Water quality and sanitation

Media brief

- One out of four urban dwellers does not have access to improved sanitation facilities.
- 90% of all waste water in developing countries is discharged untreated, polluting rivers, lakes and seas.

Main challenges

Rapid urbanisation brings along several challenges related to water quality issues and sanitation.

The major progress in the use of improved **sanitation** facilities in the last decades is undermined by the rapid urban population growth. Today, 789 million urban dwellers live without access to improved sanitation facilities.

- *The number of urban dwellers practising open defecation increased from 140 million in 1990 to 169 million in 2008.*

In most low- and middle-income countries **wastewater** is discharged directly into the sea or rivers without treatment. Many large cities do not have treatment plants or plants quickly become undersized as urban population growth outpaces investments. Discharge of untreated wastewater shifts problems to downstream areas. Well-managed wastewater can, instead of being a source of problems, be a positive addition to the environment and lead to improved food security, health and economic development.

- *Wastewater directly or indirectly irrigates 20 million hectares of land globally—almost 7% of total irrigated area.*

Water pollution is, despite improvements in some regions, on the rise globally. While substantial progress is made in regulation and enforcement, pollution is expected to increase as a result of economic development driven by urbanization, industries and intensive agriculture systems. Human-generated water pollution is a serious threat to human and ecosystem health, but its impact is hard to quantify. Urban settlements are the main source of point-source pollution.

- *Every day, 2 million tons of sewage and other effluents drain into the world's waters*

Cities' approaches

- Improve access to adequate sanitation facilities (Accra, Alexandria)
- Research on alternative unconventional urban sanitation systems (Alexandria)
- Improve sanitation services by constructing new alternative technologies of wastewater collection (Alexandria)
- Prevention of pollution (Accra, Alexandria, Belo Horizonte, Cali)
- Stormwater management (Accra, Alexandria, Belo Horizonte)
- Wastewater management and sewage treatment (Accra, Alexandria, Belo Horizonte, Cali, Lima, Lodz, Zaragoza)
- Water reuse, water recycling (Accra, Alexandria, Lima)
- Integrated urban water management (Accra, Alexandria, Belo Horizonte, Cali, Lodz)

Cities

Accra, Ghana (2.1 million inhabitants)

- **Main challenges**
  - Only 5% of the households are connected to pipe sewerage systems. **Inadequate sanitation** contributes to 70% of diseases in Accra.
  - 21 % of the households use flood drains (gutters) as **open sewerage** that ends up in nearby urban water bodies.
  - One third of the population uses **public toilets**, due to absence of sanitation facilities at home.
  - Most of the drains in the city are not covered and some households use it for defecation.
  - Nearly half of the **solid waste** is not collected.
- **Focus and objectives**
  - Quality of surface water to meet Ghanaian standards.
  - 50-80% of waste recycled.
  - Clean city with drainage canals and streets free of garbage.

- 80% of citizens to follow good sanitation practices, including paying for collection.
- Integrated and sustainable waste management system.
- 70 % reduction in the incidence of diseases associated with water and sanitation.
- 100% of sanitation facilities at an acceptable level; healthy, clean, dignified and safe.

• **Activities**
- Use of urban water (fresh and waste) for urban agriculture and other livelihood opportunities.
- Maximizing the use of natural systems in all aspects of the municipal water cycle.
- Governance for integrated urban water management.
- Stormwater management.

Alexandria, Egypt (4 million inhabitants, population increases to 6 million in the summer)

• **Main challenges**
- Increase in **water demand**.
- Many **peri-urban and informal settlements** lack sewage/sanitation coverage.

• **Focus and objectives**
- All citizens should have access to high quality (according to national norms), reliable, sustainable, and affordable water and sanitation services.
- Improving sanitation services by construction of new alternative technologies of wastewater collection.
- Reducing the disposal of sewage and pollution into Lake Maryout.

• **Activities**
- Develop a 2030 Integrated Urban Water Management Strategic Plan for the City of Alexandria.
- Upgrade from primary treatment to secondary treatment levels.
- Reuse of treated wastewater.
- Grey water recycling.
- Stormwater management.
- **Maawa Alsayadaan** demonstration project. Maawa Alsayadaan is a slum area that is currently without adequate sewage systems. The project focuses on upgrading basic infrastructure (water and sewerage). Activities include, among others, decentralized wastewater treatment, use of rain water for toilet flushing and water reuse in new developments.
- Maintenance of existing sewage systems for better performance and less overflows of sewage in the streets.

