

## COURSE SCHEDULE

### Day 1

- Conceptual models for groundwater exploration
- Remote sensing applications for groundwater management
  - ✦ Interpretation of remote sensing data; e-imagery, spectral signature, scattering, absorption, refraction, reflection, radiance
  - ✦ Extraction of lithologic, structural & topographic information
  - ✦ Applications in groundwater assessment and exploration
- Geochemical and isotopic analysis for estimation of groundwater origin and evolution
- Construction of a SWAT model; applications for Eastern Desert
- Construction of a Web-based GIS

### Day 2

- Well hydraulics;
  - ✦ Single-well operation for different aquifer conditions; unconfined, artesian & leak aquifers, full/partial penetration
  - ✦ Sensitivity analysis for different aquifer parameters. Cairo University MATLAB-based program
- Groundwater Modeling using GMS;
  - ✦ Conceptual model development
  - ✦ Selection of boundary conditions
  - ✦ Steady state and transient analysis
- Contaminant transport modeling;
  - ✦ Advection, Dispersion, Diffusion, Sorption, Decay
  - ✦ Sources and sinks
  - ✦ MODPATH v2 MT3DMS
  - ✦ Scenarios and remedial solutions

### Day 3

- Field measurement of aquifer parameters and pumping test
- Geophysical explorations using VES
- Desalination processes for tourist resorts water demand
- Environmental management for brine disposal
- Waste water recycling schemes
- Case studies from the Nubian Sandstone Aquifer

Centre for  
Environment and  
Development for the  
Arab Region and  
Europe



Global Water  
Partnership-MED  
(GWP-MED)



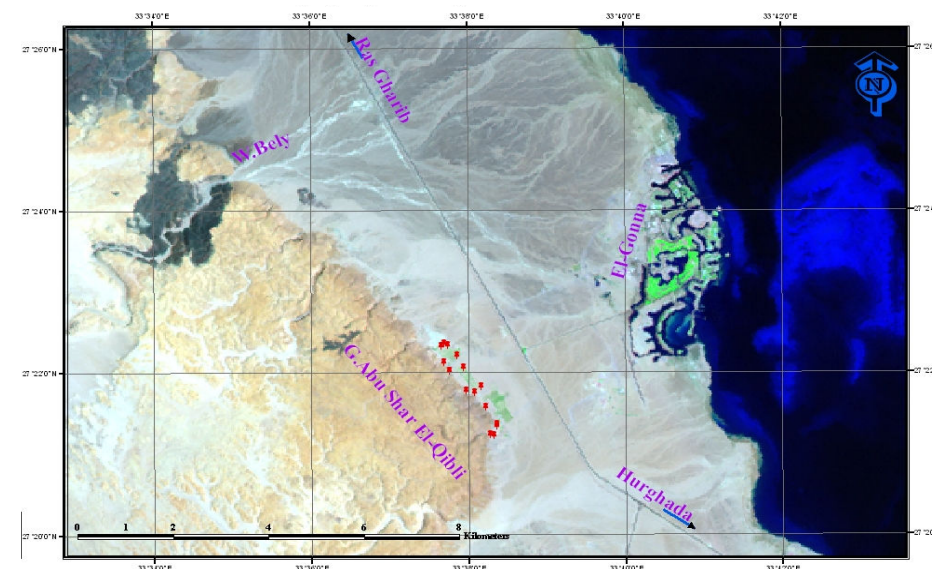
United Nations  
Development Program



The Eastern  
Desert Project



## Integrated GroundWater Resources Management (IGWRM)



## "Groundwater Assessment and Development" (Hands-on-Training)

Hurghada, Egypt (December, 13<sup>th</sup> – 15<sup>th</sup>, 2006)

**REGISTRATION FORM**  
**"Groundwater Assessment and**  
**Development"**  
**(Hands-on-Training)**

Hurghada - Egypt  
(13<sup>th</sup> – 15<sup>nd</sup> December 2006)

**Name:** .....

**Occupation:** .....

**Organization:** .....

**Field of Experience:** .....

**Address:** .....

**Country:** .....

**No:** .....

**Fax No:** .....

**Email:** .....

**Date:** .....

**Signature:** .....

**Mode of Payment:**

☐ Cash ☐ Draft cheque ☐ Transfer

مبنى سيدارى، ٢ شارع الحجاز،  
مصر الجديدة، القاهرة، مصر  
تليفون: ٦٦١ # ٢/٣/٤ ٤٥١-٣٩٢١ (٢٠٢)  
فاكس: ٤٥١-٣٩١٨ (٢٠٢)

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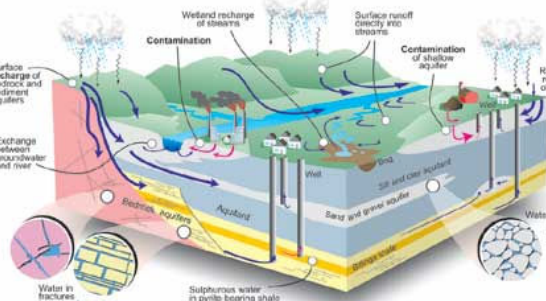
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**Information on Hurghada**

Nestled between sienna mountains and azure waters, the resorts in Hurghada, the venue of the seminar, has grown to become one of the Red Sea's most sought after destinations. With spring-like temperatures of 22-24°C in the heart of the month of December, you are guaranteed to have the sun shining all day long.



**"Groundwater Assessment and Development"**  
**(Hands-on-Training)**

**Background**

During the past 50 years groundwater depletion has spread from isolated pockets to large areas in many countries throughout the world that face numerous challenges pertaining to water resources availability, quality, and management. Groundwater (renewable and non renewable) provide an avenue for resolving part of the problem, but only if managed properly. Wady systems prevailing throughout most of the countries which possess potentials for groundwater exploration, even in shallow aquifers. Appropriate assessment of this potential seems inevitable. Moreover, field data collection in vast uninhabited desert areas needs to be augmented by novel methodologies for remote sensing. A unified methodology for evaluating the extent, source, age, potential utilization, and extraction economies for groundwater will be a major component of the training. The UNDP/GEF-funded Eastern Desert Project, which is executed by Cairo University and the National Water Research Center is a case study that, represents an attempt for tackling the previous challenges.

**Training Description**

This 3-days training is designed to provide water professionals with hands-on experience in applying state of the art techniques for groundwater exploration and development. The training addresses procedures that can be used to accurately estimate the available groundwater water resources, its distribution, quantity, and development potential. These are tested for the Eastern Desert of Egypt and are potentially applicable for other countries. The training is designed to provide a blend of analytical, technological and field groundwater management tools. Furthermore, actual case studies are presented. Instructors are affiliated with Cairo University, Western Michigan University and CEDARE.

**General Information**

Date: December, 13<sup>th</sup> – 15<sup>th</sup>, 2006  
Venue: Hurghada, Egypt  
Organizers: CEDARE, GWP-MED, EDP, UNDP  
Language: English / Arabic

**Training Fees**

Training fees including air flight tickets Cairo-Hurghada-Cairo, ground transportation between airport and hotel in Hurghada, full board accommodation at Hurghada, course materials, beverage breaks, and field trip are estimated at USD 900. Registration fees may be paid cash or by draft cheque or transferred to Commercial International Bank (CIB), Giza Branch, 21/23 Nile Tower, Giza. Bank Account number 01-90-33553-9.