Integrated Water Resources Management in Arid and Semi-Arid Regions

A 4-day intensive course

September 13–16, 2009, Genoa, Italy

Lecturers: Gideon Oron, Shimon Tal, Mousa Mohsen
Purpose

The intensive course provides experts from all around the world with advanced tools and ideas for deeper insight into sustainable integrated water resources management in arid and semi-arid regions. Participants will gain understanding and a broad view of management tools aimed at tackling problems of water and water-related issues in water scarce regions. Evaluation and adaptation of optimal long range solutions, environmental, economical and public considerations will be analyzed to help in making the best decisions for meeting the challenges of water shortage.

The course is based on extended experience gained by the instructors in one of the most water scarce regions of the world.

Topics

The course will include identification, characterization, development and utilization of the various water sources, technical and managerial aspects (qualities, quantities, location, treatment) and environmental and engineering issues (contaminations, control, risks) which are strongly linked to the management of natural waters and their role in the national water potential. The course includes an introduction to general worldwide water status and climate changes, the role of extra waters in the national water sector and the link to the practices of the end users. Other topics will be irrigation, resources contamination and rehabilitation, economic aspects of water distribution and storage. Special emphasis will be focused on trans-boundary waters and regional agreements.

Venue

Hotel Mediterranee
Via Lungomare 69, 16155 Genoa Pegli, Italy
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The courses will be held in an 18th century building with sea-front accommodation on the picturesque Italian Riviera, just 3 km from C. Colombo Airport and 1 km from the motorway tollgate.

Located in Pegli, near the historical town of Genoa, this former residence of the Lomellini family is sheltered from the winds, enjoying a mild climate in winter and temperate in summer.

The beach is nearby and there is a frequent bus service to the centre of Genoa. There is a nearby port and railway station for making a day trip to the beautiful areas of Portofino and Rapallo.
Lecturers
The lecturers bring with them enormous practical and theoretical experience and knowledge in all aspects of integrated water resources management in arid and semi-arid regions. Practical examples will supplement the theoretical lectures.

Mousa S. Mohsen
Prof. Mousa S. Mohsen is a Professor of Mechanical Engineering and the Dean of Scientific research and Graduate Studies at the Hashemite University. Upon completion of his PhD at Wayne State University, Michigan, USA in 1991, Prof. Mohsen worked as an Assistant and Associate Professor at the Applied Science University in Jordan. He obtained his MS and BS degrees from State University of New York at Buffalo in 1982 and 1983, respectively. His research interests are water treatment and desalination, water strategies and water resources management, environment, decision making, energy systems, and renewable energy. In his research, Prof. Mohsen focuses on both theoretical aspects and practical issues of the problems and he is interested in participating in interdisciplinary projects.

Prof. Mohsen is coordinating many funded international research projects. His published work exceeds fifty journal papers, and he was an invited speaker at different international conferences and workshops. Prof. Mohsen was involved in curriculum development for a number of undergraduate and graduate programs.

Gideon Oron
Upon completing his graduate studies he spent a post doctoral period at Colorado State University, Fort Collins, CO. After this training period he joined the Technion, Haifa, as researcher in the field of waste reclamation. Later he joined Ben Gurion University of the Negev, Beersheva, to do research and teaching in the general areas of low quality reclamation and reuse, management of water resources and environmental systems. During this time he spent extended periods as a Visiting Professor at AIT, Bangkok, Fresno State University, CA, UCLA, Los Angeles, CA and Yale University, New Haven, CT. Currently, he participates in national and international research projects dealing with low quality waters reclamation, primarily for agriculture use.

Shimon Tal
After getting his master degree in water systems engineering, he joined Mekorot, Israel's national water supply company. He began as a regional engineer and later reached the position of chief engineer of the company involving him in most water system development in Israel. Later he was nominated as the water commissioner of the State of Israel. This high level position involved him in most water development in the region, including peace treaties with neighboring countries. This activity requires a broad view of water and environmental considerations along with basic understanding in engineering and economic. During his service he led significant reforms in the water sector in Israel. In 2006 he became a private consultant and has been elected president of the Israeli Water Association – IsWA.
### Day 1  Basics of Water Resources and Water Use

**08:30** Opening and Introduction
- Characteristics of natural water resources in arid and semi-arid regions
- Water scarcity as a global problem
- Global climate changes and its effects on natural water resources

**09:30** Coffee break

**09:45** IWRM – Integrated Water Resources Management – Technical Approach

**10:45** Management of natural water resources
- Renewable water potential
- The importance of meteorological, hydrological, geological and quality information
- Hydrological models and forecasting
- The integration of natural water resources in national water supply systems
- Sustainable use of natural water resources in arid and semi-arid regions

**11:45** Coffee break

**12:00** Flood management in arid regions
- Drought and floods phenomena; forecasting; reliability and assessment
- Floods: in open and urban areas
- Integration of flood water into the water sector activities

**13:00** Lunch

**15:00** Resources and end users
- The population-water resources equation
- Water Stress, strain and water modulus
- Basic water demands, domestic, municipal, industrial
- Water role in serving national interests – agriculture, nature, peace agreements, others
- Strategic importance of agriculture and its role in the national water demand picture
- Competition between water consumers on water resources
- The role of “shadow water” (partly virtual water) in the balancing of the

**17:00** Summary and discussion

### Day 2  Extra Waters, Irrigation

**08:30** Production of new waters
- Production of new water – world picture
- Seawater desalination – technologies, costs, environmental problems and related considerations

**09:30** Coffee break
- Brackish water desalination – brine disposal alternatives
- Desalinated water quality issues – mixing with other water resources, linkage with different end users

**10:45** Coffee break

**11:00** Production of new waters – contd
- Wastewater – treatment technologies
- Reuse of treated wastewater (e.g. agriculture, irrigation of parks, industry, municipal use, drinking)
- Special issues in wastewater reuse

**13:00** Lunch
15:00  Irrigation and efficient use in agriculture
       Irrigation methods
       Drip irrigation: on surface and subsurface drip irrigation
       Reuse criteria of low quality treated waters
       Green water use
       Crops selection
       Irrigation regimes
       Assessment of water requirements

17:00  Summary and discussion

Day 3  Efficient water use, quality considerations

08.30  Efficient use and reclamation of waters in the industrial and municipal sectors
       Planning water conservation program
       Residential and domestic water use
       Industrial, commercial and institutional water use

10:00  Coffee break

10:15  Potable water quality considerations
       Drinking water quality criteria
       Water safety and control
       Monitoring
       Emergency situation handling

13:00  Lunch

15:00  Water resources quality control
       Water resources pollution and prevention means
       Legislations and enforcements
       Treatment of polluted water resources – methods and examples

17:00  Summary and discussion

Day 4  Contamination, Regulation, Trans boundary waters

08:30  Modeling in IWRM –

10:00  Coffee break

10:15  Structure of national water sectors
       National structure of water sector – case study Jordan
       National structure of water sector – case study Israel

13:00  Lunch

15:00  Economic tools and water pricing
       Water costs
       Water policy for charge

16:00  Trans boundary water
       Trans boundary water sources
       International water laws
       Trans boundary waters-disputes and resolution
       Conjunctive use of Trans boundary water and agreements between countries (e.g. Jordan-Israel-MM; Palestinian Authority - Israel)

17:00  Summary and discussion
       Open discussion related to water management issues in different countries

18:00  Final ceremony and adjourn