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# UNESCO-Sida project Emerging Pollutants in Wastewater Reuse in Developing Countries

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UNESCO

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**UNESCO official event**

**Emerging Pollutants in Water and Wastewater: UNESCO-Sida Project Case-Studies**

A new global water challenge

**Emerging pollutants in water  
and wastewater**

# What are emerging pollutants?

## Represent a wide spectrum of complex chemical compounds

- New compounds are being identified developed and used
  - Extensive and expanding characterization lists and acceptable ranges of newly identified compounds are being developed (EU, US EPA, WHO)
- 
- **Pharmaceuticals and personal care products (PPCPs)**
  - **Pesticides**
  - **Surfactants**
  - **Industrial additives**
  - **Other domestic and industrial chemicals that are suspected to be endocrine disruptors, or to have adverse health and environmental effects**

# Water is an exposure pathway to emerging contaminants

## Point sources:

Municipal wastewater  
Industrial wastewater  
Solid waste  
(*landfill leachate*)



## Water resources

-Rivers, streams, lakes  
- Groundwater  
-Coastal waters



## Diffuse sources:

Agricultural runoff  
Groundwater recharge (*direct or indirect*)  
Urban runoff (*road washoff*)

# Why emerging water pollutants are a growing concern?

- Have potentially significant **risks to the human and environmental health**
- Likely to be **persistent in the environment**
- **Complex in their forms and mechanisms of actions**, involving a wide range of chemicals and compounds
- **The conventional water purification and wastewater treatment facilities are not effective in removing most emerging pollutants**

# Tackling emerging water pollutants: Challenges

- **Limited scientific knowledge and understanding** on emerging pollutants:
  - human health and environmental effects, individually and in combination of multiple compounds
  - fate and transport in the environment and water resources
- **Lack of data on the occurrence and concentration levels** in water resources and wastewater
- **Lack of awareness** on emerging pollutants
  - among water professionals
  - the general public and other stakeholders

# Tackling emerging water pollutants: Challenges

- **Not regulated: lack of regulatory frameworks**
  - Lack of regulations specific to emerging, or newly identified, pollutants in water resources and wastewater.
- **No monitoring requirements and capacities**
  - **No standardized methods for monitoring**
  - **Detection and measurement** of emerging pollutants is often **difficult**
  - Require **different techniques for different compounds**
  - **Low levels of occurrence** for detection by existing analytical instruments
  - **Very few monitoring efforts** are taken as regards the discharge of these pollutants into water resources



# Tackling emerging water pollutants: What needs to be done?

- **Better scientific knowledge and understanding on emerging pollutants**
  - Development of new knowledge, promotion of scientific research
  - Sharing existing knowledge and information, best practices
- **Monitoring and data on emerging pollutants in wastewater, sludge and water resources**
  - Identification of main sources and types of commonly-occurring pollutants
  - Data on their presence and concentration levels
- **Putting in place a set of adequate regulatory and policy frameworks, as well as precautionary measures**
- **Innovative technologies and approaches for monitoring and removal of these pollutants from wastewater systems**
- **Defining interlinkages with other sectors**
  - food security, agricultural and industrial activities, etc.
  - socioeconomic factors (*lifestyles, use of pharmaceuticals, etc.*)

# Emerging water pollutants in Post-2015 Sustainable Development Goals

Goal 6  
Water

- Improve water quality by **reducing pollution**, eliminating dumping and **minimizing release of hazardous chemicals**, untreated wastewater and doubling recycling and safe reuse

Goal 12  
SCP

- Sound management of chemicals and all wastes, Reduce the release of **wastes to air, water and soil** (12.4)

Goal 15  
Ecosystems

- Restoration of **terrestrial and freshwater ecosystems** (15.1)

Goal 1  
Poverty

- Access to **basic services, natural resources...** (1.4)

Goal 3  
Health

- Combat **water-borne diseases** (3.3)
- Reduce deaths and illnesses from hazardous **chemicals, air, water and soil pollution** (3.9)

