

# background

Many Arab countries are facing major environmental challenges. Water scarcity and pollution in conjunction with loss, degradation and contamination of land resources have become core problems affecting public health and the socio-economic development. Increasing poverty in the rural areas has led to large-scale migrations to the cities.



waste dumping along rivers

dying fruit trees in the Ghouta plain

Industrial pollution, inadequate waste management, misuse of agrochemicals and over-exploitation of groundwater are some of the lead causes threatening the fragile ecosystems. Uncontrolled urbanization and inappropriate rural development have reached new dimensions in view of the rapid population growth.



waste dump

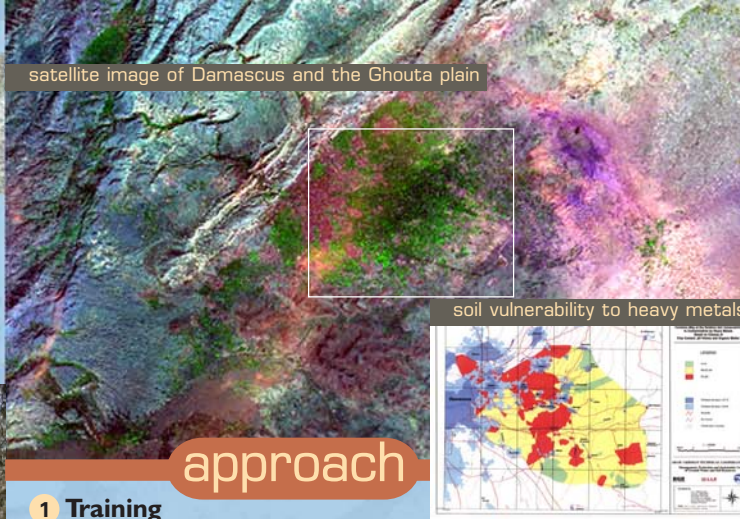
irrigation with contaminated water

well in the Ghouta plain

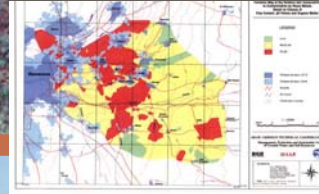
Water and soil represent exhaustible and vulnerable resources. Thus, a sustainable development of the region requires the formulation and dissemination of adequate guidelines for their management and protection.

Awareness-raising is a prerequisite for the successful implementation of regulations on both the government and population levels.

satellite image of Damascus and the Ghouta plain



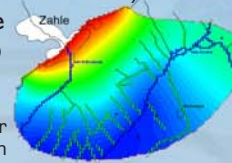
soil vulnerability to heavy metals



# approach

## 1 Training

Training on-the-job and in courses (locally and abroad) and provision of modern equipment enhance the qualification of specialists from ACSAD and participating Institutions.



building the groundwater model of the Zahle area in the Beka'a valley

## 2 Pilot areas

Studies in pilot areas consolidate the acquired knowledge and provide valuable information for concerned authorities:

- current status of soil and groundwater quality and quantity
- sources of contamination
- vulnerability mapping
- groundwater and transport modelling
- groundwater and soil information systems/GIS
- pathway-related risk assessment

Three representative highly cultivated areas were selected:

- **Damascus Ghouta Plain** - Syria
- **Beka'a Valley** - Lebanon
- **Ras El-Jebel Plain** - Tunisia

soil loss to urbanization

hazards

- groundwater depletion
- indiscriminate use of biocides
- uncontrolled waste dumping

- soil degradation
- saltwater intrusion
- heavy metals
- water shortages
- poor quality water
- over-use of fertilizers

# objectives

- **to strengthen** ACSAD's role as competent adviser for national institutions of the Arab region in groundwater and soil-related issues.
- **to develop** appropriate methodological tools and guidelines for the management, protection and sustainable use of groundwater and soil resources.
- **to disseminate** the technical know-how and raise awareness among specialists, decision makers and communities.

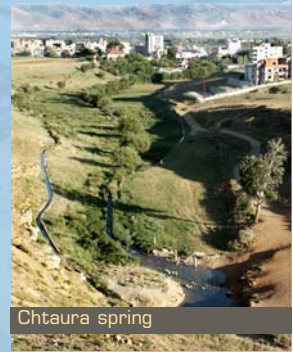
## 3 Guidelines

Adequate guidelines are developed for the assessment, monitoring and protection of groundwater and soil resources under conditions encountered in the Arab region. They are based on results from the pilot areas, experience of local experts and proven international standards and methodologies.



For the pilot areas recommendations for preventive and corrective measures will be developed, i.e.

- groundwater monitoring networks
- delineation of groundwater protection areas
- use of treated water for irrigation
- appropriate use of fertilizers
- control of saltwater intrusion



Chtaura spring

## 4 Dissemination

- **Regional workshops** in countries of the Arab League contribute to the dissemination of project outputs, methodologies and guidelines.
- **Local information days** promote the awareness of communities for the risks of contamination and overexploitation of natural resources.

panoramic view along Berdauni river in the Beka'a



# the project

Management, Protection and Sustainable Use of Groundwater and Soil Resources

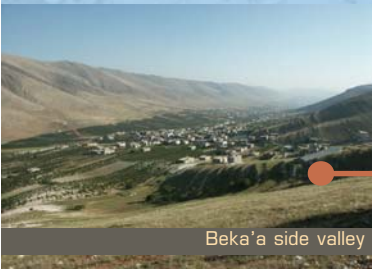
**\*phase I:** 1997-2000 **\*phase II:** 2001-2003

**\*funding:** German Federal Ministry of Economic Cooperation and Development (BMZ)

**\*implementation:**

ACSAD - Damascus/Syria

BGR - Hannover/Germany



Beka'a side valley

## national partners

### Syria:

- Ministry of Irrigation
- Ministry of Agriculture and Agrarian Reform
- Drinking Water Supply and Sewerage Authority - Damascus

### Tunisia:

- Ministry of Agriculture - General Directorate of Water Resources

### Lebanon:

- National Council for Scientific Research - National Center for Remote Sensing (special partner)
- Ministry of Water and Energy
- Ministry of Agriculture

*“Progress towards a sustainable use of water and soil resources will be achieved only if the local population – the target group and beneficiaries – can be convinced of the necessary measures.”*

The project takes initial steps in this direction.



Three generations of field workers in the Beka'a



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ACSAD is an autonomous body under the auspices of the Arab League, promoting the enhancement and transfer of know-how related to agricultural and socio-economic development. BGR has been a worldwide partner of German Technical Cooperation in the field of water and soil resources for decades.



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## Management, Protection and Sustainable Use of Groundwater and Soil Resources in the Arab Region

arab – german  
technical  
cooperation

