

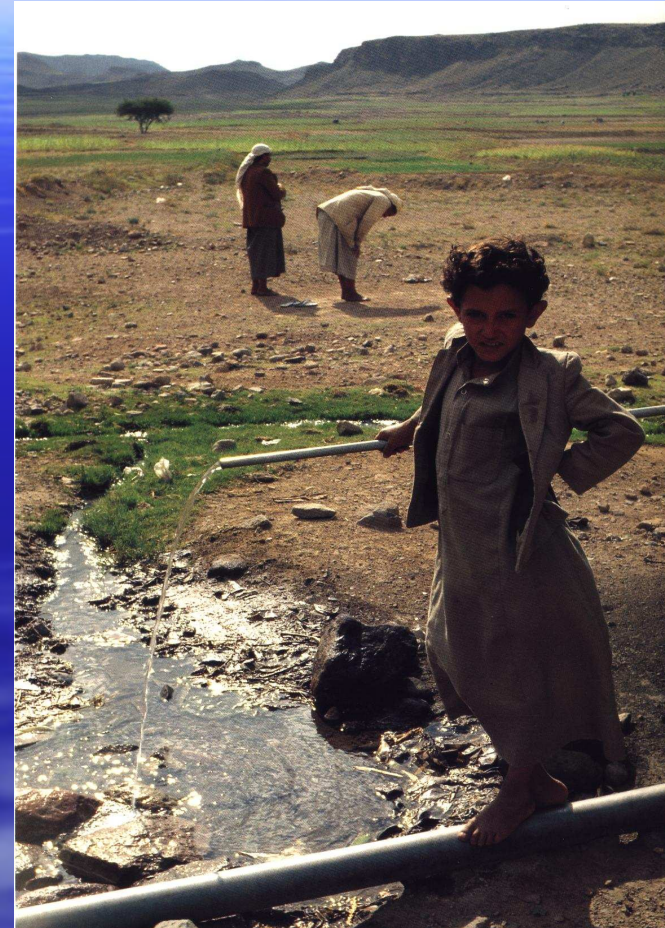


# Capacity Building and the Role of WEC in the Water Sector

*By*  
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  - The Structure of WS (Market)
  - CB Needs
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  - New Projects:
    - Mission and vision
    - Diagnosis and strategies



# Background



## Mission and Vision of WEC

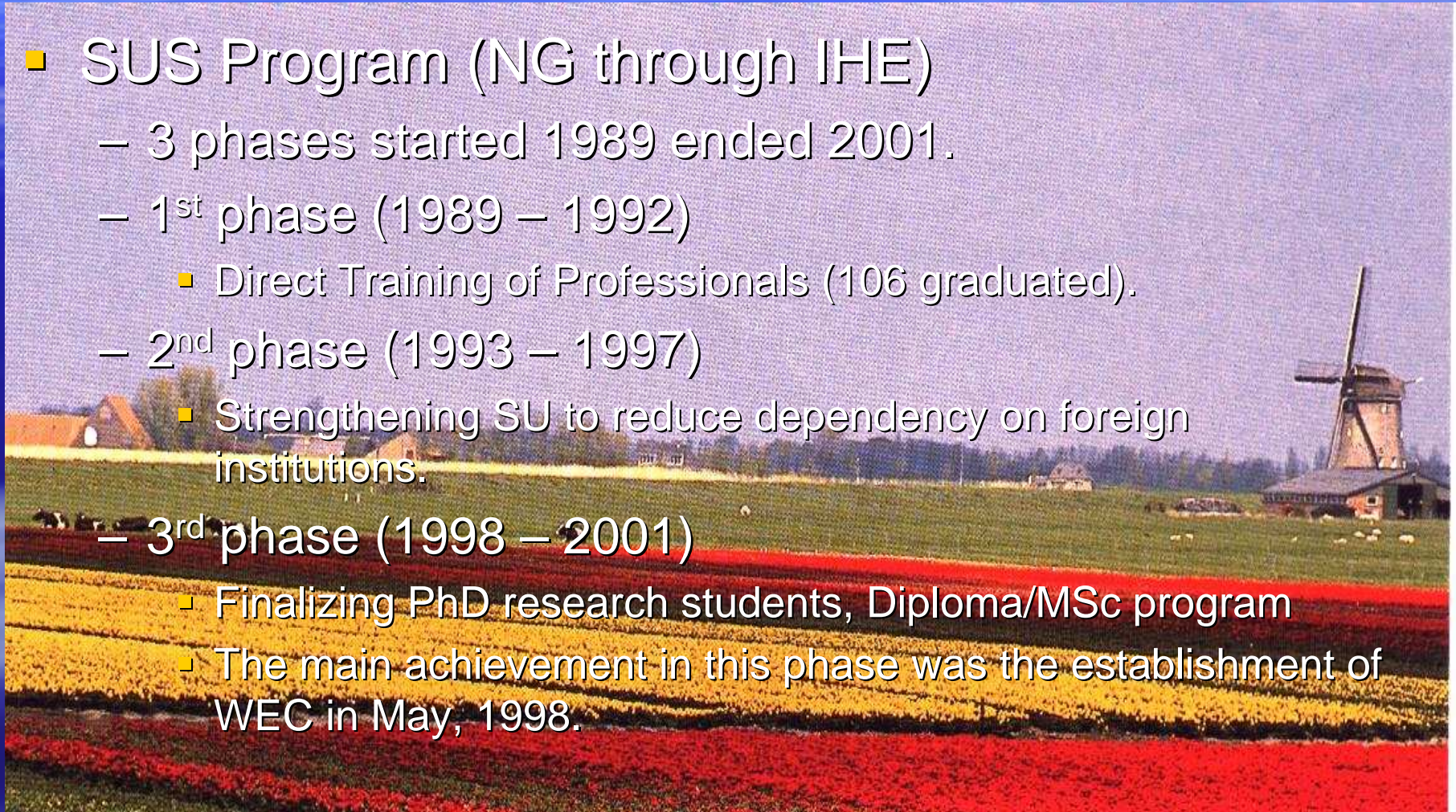
- **According to the Founding document:**
- **Mission:** to enhance Sana'a University's contribution to the national efforts in developing and protecting water resources and sustaining the environment.
- **The objectives of the Centre are:**
  - *To create a challenging, rewarding and sustainable academic environment for university staff active in the field of water and/or environment, in order to enhance their productivity in this professional field.*
  - *To conduct research related to the development and management of water resources and the protection of the environment within the Yemeni context.*
  - *Transfer of knowledge related to water and the environment.*





