

Advances in technology for safe drinking water under water scarcity conditions

8th Regional Technology Platform, Tel Aviv, June 9, 2010



Dr. Bracha Limoni-Relis (Mekorot) addresses delegates at the eighth TECHNEAU RTP held in Tel Aviv, Israel.

The eighth RTP with the title "Advances in technology for safe drinking water under water scarcity conditions" was held in Tel Aviv, Israel, on June 9, 2010. The event was hosted by Mekorot, the Israeli National Water Company.

Highlighting the situation in water stress regions with special focus on Israel, the workshop was centred on the challenges for the drinking water sector arising from climate change and increasing water scarcity. The RTP-presentations from local and international experts highlighted specific aspects of drinking water supply and water treatment in Israel as well as research results from TECHNEAU.

Israel has four drinking water sources. The main source, until recently, was Lake Kinneret, which daily provides drinking water to about quarter of Israel's population. Other important drinking water sources are groundwater and spring water. However, Israel's water demand exceeded that available from these sources. Therefore the country relies for its supply more and more on desalinated seawater and brackish water. Desalination is expected to become a major source of drinking water in Israel.

In the current decade has seen substantial investment in infrastructure development in order to improve the water quality and to satisfy the growing demand for water:

- In order to comply to the new strict drinking water standards, it was decided to build the Central Filtration Plant at the Eshkol site, which is the

fourth largest filtration facility in the world (maximum capacity =1.7 million cubic meters per daily). The plant started operating in July 2007.

- In 2002, following a prolonged drought (1998-2002) the government enacted in 2002 the construction of large seawater desalination plants along the Mediterranean coast. These reverse osmosis installations will supply 305 million m³/year of desalinated water by the year 2010. Three plants are already operating (Ashkelon, Palmachim and Hadera), two others are still under construction. In addition, there are around 30 small mostly brackish water desalination plants that desalinate about 30 million m³/year.
- Mekorot is planning to invest in a new national water system which will include several east-west arteries complementing and partly substituting for the National Water Carrier. The new pipelines will connect the five desalination plants along the coast with water users. When completed, most drinking water supplied to Israel's residents from Hadera southwards –i.e. most of the country's population – is expected to come from desalinated seawater.

In order to the secure water quality Mekorot developed a comprehensive water security strategy which combines physical barriers, early warning systems and response protocols.

- Barriers include the physical protection of the water infrastructure, physical and electronic devices to prevent unauthorized contact with the drinking water and backflow prevention devices at strategic points to protect the main water systems.
- The early warning system comprises dozens of on-line stations located along the distribution system continuously monitoring water quality. At central junctions, water quality is assessed by measurement of conventional parameters, bioassays and specific sensors.
- A number of on-line early warning biomonitoring technologies using local fish and invertebrate organisms have also been installed. The biomonitor organisms were selected for their resilience to changes in water characteristics - particularly salinity - due to blending waters from different sources (surface water, groundwater and desalinated water). In addition, the application of biomonitor in distribution necessitated prior treatment of the sampled water to remove carbon dioxide (from groundwater) and chlorine to protect the organisms.
- Procedures and protocols which determine measures for an alarm response in case of a contamination were developed and implemented.

Besides the Israeli lectures, several presentations from the TECHNEAU consortium members and from other EU- Projects disseminated research results with special relevance for the region, e.g.

- As part of the EU-Medina project, Israeli researchers are also testing options to use membrane bioreactors (MBRs) as pretreatment of seawater prior to desalination. They specially focus on the potential of MBRs to reduce TOC levels and various nutrients such as nitrogen sources, phosphorous, iron, etc. and built a lab-scale MBR system using seawater from the Ashkelon desalination plant.

- Application of the TECHNEAU Water Safety Plan (WSP) toolbox
- Application of TECHNEAU tools to monitor drinking water quality - the EDC toolbox and fish biomonitor –
- Application of TECHNEAU tools in the modelling of bacterial transport in water distribution
- Discussion of micropollutants in the urban water cycle and removal options in advanced wastewater treatment (EU-funded Neptune and Swiss Micropoll project)

The workshop also discussed other relevant issues including the identification and removal of odorous compounds from water and the role of modelling in the management and operation of water supply systems.

The workshop attracted a lot of Israeli water experts and provided an intensive insight in the enormous challenges the country is facing to assure the drinking water supply of its population. The meeting enabled new contacts and facilitated an intensive exchange between the TECHNEAU team and regional water experts from Mekorot, research institutes and the local universities.

Many participants expressed a strong interest in results from TECHNEAU and the possible application of new technologies developed within the project. Opportunities for further cooperation will be explored by the Israeli project partner, Mekorot.