies need to go hand in hand with supportive policies.


Source: Montana water center

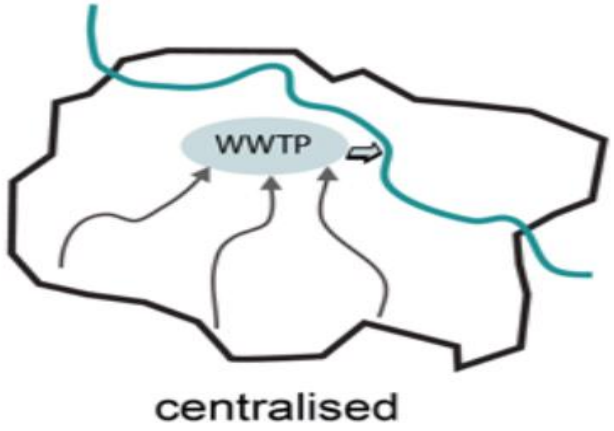


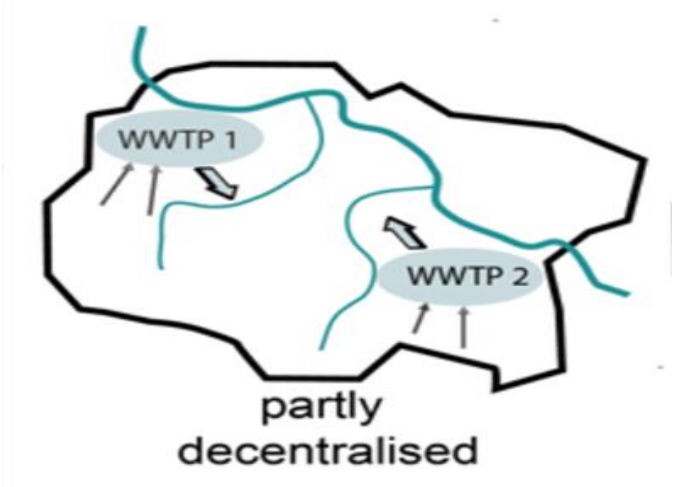
Examples….

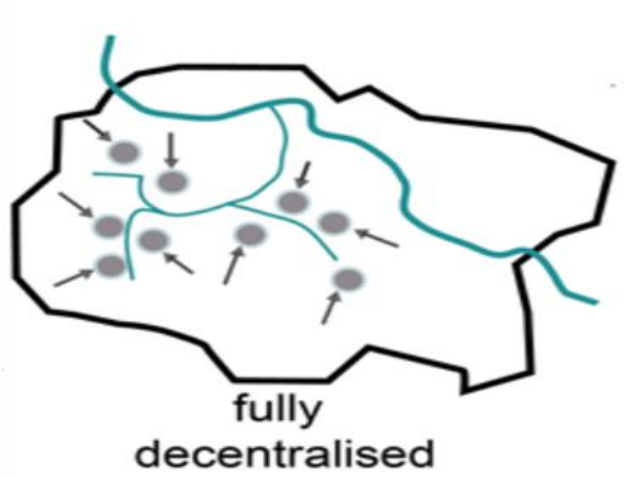
Physical conditions framing the technological set-up:



Approaches: centralized vs decentralized:





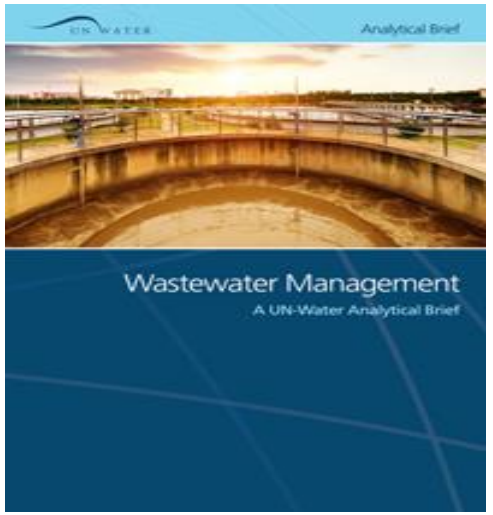


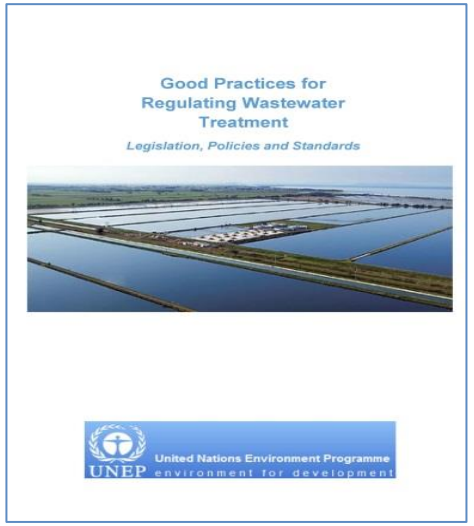
Source: Parkinson et al. 201438

Responses

B. Supportive policies

- Contextual structures serving as guides
- Additional guidelines that enable better functioning
- Selected methods to help guide & determine present and future decisions





Responses

C. Innovative Financial Mechanisms

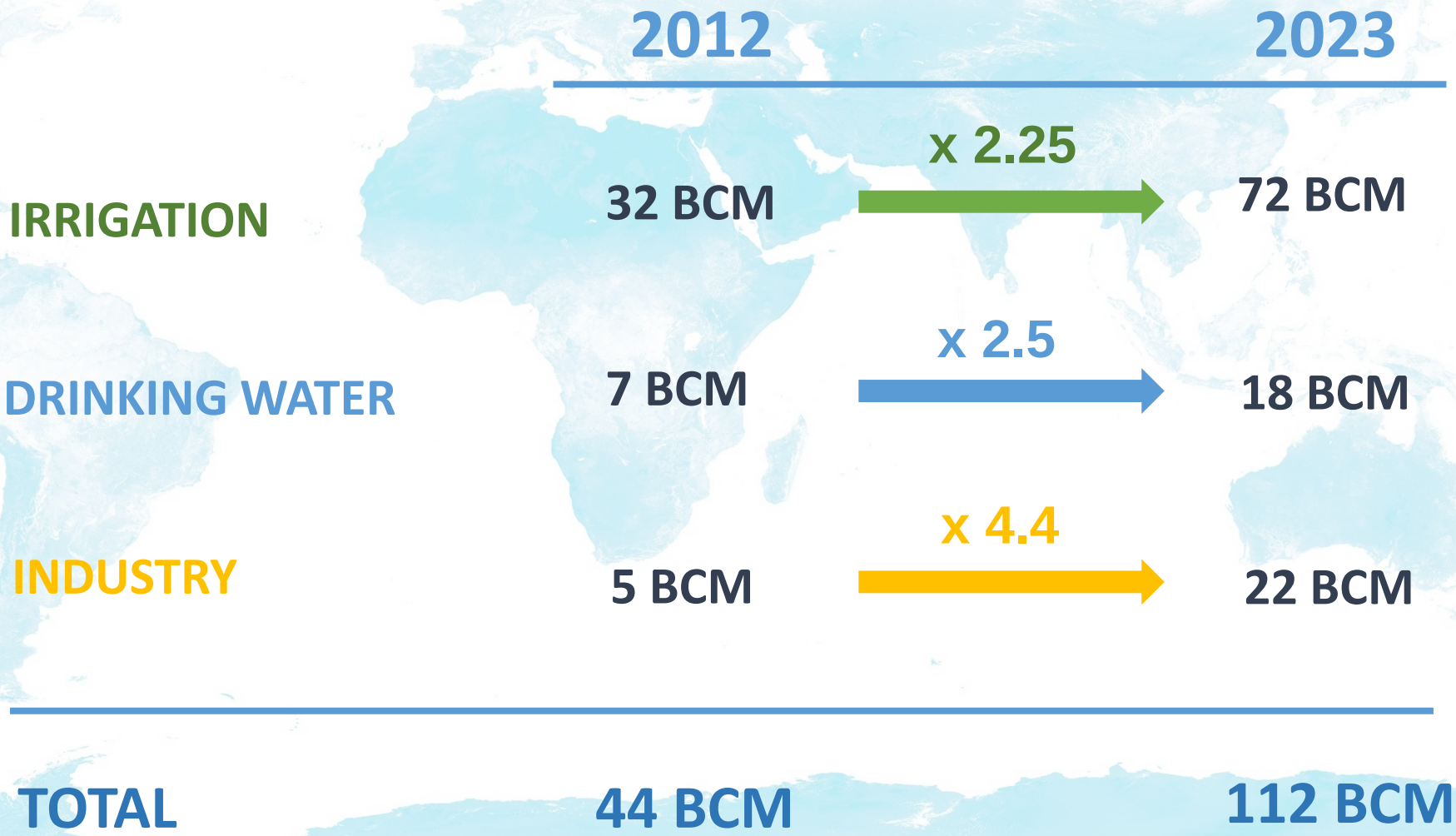
- Stick/carrot-Incentives for good doers
- Polluters Pays Principle/Users pays principles
- Public-Private-Partnership
- Could wastewater be another commodity such as carbon footprint?