# CB within SU in W&E

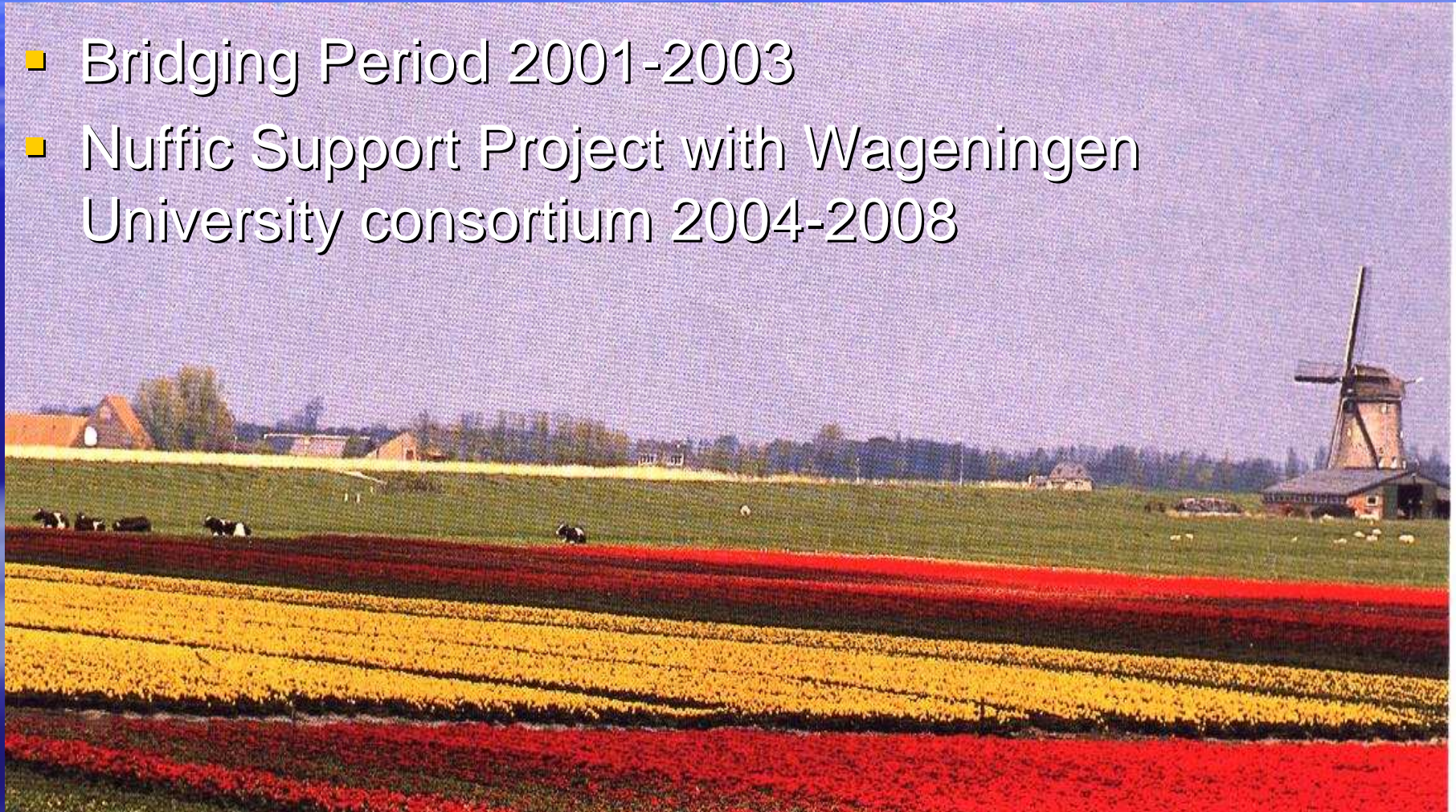
- SUS Program (NG through IHE)
  - 3 phases started 1989 ended 2001.
  - 1<sup>st</sup> phase (1989 – 1992)
    - Direct Training of Professionals (106 graduated).
  - 2<sup>nd</sup> phase (1993 – 1997)
    - Strengthening SU to reduce dependency on foreign institutions.
  - 3<sup>rd</sup> phase (1998 – 2001)
    - Finalizing PhD research students, Diploma/MSc program
    - The main achievement in this phase was the establishment of WEC in May, 1998.