Belo Horizonte, Brazil (2.4 million inhabitants)

• **Main challenges**
- Related to the wastewater system, there are **heavily polluted** receiving bodies due to the lack of interceptor pipelines and illicit inter-connections between the wastewater and stormwater networks.
- **Health risks** due to direct human contact with polluted water including diseases associated with lack of sanitation.
- 92% of the population is connected to the wastewater sewerage system, but there is a **lack of wastewater treatment facilities** and of interceptor pipelines.

• **Focus and objectives**
- Activities of the Belo Horizonte Learning Alliance (BEHLA) are oriented by issues related to integrated urban water management (IUWM) and associated research topics.

• **Activities**
- Socio-environmental research: evaluation of the social acceptability of locating stormwater management facilities within recreational areas.
- Innovations in the treatment of wet weather diffuse pollution.
- Experiments on source control for stormwater management.
- Organization of an optimized system of mathematical modelling of the stormwater system.
- Organization of a system of quality indicators of services rendered for urban drainage.

Cali, Colombia (2.1 million inhabitants)

• **Main challenges**
- The Cauca River permanently complies with the requirements to be used as a source for drinking water in terms of quality and quantity.

- The drainage system for the south of Cali will meet the environmental requirements and the water quality will be such that it can be used as source for drinking water.
- Introduce a paradigm shift in the **water pollution control** in the context of the Integrated Water Resources Management for the urban expansion area in the south of Cali.

• **Focus and objectives**
- Shift paradigm in wastewater management. From the focus on wastewater treatment (Wastewater Treatment Plant, WWTP) towards a holistic view of pollution control.
- Cali demonstration city, urban area in the context of the upper basin of the Cauca River. Working together towards sustainable water management.
- Three main topics: the water quality of the Cauca River and its impact on the water supply system of Cali; the Southern drainage system of the city of Cali; the expansion area and the possibility of including innovative strategies.
- To encourage inter-institutional and interdisciplinary work and contribute to the formulation of public policies to control pollution in the city of Cali and the upper basin of the Cauca River.

• **Activities**
- Diagnosis of the urban water management for the City of Cali.
- Assessment of projects proposed by institutions at local level (Cali) and regional level (upper basin of the Cauca River) to solve the water pollution of the Cauca River and its tributaries.
- Proposal for a paradigm shift in the water pollution control in Cali, including different strategies: decentralization, natural system, minimization and prevention, reuse and self-purification capacity of the Cauca River and its tributaries.
- Workshops with stakeholders' members of Learning Alliances, seminars, research.
- Symbiosis with the processes related to local, regional and national water resources management.
- Contribution to the formulation of public policy for the pollution control of water resources in the upper basin of the Cauca River. Cali is the main town in the basin.
- Development of some short-term activities, for example "Sentinel of the Cauca river Water Quality for the City of Cali", an early warning system and real-time control strategies that contribute to mitigating the impact of extreme pollution events in the Cauca River on the operation of the Puerto Mallarino and Cauca River drinking water treatment facilities on the municipal water supply system.

Lima, Peru (8.5 million inhabitants)

• **Main challenges**
- Of all of the **wastewater** generated (17.6 m^3/s), 9.2% is treated and only half of that is reused (approx. 1 m3/s) to irrigate less than 10% of the green areas of the city and the agricultural areas; the remaining treated wastewater is dumped into the river (approx. 1 m^3/s).
- The rest of the wastewater (approx. 17 m^3/s) is not treated and is eliminated directly into the Pacific Ocean, causing significant problems to public health and the environment.

• **Focus and objectives**
- To formulate policy guidelines for the promotion of use of domestic treated wastewater for the irrigation of green areas and urban and peri-urban agriculture (integrated systems for treatment and reuse).
- Combat urban poverty, improve food security and foster public participation at the local level through the implementation of a wastewater treatment system for re-use in multi-functional green areas.