Mobilizing the necessary financial resources requires recognition of the need for reliance on new ways of financing urban sanitation, sewerage and wastewater management.

Sludge treated to produce renewable energy, Aqualogy, UK

WASTEWATER MANAGEMENT PRACTICES IN TURKEY

Water Consumption & Demand in Turkey



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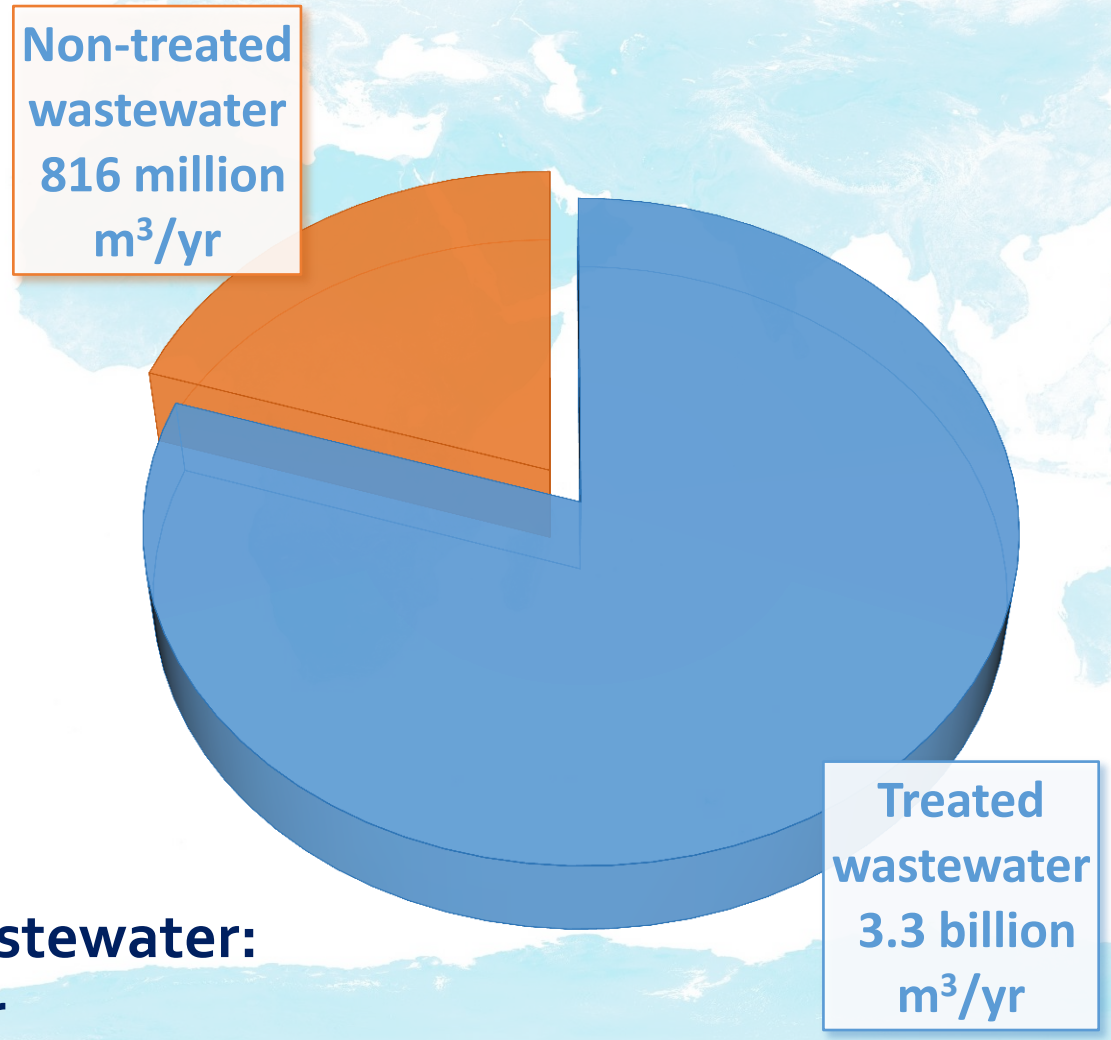
Wastewater Treatment in Turkey