# CB within SU in W&E

- Bridging Period 2001-2003
- Nuffic Support Project with Wageningen University consortium 2004-2008





# Why WEC ?

- Water and Environment are critical issues in Yemen.
- GW management in arid regions poses challenges.
- Significant demand/hydrological imbalance.
- Weak infrastructure.
- Need of the Application of IWRM.



# The Structure of WS (Market)



- Government Institutions
  - WS consists of 3 main sub-sectors under the ministry of Water and Environment:
    - WRS (NWRA)
    - NWSA
    - GARAW
  - IS (MAI)
  - Donors
    - NG
    - WB
    - UNDP
    - GTZ
    - FAO
  - Private Sector



# The Structure of WS (Market)



- Market Size
  - Major Client (NWRA)
    - NWRA manpower required by 2003 = 300
    - 40% skilled
    - 60% have no specific skills
    - Need for training
  - Other clients
    - NWSA, GARAW, GDI
    - Manpower around 1800





# Capacity Building Needs



A recent Survey across the WS has show the importance of IWRM Approach

*Table 1*

*Summary of the main issues related to IWRM as rated by decision makers across the Water Sector in Yemen (Source: Al-Mooji, 2002).*

<b>Issue no.</b>	<b>Description</b>	<b>Relevance</b>	<b>Training needs</b>
1	Concept of IWRM	5.0	5.0
2	Water Sector Assessment	4.6	4.4
3	Water Policy and Strategies	4.4	4.2
4	Water Legalization & Standards	4.6	4.3
5	Water Sector Institutional Framework	4.5	4.0
6	Participatory Planning & Management	4.2	4.0
7	Water Allocation & Conflict Resolution	4.5	4.3
8	Function & Values of Water Resources	3.9	3.7
9	Tran-boundary Issues	1.9	1.8
10	Water-Land Ecosystem Processes	4.3	4.3



**TRAINING NEED ASSESSMENT IN IWRM  
ANALYSIS OF QUESTIONNAIRE RESPONSES  
FOR  
YEMEN REPUBLIC**

Water & Environment Centre (WEC)

# Training Needs Ass.

- TNAS: ■
- designed questionnaires, ■
- sent to professors, researchers, decision makers, senior ■
- water specialists, general managers, directors, and ■
- engineers at Universities; water research institutes, ■
- water agencies within the Ministry of Water and ■
- Environment (MWE), Ministry of Agriculture and ■
- Irrigation (MAI)
- Personal interviews were carried out. ■