**UNESCO-IHP International Initiative on Water Quality**

*Improving water quality to enhance water security*

**UNESCO's work on addressing emerging  
pollutants in water and wastewater**

# Water quality is a key element of water security

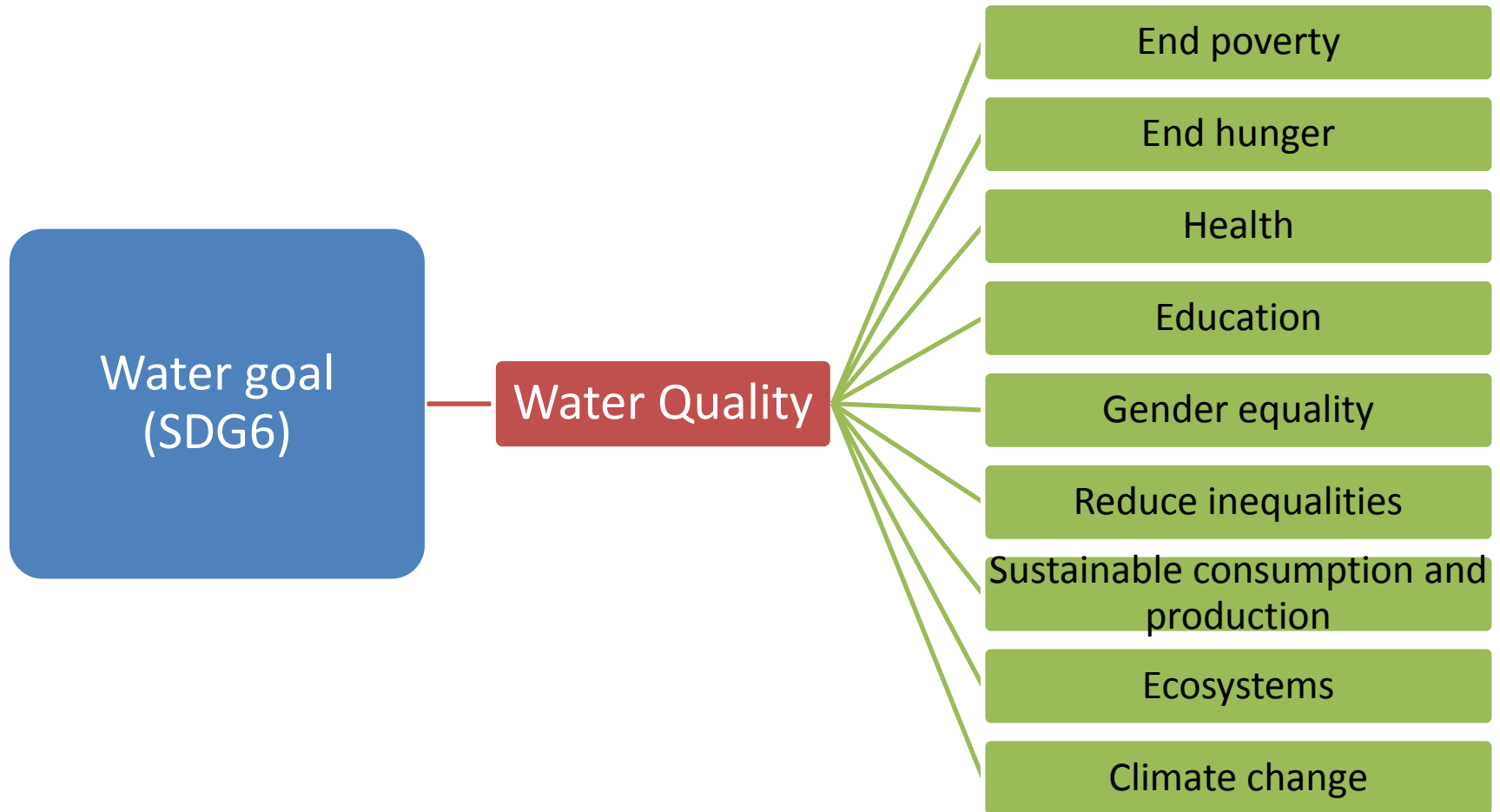
The capacity of a population to safeguard access to **adequate quantities of water of acceptable quality** for sustaining **human and ecosystem health** on a watershed basis, and to ensure **efficient protection** of life and property against water related hazards - floods, landslides, land subsidence, and droughts.

