Cities coping with water uncertainties

Media brief

Main challenges

Today, many cities are facing severe water uncertainties, such as floods, droughts and upstream activities on transboundary rivers. Climate change and water-related disasters will place increasing demands on urban systems and will result in increased migration to urban areas. The most vulnerable are the urban poor, since they often live in hazardous locations, such as flood plains, and in poor quality housing.

Floods cause half of disasters worldwide and 84% of all disaster deaths. Floods in dense, poorly serviced settlements can lead to diseases such as diarrhoea, typhoid, scabies, cholera and malaria. Furthermore, floods can cause contamination of water supplies, as pipes in slum areas are often damaged or leak. Many of the world's cities are located on coasts and vulnerable to floods areas.

- *21 of the world's 33 megacities are built on the coast.*
- *In Asia, more than a billion people live within 100 kilometres of the sea.*

Droughts. After floods, droughts are the world's second most geographically extensive hazard. Droughts may cause less immediate physical damage than earthquakes, floods, or storms, and as a result often receive lower priority in disaster risk reduction. But they often have a longer-lasting impact, undermining food and water security. As they become more frequent and widespread, they will need much greater attention.

Climate change is already affecting water resources and their management in various regions. It can have severe impacts on urban areas, including increased flood risk, reduced water supply and displacement of inhabitants from coastal cities. Higher temperatures and changes in extreme weather conditions are projected to affect the availability and distribution of rainfall, snowmelt, river flows and groundwater, and deteriorate water quality.

Water scarcity is both a natural and a human-made phenomenon. Water scarcity is a relative concept and can occur at any level of supply or demand. Water scarcity may be exacerbated in downstream countries by upstream abstractions on transboundary rivers, or by unilateral groundwater developments in riparian countries sharing transboundary aquifers. Scarcity may be a social construct (a product of affluence, expectations and customary behaviour) or the consequence of altered supply patterns - stemming from climate change for example. Hydrologists typically assess scarcity by looking at the population-water equation. An area is experiencing water stress when annual water supplies drop below 1 700 m^3 per person. When annual water supplies drop below 1 000 m^3 per person, the population faces water scarcity, and below 500 cubic metres "absolute scarcity".

- *One fifth of the world's population, 1.2 billion people, live in areas of water scarcity.*
- *Urban and industrial water use is projected to double by 2050.*

Cities' approaches

- Flood warning and emergency planning (Belo Horizonte, Granada)
- Development of a decision support system on flood risk management (Belo Horizonte)
- Studies and application of technologies such as water re-use, rainwater harvesting, artificial wetland, river restoration (Belo Horizonte, Granada)
- Strategic Integrated Urban Water Management (IUWM) planning (Alexandria)
- Innovative storm water management
- Improved urban and land use planning (Alexandria)
- Adaptation plans to climate change (Alexandria)

Cities

Accra, Ghana (2.1 million inhabitants)

- **Main challenges**
  - **Flood risk;** many neighbourhoods are built in flood prone areas.
  - Most of the **natural drainage systems** have been lost and the capacities of the constructed drains are limited.
  - Both long term climate change and short term climate variability have an impact on the **efficacy of water and sanitation systems**.
  - Accra is built on the coast. The expected sea level rise leads to an increased flood risk.
  - It is expected that the rate of **groundwater recharge** will be reduced in the future.

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

- **Main challenges**
  - Climate change is expected to affect **water supply and demand**; water supply systems become water stressed and vulnerable to salt water intrusion due to possible sea level rise from climate change.
  - **Precipitation changes** in the Nile River will affect water resources in Alexandria, which relies for 95% of its water resources on the Nile.
  - For Alexandria, a coastal city, a rise in sea level between 0.5 and 1 meter is assumed over the next century. If no action will be undertaken, 30% of the city will be lost due to **inundation**.
- **Focus and objectives**
  - Addressing potential impacts of climate change.
  - Exploring alternative water resources.
  - Improved urban development plans.
- **Activities**
  - SWITCH supported the Director of the Alexandria Water Utility to present at Stockholm Water Week on Alexandria, climate and SWITCH.
  - Funding for a documentary on the impact of sea-level rise on Alexandria, New York, Rotterdam and Jakarta.
  - Preparation of a 2030 Integrated Urban Water Management (IUWM) Strategic Plan for the city of Alexandria.
  - Involvement of SWITCH Alexandria experts in the Alexandria governorate urban development plan.
  - Assessment of infrastructure development by the Shore Protection Authority of the Ministry of Water Resources and Irrigation for the protection of Alexandria against shore erosion and potential sea level rise.
  - Exploring alternative strategic options for meeting future demands under uncertainty, including water demand management and use of non conventional water resources such treated wastewater reuse and use of desalinated water.