**Table 1: The number of points for the selected training subjects by respondents.**

<b>Subject No.</b>	<b>Subjects Name</b>	<b>No. of Points</b>	
<b>1</b>	<b>Concepts of IWRM</b>	<b>44</b>	
<b>2</b>	<b>Enabling Environment and Institutional Roles</b>	<b>32</b>	
<b>3</b>	<b>Legislative and Organizational Frameworks</b>	<b>21</b>	
<b>4</b>	<b>Economic Dimensions of IWRM</b>	<b>15</b>	
<b>5</b>	<b>Stakeholder Participation</b>	<b>15</b>	
<b>6</b>	<b>Water Supply, Sanitation and Health in IWRM</b>	<b>13</b>	
<b>7</b>	<b>Environment and IWRM</b>	<b>22</b>	
<b>8</b>	<b>Balancing Water Supply and Demand</b>	<b>17</b>	
<b>9</b>	<b>Water Demands: Modeling and Management</b>	<b>16</b>	
<b>10</b>	<b>Cost and Pricing of Water</b>	<b>9</b>	
<b>11</b>	<b>Public Private Partnerships in Water Management</b>	<b>9</b>	
<b>12</b>	<b>Groundwater and IWRM</b>	<b>37</b>	
<b>13</b>	<b>IWRM and Agriculture</b>	<b>15</b>	
<b>14</b>	<b>Management of Shared Water Resources</b>	<b>18</b>	
<b>15</b>	<b>Poverty Reduction and IWRM</b>	<b>7</b>	
<b>16</b>	<b>Others:</b>	<b>10</b>	

# The Results

***Concepts of IWRM (subject 1)*** (scored the highest selection (44 points or 44% of the total score for subjects) among all training subjects of IWRM)

***Groundwater and IWRM (subject 12)*** (second selection score of 32 points or 32% the total score for subjects, were given equally for two subjects namely).

***Poverty Reduction and IWRM (subject 15)***, (was the lowest selection (7% of the total score for subjects).



# Capacity Building Needs

- Need for strong links with both local and regional CB institutions / knowledge centers for water sciences & IWRM.
- NWRA has established good working relationship with WEC





# Critical Issues

Table 3

*Critical issues and potential solutions to groundwater depletion problem in Yemen (modified after WB, 1996; Al-Mooji, 1996 and 2002b)*

<i>Critical issues</i>	<i>Sources</i>	<i>Long term agenda</i>
Rapid depletion of major regional aquifers.	<ul style="list-style-type: none"> <li>• Inadequate knowledge on the available resources.</li> <li>• Rapid uncontrollable growth in population.</li> <li>• Expansion of a subsidized agricultural sector.</li> <li>• Introduction of modern drilling and pumping technologies with no control of their application in groundwater abstraction.</li> </ul>	<ul style="list-style-type: none"> <li>• Capacity building.</li> <li>• Policy and strategy.</li> <li>• Water laws and legislations.</li> <li>• Research and development for <i>Long-term Perspectives Study</i>.</li> </ul>
Deterioration of groundwater quality	<ul style="list-style-type: none"> <li>• Upconing of saline waters</li> <li>• Poor irrigation practice</li> <li>• Inadequate drainage for surface discharge</li> <li>• Growth of polluting industries in major urban centres.</li> </ul>	
Inefficient use	<ul style="list-style-type: none"> <li>• Growing imbalance of water supply and demand.</li> <li>• Absence of legal means to enforce water rights and settle disputes.</li> <li>• Failures of planning and forecasting.</li> </ul>	
Increasing costs of future abstraction.	<ul style="list-style-type: none"> <li>• Exhaustion of easy options in the face of growing demands.</li> <li>• Absence of effective demand management.</li> </ul>	



# Overview of the Establishment Process of the WEC

- 12-1997 UC approves the “Main Principles” document and forms a Steering Committee
- 08-1998 SUS prepares the first draft of the by-laws for the WEC
- 12-1998 SU President appoints the Director of the WEC
- 05-1999 UC approves the by-laws of the WEC
- 06-1999 SUS prepares the first draft Business Plan of the WEC
- 11-1999 First WEC Council Meeting
- 10-2000 “Official opening” of the WEC – CB Seminar, Sana’a
- 01-2001 2 PhDs in Water Sciences Graduated From Netherlands
- 12-2001 SUS Project Ends
- 02-2002 Bridging Period Support from RNE
- 08-2002 Final Draft Proposal Submitted to RNE for Strengthening the WEC within the Scope of Water Sector Capacity Building for the period 2002-2006
- 10-2002 Seminar With German Universities On “ Problems of GW in Arid Lands





# Organizational Set-up

- Center (Director)
- Dept. of Research
- Dept. of Training
- Bodies
  - WEC Council
  - Scientific Advisory Committee
- Like other Centers, WEC has seat in the UC

