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)

Division of Water Sciences
International Hydrological Programme

The present threat of new and emerging pollutants in water

Good quality water is essential to sustain human well-being, livelihoods and a healthy environment for the post-2015 sustainable development. The United Nations 2030 Agenda development agenda and Sustainable Development Goals (SDGs) recognize the crucial role of access to water that is really safe for human uses and the urgent need to protect the quality of world's water resources in achieving many sustainable development goals. The Sustainable Development Goal 6 "Ensure availability and sustainable management of water and sanitation for all" calls for immediate, oriented and global action to "achieve universal and equitable access to safe and affordable drinking water for all" (Target 6.1) and to "improve water quality by reducing pollution, eliminating dumping and minimizing release of hazardous chemicals, halving the proportion of untreated wastewater and substantially increasing recycling and safe reuse globally" (Target 6.3). The potential threat of water pollution by hazardous chemicals to human health and ecosystems is, furthermore, emphasized in other SDGs. In particular, Goals 3 and 12 stress the urgent need to significantly reduce the release of wastes and hazardous chemicals to air, water and soil to minimize their adverse impacts on human health and the environment.

New and emerging pollutants present a new global water quality challenge with potentially-serious threats to human health and ecosystems. Emerging pollutants can broadly be understood as any synthetic or naturally-occurring chemical or any microorganism that is not commonly monitored or regulated in the environment with potentially known or suspected adverse ecological and human health effects. These contaminants comprise a wide variety of chemicals used in our daily lives, including pharmaceuticals, personal care products, pesticides, industrial and household chemicals, metals, surfactants, industrial additives and solvents. They are a source of concern since a wide variety of pharmaceuticals and household and industrial chemicals are used and released continuously into the environment even in very low quantities and some may cause chronic toxicity, endocrine disruption in humans and aquatic wildlife and the development of bacterial pathogen resistance. Potential human health risks of emerging pollutants through the exposure via drinking water needs special attention and further scientific research because conventional water purification and wastewater treatment facilities are not effective in removing them.

© Duke2015 / Fotolia

Still a long way to go

Scientific knowledge and understanding on potential human and ecosystem health risks posed by emerging pollutants is still very scarce, as well as on their presence in water resources and wastewater and their pathways and accumulation in the environment. Most emerging pollutants are not regulated in environmental, water quality and wastewater discharge regulations. Hence, there is an urgent need to strengthen scientific knowledge and adopt appropriate technological and policy approaches to monitor emerging pollutants in water resources and wastewater, assess their potential human health and environmental risks, and prevent and control their disposal to water resources and the environment.

The UNESCO Project on "Emerging Pollutants in Wastewater Reuse in Developing Countries" responds to this need. The project also contributes to the 2030 Agenda and Sustainable Development Goals, including the goals, among others, on water, health, hunger, ecosystems and chemicals management.

Main objective

The project, implemented under UNESCO-IHP International Initiative on Water Quality (IIWQ), aims to support UNESCO Member States to strengthen their scientific, technical and policy capacities to manage human health and environmental risks caused by emerging pollutants in water and wastewater by improving water quality and wastewater management and promoting safe reuse of wastewater, ultimately contributing to enhance water and food security.

Interdependencies between water-food-agriculture and with other water domains

Wastewater reuse is becoming an integral part of water resources management plans in many regions. Effects of these noxious chemicals found in diverse forms and various quantities in water resources and wastewater can have a serious effect on water-food-agriculture interdependencies. As wastewater is used to irrigate crops in many countries in water-scarce areas, people in these regions are exposed to these contaminants via the agricultural produce they eat. The potential risk of emerging pollutants to human health through the use of insufficiently treated, or untreated, wastewater in agricultural irrigation requires particular consideration. Consequently, to provide significant additional water resources of satisfactory quality for agricultural irrigation and other purposes, safe reuse and reclamation of wastewater need to be promoted through water quality protection and appropriate wastewater management strategies.

Achieving the objective through 3 main components

1 Strengthening scientific research and policy (2015-2017)

Objective: Promote scientific research and strengthen the knowledge base on emerging pollutants in water and wastewater to enhance the scientific and technical capacity of developing countries and support the development and implementation of effective policies and programmes.