- Annually collected wastewater:
  ~ 4.1 billion m³/yr

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Reuse Practices in Turkey

- Regulations (in accordance with the EU Directives)
- National Basin Management Strategy
  - → wastewater reuse for irrigation will be increased to 30% by 2023
- 10th Development Plan (2014-2018)
- Strategic Plans of Water & Sewerage Administrations

Current Applications

- Few fully implemented projects
- Feasibility studies & pilot-scale projects
  - Governmental organizations
  - Universities
  - Local Administrations

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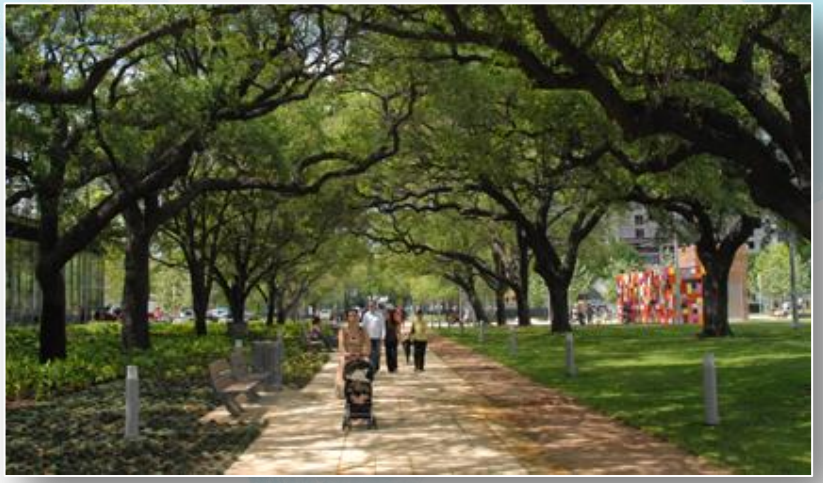
CURRENT APPLICATIONS in TURKEY



Irrigation of parks & recreational areas

Process Water (WWTPs)

Agriculture

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Wastewater Reuse in Istanbul

Domestic WWTPs & Reuse Capacities in Istanbul

Wastewater Tre. Plant	Paşaköy AWWTP
Capacity (m^3/day)	200.000
Condition. of the Plant	In Operation
Reuse (m^3/day)	100.000