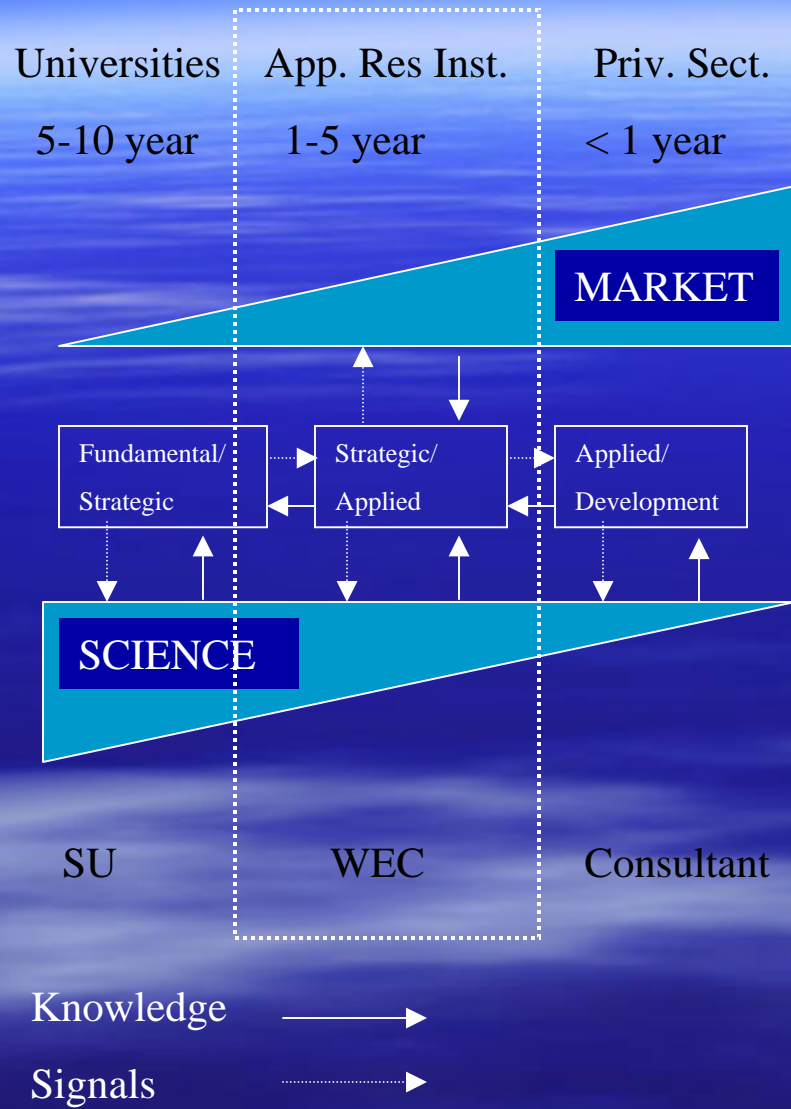


# Projects in the Environment Sector for the next 1-3 years (inventory: June 1999)



Project:	Funding/ Executing agency	Start/Duration of project	Budget
1) Capacity development EPC Phase III	Dutch/ EPC	1997 / 4 years	USD 2,100,000
2) Land and water conservation project	World Bank / FAO, MAI	1995 / 4 years	USD 32,800,000
3) Establishment of Socotra as a National Protected Area	EU, UNDOP, UNICEF, WHO, etc./ UNOPS, Yemen	1997 / 4 years	USD 7,000,000
4) Tibama Environment Protection Project	IFAD / MAI, TDA	1996/ 5 years	USD 11,720,000
5) Support cleaning project in the Governorates	JICA/ MHCUP	1996/ 4 years	USD 6,300,000
6) Development of urban services at Nuqum Centre	JICA/ MHCUP	1996/ 4 years	USD 2,500,000
7) Water supply and sewage rehabilitation in conflict affected areas	UK, JICA, Italy, UNDP, IPF/ MHCUP	1996/ 4 years	USD 5,190,000
8) Protection of eco-tourism	GEF, UNDP/ GTA	? / 3 years	USD 210,500
9) Bio-diversity strategy and action plan			
10) Conservation and sustainable use of bio-diversity of Socotra Archipelago	GEF, UNDP/ EPC	?/ 3 years	USD 4,944,700
11) Environmental information system for natural resources, conservation and use	FAO/ MAI, EPC	1998/? years	USD 347,500
12) Establishment of natural protected area in Jabal Bora	?	?/?	USD 1,000,000
13) Evaluation of desertification and preparation of desertification maps of Yemen	SEMP	?/?	USD 750,000
14) Establishment of land use planning center to promote zoning and land registration	SEMP	?/?	USD 2,000,000
15) Sand dune stabilization Wadi Sibam	IFAD/ TDA	?/?	USD 1,900,000
16) Establishment of wind breaks in the Hadramaut	?	?/?	USD 150,000
17) Rehabilitation Tawilah tanks in Aden	UNESCO	?/?	USD 620,300
18) Coastal fisheries development project; cooperatives on the Gulf of Aden	JICA/ Ministry of Fisheries Wealth	?/ 3 years	USD 3,000,000
19) Coastal fisheries development in the northern region	JICA/ Ministry of Fisheries Wealth	?/ 3 years	USD 5,800,000

# Positioning of the WEC





# What Does WEC Offer ?

- Research (applied)
- Consultancies and studies
- Water and waste water laboratory analysis
- Tailor made training