Case-studies: A series of technical and policy case-studies on emerging pollutants in water and wastewater in different regions (Africa, Asia, Latin America, Arab States and globally).

- To collect and document existing scientific information and policy analysis in relevant areas;
- Strengthen, as a result, the knowledge base on emerging pollutants in water and wastewater by sharing and disseminating scientific information and policy approaches.

Technical and policy guidelines: Technical and policy guidelines, complemented by findings of case-studies, to assist science-based policy-making on addressing emerging pollutants and safe wastewater reuse.

2 Promoting scientific exchange and collaboration (2015-2017)

Objective: Support scientific exchange and collaboration in areas related to emerging pollutants and wastewater reuse.

Scientific meetings and workshops: Multi-stakeholder events for scientific exchange and expert collaboration to provide a platform for further scientific discussion on related issues.

- Experts meetings, workshops and international conferences to promote scientific exchange and collaboration.

Network of experts and institutions: Establishment of an international and comprehensive network of experts and institutions to facilitate scientific exchange and collaboration between developed and developing countries.

3 Capacity building and awareness raising on emerging pollutants (2017-2018)

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

Training: Regional training activities in developing country regions, such as Africa, Asia, Latin America and Arab States, targeting researchers, practitioners, policy-makers both within and outside the water sector, and other stakeholders.

Raising awareness: Information brochures, technical and policy briefs, and educational tools on emerging pollutants and wastewater reuse targeting the general public.

Concluding International Conference (2018)

A culminating event to present results of the project activities, including case-study reports, technical and policy guidelines, experts meetings' reports, designated platforms and awareness raising materials.

Additionally, to further enhance the scientific network of experts and key partners, and develop future collaboration opportunities among the participants, as well as with UNESCO.

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

Water quality is one of its key thematic areas of UNESCO activities in the field of water sciences. During the Seventh Phase of IHP (IHP-VII, 2008-2013), water quality issues were addressed by implementing targeted activities with a renewed focus on "Protecting water quality for sustainable livelihoods and poverty reduction" (IHP-VII Focal Area 4.1).

This has brought water quality issues to the forefront of IHP activities and has led to the prioritization of water quality as one of the main themes of the IHP-VIII Strategic Plan, as reflected in the dedication of IHP-VIII Theme 3 on "Addressing water scarcity and quality".

The UNESCO-IHP International Initiative on Water Quality, established by Resolution XX-4 of the 20th session of the IHP Intergovernmental Council of UNESCO, provides a platform to mobilize and promote scientific knowledge, research and science-based policies to respond to water quality challenges, including safe water, wastewater and sanitation issues, towards ensuring water security for sustainable development. It is a comprehensive scientific cooperative programme to address water quality and wastewater issues in a holistic and integrated manner. It also aims to facilitate collaboration on water quality and wastewater issues among researchers, practitioners, policy–makers and other stakeholders in both developed and developing countries.

The IIWQ provides an umbrella programme for UNESCO activities and projects on water quality.

UNESCO-IHP mandate and unique position

UNESCO's International Hydrological Programme (IHP) is the only intergovernmental scientific programme of the UN system devoted to water research, water resources management, and education and capacity building. Aligned with the new eight-year Medium-term Strategy of UNESCO, the Eighth Phase of IHP (IHP-VIII, 2014-2021) aims to improve water security in response to local, regional, and global challenges.

About the Swedish International Development Cooperation Agency

The Swedish International Development Cooperation Agency (Sida) is a government agency working on behalf of the Swedish Parliament and Government, with the mission to reduce poverty in the world. Through their work and in cooperation with organizations and institutions, the agency contributes to Sweden's Policy for Global Development (PGU).

This UNESCO Project on "Emerging Pollutants in Wastewater Reuse in Developing Countries" benefits from generous support under the Programme Cooperation Agreement between UNESCO and Sweden for 2014-2017.

CONTACT:

International Initiative on Water Quality (IIWQ)
Division of Water Sciences - International Hydrological Programme
UNESCO

waterquality@unesco.org
en.unesco.org/emergingpollutants

SC/HYD/WQ/2015/3updated