IHP-VIII for 2014-2021:

*“Water Security: Responses to Local, Regional and Global Challenges”*



# Water quality in the post-2015 Sustainable Development Goals (SDGs) framework



# UNESCO's work on Emerging pollutants in water and wastewater

## Main objectives:

- Strengthening the scientific understanding and knowledge base on new and emerging water quality issues such as **emerging pollutants in water and wastewater**;
  - Facilitating the **science-policy interface to improve water quality and wastewater management** by providing scientific information for science- and evidence-based policy making and raising awareness on water quality issues
- 
- **UNESCO experts meetings** and development of a network of experts
  - **UNESCO seminar** at the Stockholm World Water Week (2010)
  - **UNESCO International Symposium on Emerging Pollutants in Water** (Belgrade, 2013)

# UNESCO-Sida project:

## Emerging pollutants in water and wastewater

### Main objective:

To support UNESCO Member States to strengthen their scientific, technical and policy capacities to manage risks caused by emerging pollutants in water and wastewater by promoting safe reuse of wastewater leading to improved water and food security

### The key expected result:

UNESCO Member States supported to strengthen their scientific, technical, institutional and policy capacities to address emerging pollutants in water and wastewater and the safe reuse of wastewater

### Implemented under:

*UNESCO-IHP International Initiative on Water Quality (IIWQ)*

### Funding:

**Funded by the Swedish Development and Cooperation Agency (Sida) on behalf of the Swedish Government for 0.6 mln USD**

# Project Component 1: Strengthening scientific research and policy on emerging pollutants in water and wastewater (2015-2016)

***Objective - Promote scientific research and strengthen the knowledge base on emerging pollutants in water and wastewater***

- **Case-studies:** Technical and policy case-studies on emerging pollutants in water and wastewater
- **Technical and policy guidelines:** Together with findings of case-studies to support science-based policy-making addressing emerging pollutants and safe wastewater reuse



# Project case studies

## Objectives of case-studies

- Collect and document existing scientific information and policy analysis on emerging pollutants in water and wastewater
- Strengthen knowledge, share and disseminate the existing scientific information and research to enhance the scientific and technical capacity of developing countries to develop and implement effective policies and programmes

## Case-studies:

- **Total number of case-study proposals received: 45**
- **Total number of case-studies selected: 16**
  - Africa, Asia, North America, Latin America, Europe, covering multiple regions
- **Key partners and institutions:** IHP network, research institutions and international/ national organizations

## Project Component 2: Promoting Scientific Exchange and Collaboration in the Areas of Emerging Pollutants and Wastewater Reuse (2015-2017)

### *Support scientific exchange and collaboration in the areas of emerging pollutants and wastewater reuse*

- **Meetings, workshops and international conferences:** Multidisciplinary and multi-sectoral stakeholders' events
  - Promote scientific exchange and collaboration in these areas
  - Provide a forum for scientific discussion and exchange on these topics and disseminate project results to the wider international and scientific community
- **Network of experts and institutions:** A broad and comprehensive network to facilitate scientific exchange and collaboration between developed and developing countries

# Project Component 3: Capacity Building and Awareness Raising on Emerging Pollutants in Water and Wastewater and the Safe Reuse of Wastewater (2016-2017)

*Foster capacity building and awareness raising on emerging pollutants in water and wastewater and the safe reuse of wastewater*

- **Training activities:** In developing country regions such as Africa, Asia, Latin America and Arab States targeting policy-makers both within and outside water sectors
- **Awareness raising:** Materials on emerging pollutants and wastewater reuse including awareness raising brochures, technical and policy briefs and educational tools

# Final Output

- **Concluding international conference: 2017-2018**
  - **Present final results**
  - **Bring together a network of experts and partners**
  - **Define the next agenda and future steps**
  - 
  - **Explore future collaboration**

# UNESCO Project

## Emerging Pollutants in Wastewater Reuse in Developing Countries



*Implemented under*

**UNESCO-IHP International Initiative on Water Quality (IIWQ)**

*Funded by the Swedish International Development Cooperation Agency (Sida)*



2014-2017

# Thank you

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