## Key-words

- Quality
- Independent
- Gate (to International Institutes)





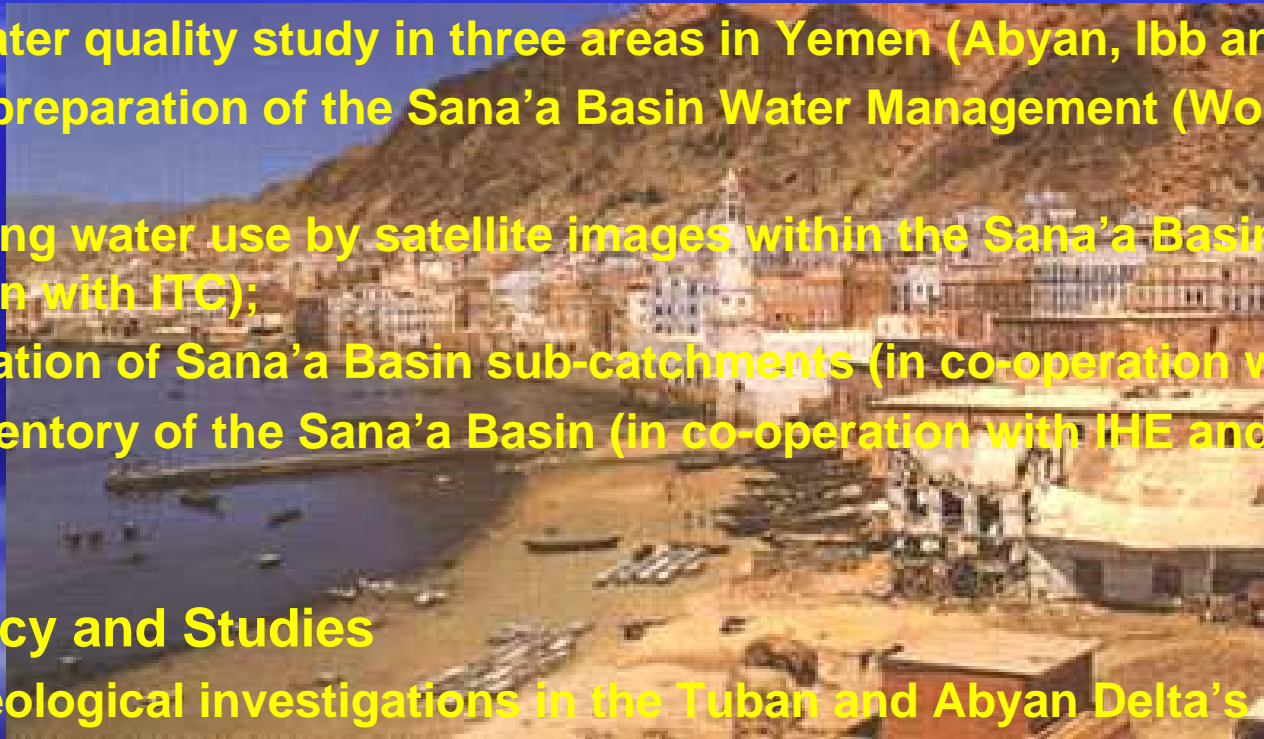
# What Has WEC Really Done ?

## WEC's research activities included :

- Rural water quality study in three areas in Yemen (Abyan, Ibb and Hajjah);
- Project preparation of the Sana'a Basin Water Management (World Bank) Project;
- Monitoring water use by satellite images within the Sana'a Basin (in co-operation with ITC);
- Prioritization of Sana'a Basin sub-catchments (in co-operation with IHE);
- Well-inventory of the Sana'a Basin (in co-operation with IHE and ITC).

## Consultancy and Studies

- Hydrogeological investigations in the Tuban and Abyan Delta's
- Determining Wadi recharge in the Sana'a Basin
- Analysis and evaluation of groundwater for drinking water purposes in a number of rural areas





# What Has WEC Really Done ?

## Analysis Services :

- Chemical Analysis of 70 water samples from Abian and Tuban for KOMEX company;
- Extensive Chemical and Microbiological Analysis of wastewater effluent from Sana'a treatment plant, sponsored by WB;
- Chemical and Biological Analysis of several shallow handdug wells in Sana'a aquifer for WB;
- Chemical and Biological Analysis of several wells in Sana'a, Sa'dah, Amran, Al-Hodiedah Basins for NWRA;
- Analysis for different private companies and contractors.