- First reuse application in Turkey
- BNR → Sand filters → UV disinfection
- Applications:
  - drying, cogeneration within WWTP
  - cleaning of sewerage networks
  - irrigation of urban green areas
    - 20 km transmission line (Tuzla-Bostancı shore line, Istanbul Park, Sabiha Gokcen Airport, recreational area around Tuzla Lagoon Lake)

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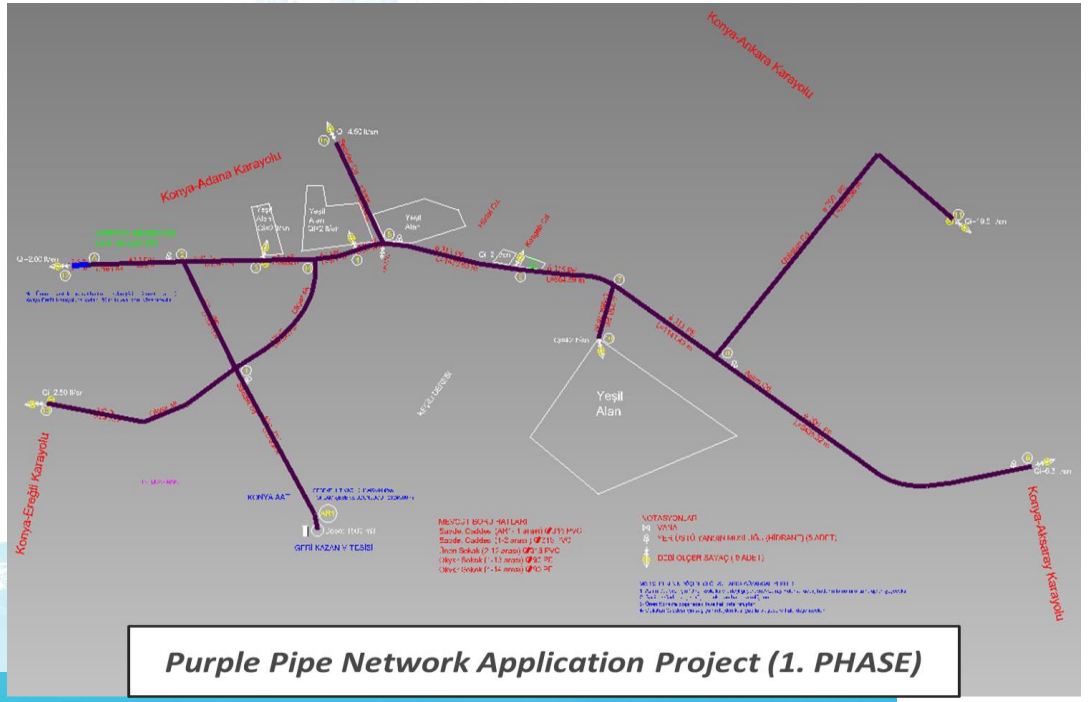
Reuse of Konya WWTP effluent for irrigation of urban green areas

Konya Purple Pipe Network

- 24 km transmission line for irrigation
- Advanced treatment plant includes:
  - pressure sand filtration
  - UV disinfection units

3.2 million m² land was irrigated during summer months of 2012-2013-2014.



Purple Pipe Network Application Project (1. PHASE)

SUGGESTIONS for the FUTURE – KEY ELEMENTS

Fit-for-Purpose Water Reuse	• Distinguish the right kind of treatment for the right kind of use • Decentralized systems with recycling of water & nutrients (in poor and peri-urban settlements)
Ecosystem based Management	• Need to shift towards environmentally sustainable economic policies that considers the interconnection of ecological systems to address human impacts and meet the needs for healthy productive ecosystems. (WWDR 2015)
Regulations	• Frameworks should clarify & link the roles of central & local authorities, promote public responsibility, and facilitate private investment & involvement in ww management. (UNEP-SickWater)
Financing	• Financing is reported to be particularly inadequate for sanitation, with drinking water absorbing the majority of funding available particularly in developing countries. (WWDR 2015)

THANK YOU!