Belo Horizonte, Brazil (2.4 million inhabitants)

- **Main challenges**
  - The **risk of floods** threatens material damage and loss of life.
  - Occupation of **flood prone areas**.
  - **Pollution** of creeks.
  - Little treatment of **sewage**.
  - **Metropolitan** integration.
- **Focus and objectives**
  - Assessing and reducing potential flood risk and flood damages.
  - Pollution reduction.
  - Popular participation on decisions.
- **Activities**
  - Studies on flood forecasting, flood warning and emergency planning in the context of urban flash floods.
  - Studies for the implementation of a support system for decision-making on occurrences of urban floods, including modelling, monitoring, flood forecasting, emergency planning.
  - Studies on other technologies: re-use, rainwater harvesting, artificial wetland, river restoration.
  - Studies on economics and financial instruments.

Granada, Nicaragua (110,000 inhabitants)

- **Main challenges**
  - The communities El Paso and Malacatoya Estas, which are located in the rural area of Granada, are vulnerable to floods in winter time due to water level rising. The floods cause victims and material damage.
  - In the summer some communities lack sufficient drinking water.
- **Focus and objectives**
  - To reduce damage caused by floods through reforestation and good practices in land management.
  - Provide the communities with sufficient potable water.
- **Activities**
  - Granada participates in disaster prevention programmes such as PREVDA (Regional Programme to Reduce Environmental Vulnerability and Degradation), which is financed through European Union funds. These programmes cover the reforestation of river banks and other prevention activities. In these programmes also several municipalities of neighbouring departments and the community participate.
  - The municipality of Granada is managing, in cooperation with Bomberos Unidos Sin Fronteras, the training and equipment of the municipal teams to prevent and assist in case of a disaster. This project is funded by the Community Program 'Municipia' of AECID (the Spanish Agency for International Cooperation).

References

- Alabaster, Graham (UN-HABITAT). Urbanization and water management - trends, challenges and perspectives. Presentation at World Water Week Stockholm 2010.
- Darteh, Bertah. 2010. Flooding in the City: The Blame Game. Accra Learning Alliance blog. http://switchaccra.wordpress.com/2010/08/
- Khatri, Krishna B., Peter van der Steen and Kala Vairavamoorthy. 2007. Climate Change: Accra-Ghana. Briefing note Accra July 2007. UNESCO-IHE. http://www.delftcluster.nl/website/nl/page1045.asp
- Khatri, Krishna B., Peter van der Steen and Kala Vairavamoorthy. 2007. Climate Change: Alexandria-Egypt. Briefing note Alexandria July 2007. UNESCO-IHE. http://www.delftcluster.nl/website/nl/page1045.asp
- Secretary-General message on International Day for Disaster Reduction 13 October 2010. http://www.unisdr.org/eng/public_aware/world_camp/2010/docs/SGMessage_Approved.pdf
- SWITCH materials, work packages, website and information on mentioned cities. http://www.switchurbanwater.eu/cities/index.php
- SWITCH Demand Management Study Alexandria. 2010. http://switch.cedare.int/cedare.int/files28%5CFile2975.pdf
- UNESCAP, UNISDR (2010). The Asia Pacific Disaster Report 2010. Protecting Development Gains: Reducing Disaster Vulnerability and Building Resilience in Asia and the Pacific. http://www.unescap.org/idd/pubs/Asia-Pacific-Disaster-Report%20-2010.pdf
- UN-HABITAT website 'Climate change and cities'. http://www.unhabitat.org/content.asp?cid=5155&catid=550&typeid=24&subMenuId=0
- UN-HABITAT website 'Risk and Disaster Management'. http://www.un-habitat.org/categories.asp?catid=286
- UN-HABITAT. 2010. State of the World's Cities Report 2010/2011. Press Kit. http://www.unhabitat.org/content.asp?cid=8051&catid=7&typeid=46&subMenuId=0
- UN-HABITAT. 2008. State of the World's Cities 2008/2009. http://www.unhabitat.org/pmss/listItemDetails.aspx?publicationID=2562
- UNIRSD video World Disaster Reduction Campaign 2010-2011. http://www.unisdr.org/english/campaigns/campaign2010-2011/
- UN Office to Support the International Decade for Action 'Water for Life' 2005-2015 website, section on 'Water Scarcity'. http://www.un.org/waterforlifedecade/scarcity.html
- UN Water. 2010. Policy Brief. Climate Change Adaption: The Pivotal Role of Water. http://www.unwater.org/downloads/unw_ccpol_web.pdf
- UN Water. 2007. Brochure World Water Day 2007. Coping with water scarcity. Every drop counts. http://www.unwater.org/wwd07/downloads/documents/wwd07brochure.pdf
- UN Water, FAO. 2007. Coping with water scarcity. Challenge of the twenty-first century. http://www.fao.org/nr/water/docs/escarcity.pdf
- UN-WWAP, UN-HABITAT. 2010. Water for sustainable urban human settlements. Briefing note www.unwater.org/downloads/WWAP_Urban_Settlements_Web_version.pdf