## Participating in and Organizing Workshops, Seminars and Conferences Addressing Key Issues in the Sector of Water and Environment :

- **Regional:**
  - Bahrain, Lebanon, Jordan, Egypt, United Arab of Emirates, Oman
- **Europe.**



# What Has WEC Really Done ?

## Networking and co-operating with relevant national and international institutions.

### *National :*

- NWRA, NWSA, MAI, TS-WSSS,

### *Regional :*

- UNESCO – IHP Network in Groundwater Protection
- UNESCO – IHP Network Wadi Hydrology.
- The WEC has participated in the IHP-V programme, and is expected to be an active participant of IHP-VI.
- Scientific cooperation with the Water Education and Environment Centres at the Jordan University, Cairo Univeristy, Assuit University and the National Water Institute in Cairo.
- Invitation of guest speakers such as Prof. Dr. Abdin Salih, the former regional hydrologist of UNESCO Cairo (currently in UNESCO Headquarters in Paris).



# What Has WEC Really Done ?

## Training:

- Water resources management: an integrated approach with regional applications
- Technical writing
- Socio-economic aspects of water resources
- Drilling supervision course
- Hydrogeology refresher course
- Groundwater modelling
- Remote Sensing and GIS
- Unaccounted-for water
- Hydrochemistry and the environment





# The Future

- Construction of an office building with the proper research and educational set up.
- Setting up water research laboratories.
- Establishing Network
  - Local
  - Regional
  - International
- Developing an expanded demand-driven post-graduated program (MSc/PhD).
- Visiting lecturers exchange program
- Developing a demand-driven national program.
- Training of trainers.





# Challenges

- The main critical issues with respect to the further development of the WEC are:
  - The Limited Capacity of WEC's Scientific Staff.
  - Not Enough Commitment from the Government and the Donors (Except SU & RNE).
  - MSc Program might face difficulties:
    - WS.
    - SU Faculties and UC.
    - Not enough enrolment to make it sustainable.



A scenic sunset over a lake. The sky transitions from a deep blue at the top to a bright orange and red near the horizon. The water in the lake reflects the colors of the sky. Silhouetted trees are visible along the shoreline, and a large, bare tree stands prominently in the foreground on the right side.

