

Water and Environment Centre - Postgraduate Studies (Diploma/Master program)

In brief

The postgraduate studies and training unit at the Water and Environment Centre was established in 1999 to coordinate the development and implementation of teaching and training at the WEC. The unit within the centre is now running an Integrated Water Resources Management (IWRM) MSc and Diploma programme which includes the supervision of MSc thesis research and Diploma research. In addition, the unit coordinates communication between the WEC and the Higher Education and Science Research studies Rector of Sana'a University. In this document we focus on the IWRM programme, for further information on the training and courses given at WEC please read the WEC training and courses guide.

In 2004, the Water and Environment Centre postgraduate studies and training unit started the development of an MSc programme on IWRM in collaboration with Wageningen University and the Technical University in Delft, the Netherlands. The curriculum has been developed, improved, adjusted and evaluated by lecturers, advisors and IWRM students. The entire curriculum was assessed and reviewed in 2013 to incorporate several cross-cutting topics, such as climate change and gender. This document provides interested people in this program with the overall curriculum objectives, course objectives and expected competencies to be acquired by students upon successful graduation from the programme. Moreover, we have included a description of the Water and Environment Centre, which provides the boundary conditions for this excellent curriculum. Although we present the curriculum description as a finished product, an educational programme on a topic of water management is never finished. New activities, thoughts and insights are continuously incorporated in the programme. WEC will continue this process of innovation with the help of the Yemeni water sector, the international community, and above all, the graduates from the programme.

Through the IWRM MSc programme, WEC wants to contribute to practical solutions to water security issues. It wants to accelerate and broaden the flow of workable ideas and solid knowledge in water management in Yemen. As such, it wants to make the work of the University relevant to one of the major challenges in the country and beyond. WEC thus provides a linkage based on IWRM principles between academic knowledge and skills at Sana'a University and the agencies responsible for water development and management in Yemen.

Students entering the programme are highly motivated, have a BSc-degree from a range of technical and non-technical disciplines, many of whom have considerable work experience in the water sector. When graduated from the IWRM study curriculum, students should have developed competencies which are in line with those required and sought for in their professions.

The program prepares students to develop and contribute to practical solutions for more water security and environmental challenges in Yemen; a 'new way of thinking'. Graduates find employment opportunities in research, consultancy and government agencies, and therefore need that solid interdisciplinary knowledge on water and environment. At the same time, the 'MSc' label requires an academic approach to problems, allowing students with skills and motivation to continue for PhD research.

Diploma & MSc Courses Descriptions

The WEC MSc programme on IWRM is a fulltime 4 semester programme. Students are expected to work 30 hours per week, partly in self-study.

In the first semester, students will develop a basic knowledge through the introductory courses on the integrated water management which include Water issues in Yemen and the Arab Region, and Hydrogeology and Water Resources in Yemen, Urban water management, Water use in agriculture, Water Governance and Basic skills.

In the second semester students develop skills to integrate these different disciplines. The courses in which this is done are Environmental Impact Assessment; Water Chain Management; Integrated Groundwater Management; Integrated Watershed Management, Integrated Coastal Zone Management and Advanced Research Methodologies and Writing. Those courses are more practice-oriented, and knowledge from the first semester will be used.

In the third semester students will work in groups on the diploma project, in which students work on real-time cases from the Water and Environment sector. In these projects students are challenged to collectively devise solutions and advices similar to what would be expected in a job in the (private) sector. The student receives a diploma after successful completion of the three semesters. If eligible the student could proceed for an MSc degree in the fourth semester.

In the fourth semester, students work on an individual thesis research, which reflects the academic status of the programme.

First Semester (Introductory Courses)	1.1 Integrated Water Management	1.1.1. Introduction to IWRM 1.1.2. Water Issues in Yemen and the Arab Region 1.1.3. Hydrogeology and Water Resources in Yemen
	1.2 Urban Water Management	1.2.1. Water Use in Urban and Rural Areas 1.2.2. Sanitation and Wastewater Treatment 1.2.3. IWRM Case Study
	1.3 Water Use in Agriculture	1.3.1. Water Use in Agriculture 1.3.2. Water and Environment
	1.4 Water Governance	1.4.1. Water Rights and Policies 1.4.2. Gender and Water 1.4.3. Water Value and Economics
	1.5 Basic Skills	1.5.1. Report Writing 1.5.2. Basic Computer Skills and Research Methodology 1.5.3. GIS/RS