• **Activities**
- Formulation and approval of Policy guidelines for sanitation sector (Ministerial Resolution 176-2010-VIVIENDA).
- 3 decentralized training courses to design and implement integrated systems of treatment and reuse of wastewater.
- Creation of an intersectorial national committee (Sanitation, Health, Agriculture, Water Management and Environment) to follow up and support the implementation of the policy guidelines.
- Build a wastewater treatment plant with the capacity to treat 1 l/s of water that will help develop and maintain 2.6 hectares of recreational and productive green areas (for urban agriculture).

Lodz, Poland (800,000 inhabitants)

• **Main challenges**
- Today most of the rivers serve as sewerage and are **polluted**.
- The **efficiency of sewage purification** by the wastewater treatment plant during wet weather is diminished.

• **Focus and objectives**
- Application of Ecohydrology (EH) as the integral part of an integrated urban water management approach.

- Decrease contamination and increase the quality of life and health of the inhabitants, and lower the cost-efficiency of the management.

- **Activities**
  - Sokolowka river: implementation of ecohydrological principles to renaturalize the river in order to increase the water retention and improve the quality of life in the city.
  - Ner river and Group Sewage Treatment Plant: a systemic approach to urban water management – the use of fitotechnology to utilize sewage sediments, produce energy and improve water quality.
  - Development of a city-wide strategic plan for water.

Granada, Nicaragua (110,000 inhabitants)

- **Challenges**
  - Granada does not have an adequate sewage sanitation system, which causes wastewater to contaminate creeks, which in turn contaminate Lake Cocibolca. Since this Lake is a potential source of water supply source for the region, it is crucial to stop pollution.
  - Since the houses in Granada are old, the system of black water is mainly done through sceptic tanks (deep holes in the ground).

- **Focus and objectives**
  - Prevent the pollution of Lake Cocibolca, a potential source of water supply. This would not only benefit the city and Nicaragua, but the whole Central American region.
  - Improve wastewater treatment.

- **Activities**
  - The Project "Improvement and Expansion of the Drinking Water and Sanitation System of Granada" is supported by the Municipality of Granada, the Nicaragua Company for Aqueducts and Sewerage Sanitation of the Government of Nicaragua, the German government through KFW, and the Japanese government. This project aims, among other things, to prevent the contamination of Lake Cocibolca through the treatment of residual waters and oxidation basins.

Zaragoza, Spain (650,000 inhabitants)

- **Challenges**
  - Water quality.

- **Focus and objectives**
  - Improve drinking-water quality.

- **Activities**
  - Drinking water is now directly brought from reservoirs in the Pyrenees, which resulted in an excellent drinking-water quality since one year now.
  - 97% of the city's sewage is treated in Zaragoza's water-treatment plants since 1994.

References

- Butterworth, John (IRC). The role of learning alliances in catalyzing change in urban water management. Presentation at World Water Week Stockholm 2010.
- Chiramba, Thomas (UNEP). 'Managing the ecological footprint of urban water'. Presentation at World Water Week Stockholm 2010.
- SWITCH material, websites and work packages on the mentioned cities. http://www.switchurbanwater.eu/cities/index.php
- UN-HABITAT. 2008. State of the World's Cities 2008/2009. http://www.unhabitat.org/pmss/listItemDetails.aspx?publicationID=2562
- UNDP. 2006. Human Development Report 2006. Chapter 4. http://hdr.undp.org/en/media/HDR_2006_Chapter_4.pdf
- UNEP, UN-HABITAT. 2010. Sick Water? The role of waste water management in sustainable development. A rapid response assessment. http://www.grida.no/_res/site/file/publications/sickwater/SickWater_screen.pdf
- UN Office to Support the International Decade for Action 'Water for Life' 2005-2015 website, section on 'Water Quality'. http://www.un.org/waterforlifedecade/quality.html
- UN-WWAP, UN-HABITAT. 2010. Water for sustainable urban human settlements. Briefing note. www.unwater.org/downloads/WWAP_Urban_Settlements_Web_version.pdf
- UN-WWAP. 2006. 3rd United Nations World Water Development Report. http://www.unesco.org/water/wwap/wwdr/
- WHO/UNICEF JMP. 2010. Progress on sanitation and drinking water: 2010 update. www.unwater.org/downloads/JMP_report_2010.pdf