# Mission, Vision, Diagnosis and Main Strategies

## Strengthening WEC

# From Mission to Strategy

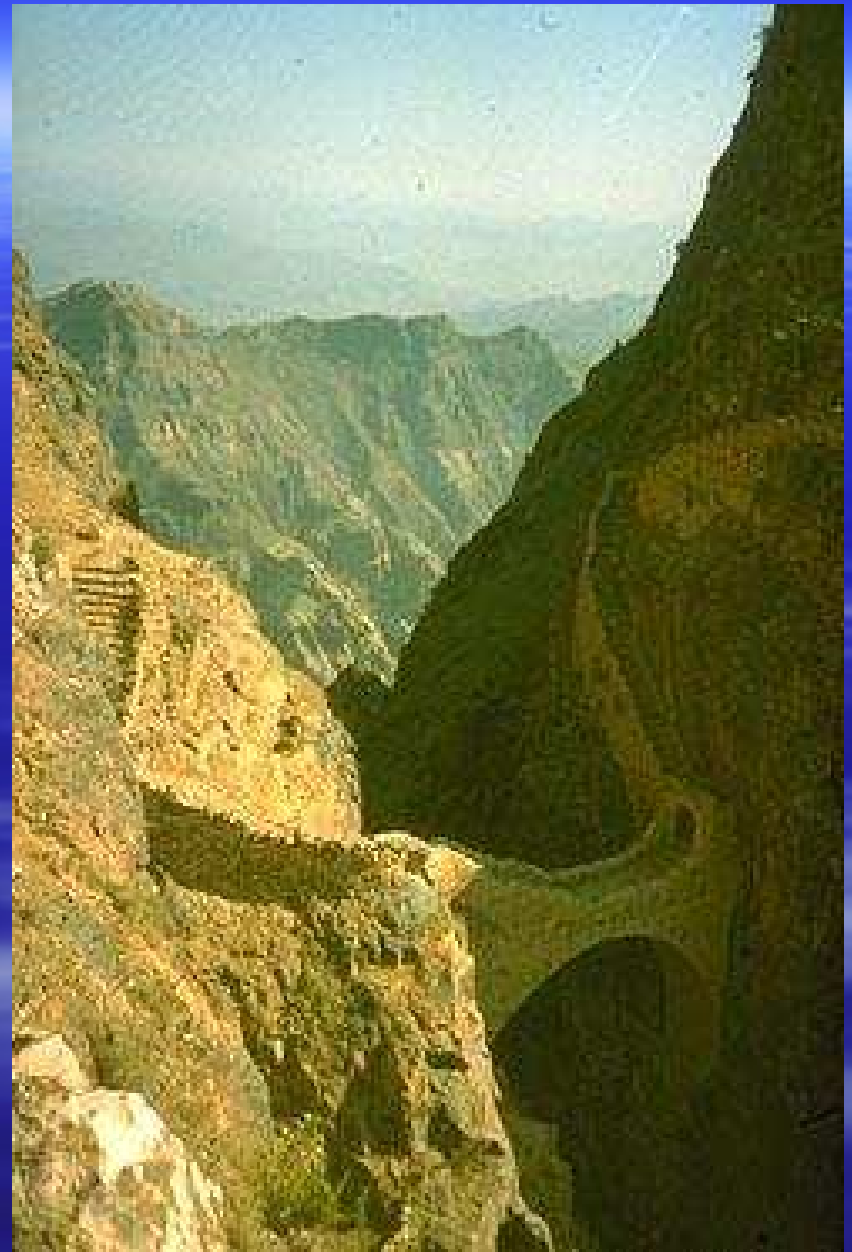


Mission

Vision

Diagnosis

Strategy



# **Mission of WEC**

**WEC contributes to the highly required practical solutions to water security. It accelerates and broadens the flow of workable ideas and solid knowledge in water management in Yemen. As such it makes the work of the University relevant to one of the major challenges in the country and beyond.**

**15 11:49**



# **Vision – what do we want to be?**

**WEC functions as a financially autonomous centre of excellence combining research, practical advisory service and capacity building in water management – responding to demands from the society and applying quality standards as may be expected from the University.**

# Diagnosis – where do we stand now?

- 
- Strengths ■
  - Weaknesses ■
  - Opportunities ■
  - Threats ■

# Strengths

- Track record in practical research and capacity building. ■
- Sufficient human resource basis in water-related issues. ■
- Access to broad pool of experts. ■
- Has developed curricula on large number of water related topics. ■
- Sanitary Lab ranked 2<sup>nd</sup> in the country. ■
- Relationship with client organizations - NWRA, NWSA, GTZ, World Bank. ■
- Link to AWARENET and PoWER. ■
- Impartial reputation of Sana'a University. ■



# Weaknesses

- “Technical” bias in training/research: no track record in water governance/ socio-economic issues
- Funding uncertainty
- Passive interest from University
- University stigma of not being relevant
- Byelaws in place but not implemented fully
- Low visibility
- Commercially inexperienced

# Opportunities

- Very large need to put improved water management and IWRM on the ground.
- Requirements of the Water Law.
- Funding support for capacity building (EU Food Security Program; NWSSIP).
- Lack of good educational material on IWRM.
- No competition in capacity building.
- Scope for consultancy services.
- Link in with other relevant networks.
- High motivation among the staff members and University management for IWRM.



# Threats

- **Student fall out because of fees and time for participants to be released from their work.**
- **No acceptable arrangement for consultancy assignments to WEC.**
- **High dependence on international funding.**
- **Client organizations 'forget' WEC.**

# Output Streams of Strengthening Project

Development of vision and strategic framework for WEC. .1

IWRM diploma program for policy makers and water managers. .2

IWRM MSc course. .3

WEC as consultancy center. .4

Strengthening information center and Library. .5

Strengthening laboratory. .6

# Strategies/ Output 1

- **Promote Mission and Vision .**
- **Update byelaws and ensure implementability.**
- **Business planning – incl course financing (aiming at affordability).**
- **Develop linkages between research-consultancy-capacity building – institution building.**
- **Train management and support staff of WEC.**

# Strategies/ Output 2 and 3

**Develop 'trendsetting' and well-recognized IWRM course.** ■

**Special emphasis for non-technical areas.** ■

**Tailor training to needs of client organizations.** ■

**Integrate practical issues in training course.** ■

**Continue to promote existing courses.** ■

**Work on attractive learning packages with high communication content.** ■

**Actively market training programs and secure funding base.** ■

**Promote training in-WEC and on-site.** ■

**Develop capacity to translate research/ consultancy into capacity building.** ■

**External PhD/MSc training in line with need for faculty in WEC course and consultancy program.** ■

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# Strategies/ Output 2 and 3

- Develop 'trendsetting' and well-recognized IWRM course. ■
- Special emphasis for non-technical areas. ■
- Tailor training to needs of client organizations. ■
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- Continue to promote existing courses. ■
- Work on attractive learning packages with high communication content. ■
- Actively market training programs and secure funding base. ■
- Promote training in-WEC and on-site. ■
- Develop capacity to translate research/consultancy into capacity building. ■
- External PhD/MSc training in line with need for faculty in WEC course and consultancy program. ■

10/10/09

# Strategies/ Output 5 and 6

- Improve visibility through research highlights etc.
- Develop accessible resource centre.
- Publish number of 'popular/ standard' water management books in Arabic for use in ME.
- Upgrade Lab in line with demand from clients.
- Market lab services.
- Use lab in capacity building and consultancy.

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Thank You



Thank you