Second Semester (Comprehensive Integrating courses)	2.1 Integrated Watershed Management (compulsory)	2.1.1. Introduction 2.1.2. Hydrology and Water Balance of a Watershed 2.1.3. Spate Irrigation within the Context of IWSM 2.1.4. Management Options and Tools to Solve IWSM Issues 2.1.5. Group Work Project
	2.2 Integrated Water Chain Management (optional)	2.2.1. Introductory: Explanations of the Water Chain concept 2.2.2. Review of conceptualisations of UWM from the past up to present 2.2.3. Urban Water Management in Yemen region 2.2.4. Possible integrated urban water management (IUWM) options in newly build areas
	2.3 Integrated Groundwater Management (optional)	2.3.1. Introduction to IGWM 2.3.2. Technical Aspects on Groundwater Management 2.3.3. The Role of the Government in IGWM 2.3.4. IGWM Aspects 2.3.5. Sana's Basin Case Study
	2.4 Integrated Coastal Zone Management (optional)	2.4.1. General Introduction 2.4.2. User Functions and Processes in Coastal Zones of Yemen 2.4.3. The Need for an Integrated Approach in Coastal Zone 2.4.4. Sustainable Development of Coastal Zones in Yemen
	2.5 Environmental Impact Assessment (compulsory)	2.5.1. Environmental Impact Assessment 2.5.2. The EIA Process 2.5.3. The Context of Environmental Analysis 2.5.4. EIA Project Evaluation and Decision Making 2.5.5. Post Project EIA Activities 2.5.6. World Bank Project Classification 2.5.7. Preparation of EIA Terms of References
	2.6. Advanced Research Methodologies and Writing (compulsory)	2.6.1. GIS/RS 2.6.2. Some Qualitative Analysis 2.6.3. Proposal writing, writing thesis and scientific papers
Third Semester (Diploma Project)	3.1 Diploma Project	<p>// Students will work in groups on real-time problems in the management of water and the environment. They will apply the knowledge obtained in the previous semesters to formulate and present a comprehensive integrated solution and advice to a sector problem.</p> <p>After successfully completing the third semester, successful students will receive a postgraduate diploma.</p>
Fourth Semester	4.1 MSc Thesis	<p>// For students wanting to complete their studies with an MSc degree, a 6 months thesis research can carried out at WEC. Required is an approval from the WEC based on the students' performance in the courses and the diploma project.</p>

** Students are required to choose at least one optional course during the second semester.

Contact information

Interested and would you want to know more about the IWRM postgraduate course or the research and outreach activities of the Water and Environment Centre? Visit our centre, our website or contact us through email or phone.

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Annex: ??? List of MSc. Rsearches (1999 -2014) and pilot researches?

Research Topic
Crop Water Productivity from the Field Level to the National Scale within the IWRM Framework, Case study: Qa'a Jahran
Analysing the Potential of Roof Rainwater Harvesting System for Water Supply in Manaka Town and Surrounding Area
Assessment of the October 24 th 2008 Flood in Wadi Doan, Hadramout Towards Realization of IWRM
Assessing Ground Water Recharge Potential in Wadi Zabid and its Impact on Supplementary Irrigation of Crops in Spate Irrigation Areas
Assessment of Sources of Elevated Nitrate in Groundwater in Wadi Siham within IWRM Perspective
Assessment of Water Resources Situation of Ghayl Bawazir Area in Hadramout Governorate from IWRM Perspective with Special Emphasis on Indigenous Traditional Practices
Evaluation of the Benefits of Hammam Ali's Thermal Springs and their Sustainability from IWRM Perspectives
The Health and Socioeconomic Impacts of Silver Impregnated Ceramic Filters in Four Villages in Amran Governorate
Water User's Associations Evolution & Strengthening in Spate Areas within IWRM Approach, Case Study : Wadi Zabid – Tihama Plain
Assessing Climate Change Trend and its Effects on Field Crop Water Requirements and Productivities, Dhamar as a Case Study
Assessment of Introducing Water Saving Irrigation Technologies for Sustaining and Enhancing Crop Production in Jahran Area
Exploitation of Rainfall and Treated Wastewater as Alternatives for Groundwater Use in Sana's Basin
Evaluating the potential of Road Rainwater Harvesting in Yemen, A case study of the Maghrabah Manakah Bab Bahil Road, Sana'a Governorate
The Impact of Al-Azraqain Landfill on the Vicinity Groundwater Quality within IWRM Perspective
Integrated Disposal Water Management in Oil Production, Case Study: Block 14 Al-Masila
Assessment of Seawater Desalination as an Option for Augmenting Municipal Water Supply Ta'iz City and Integrating It into the Water Cycle
Assessment of Water Demand Management in Wadi Hadhramaut Using IWRM Perspective, Case Study: Tarim Area
Implementing Integrated Water Resources Management in Water Projects in Rural Areas in Al-Mahweet Governorate, Case Study: Yelaan, Sawaan, and Al-Dahabisha Villages
Integrated Water Quality Management and its Impact on the Population of Mawyah
Wastewater Reuse in Irrigation through Applying the IWRM Concept, Effluent of Sana'a Treatment Plant as a Case Study
The Impact of Sana'a Waste Water Treatment Plant on the Drinking Water Quality in Bani Al-Harith District /Sana'a City
Water Demand Management in Sana'a through applying the IWRM Concepts, Impact and Constraints of Grey Water Reuse in Agriculture at Sana'a City
Integrated Watershed Management for a Small Catchment within Sana'a Basin