



International Hydrological Programme

A satellite-style map of the African continent, showing topography and vegetation in shades of green and brown. The map is centered on the continent and occupies the right half of the slide.

Building Capacities in the application of remote sensing to water resources management in Africa:

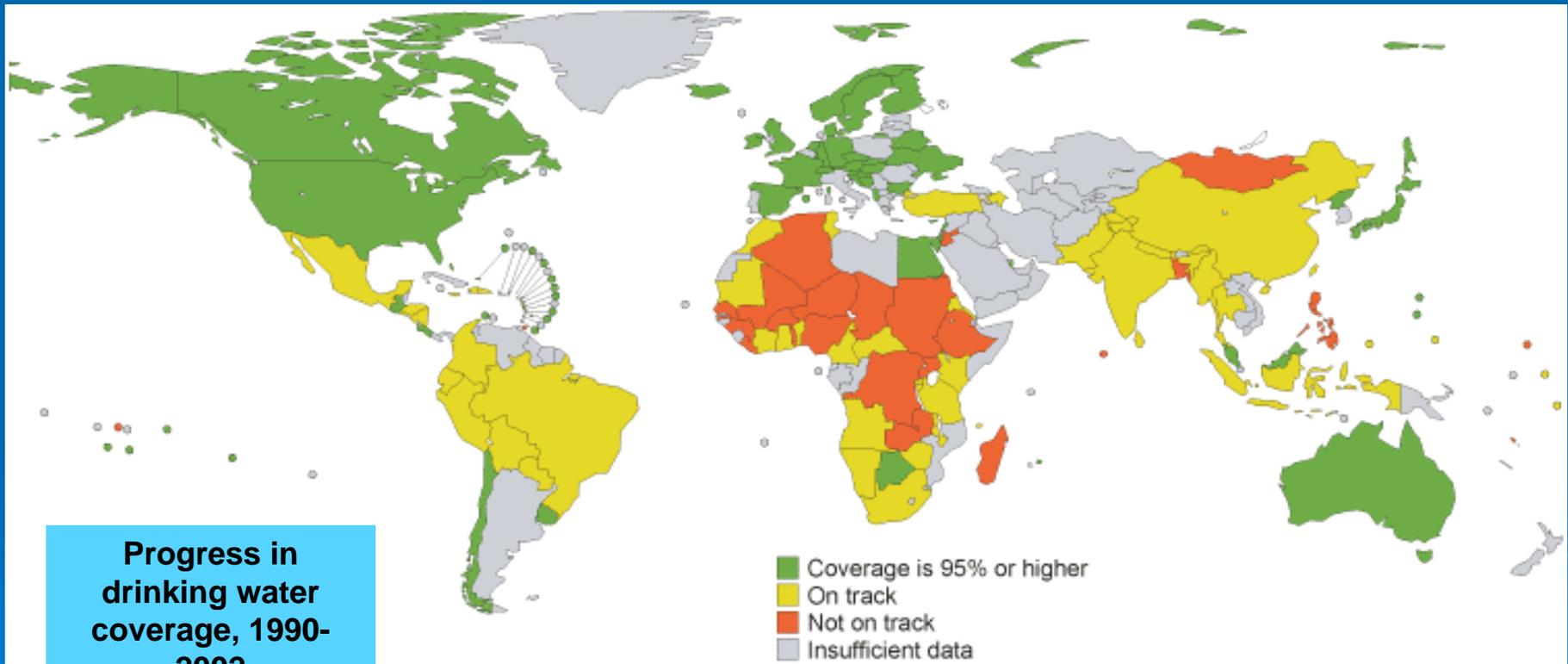
UNESCO examples

Ms. Annukka Lipponen

UNESCO International Hydrological Programme

Division of Water Sciences

If the current trend continues, sub-Saharan Africa will not reach MDG water target



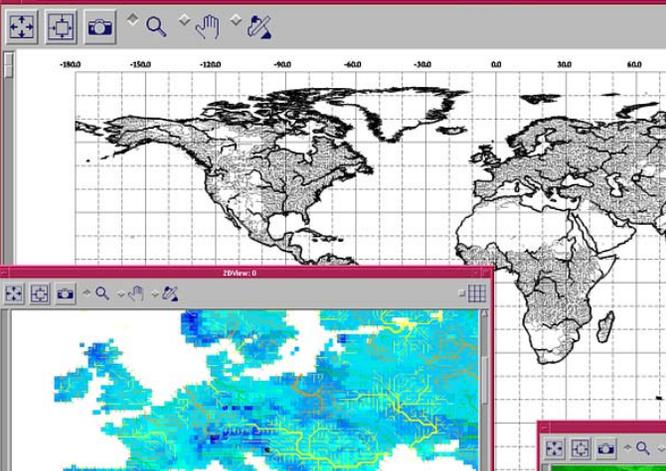
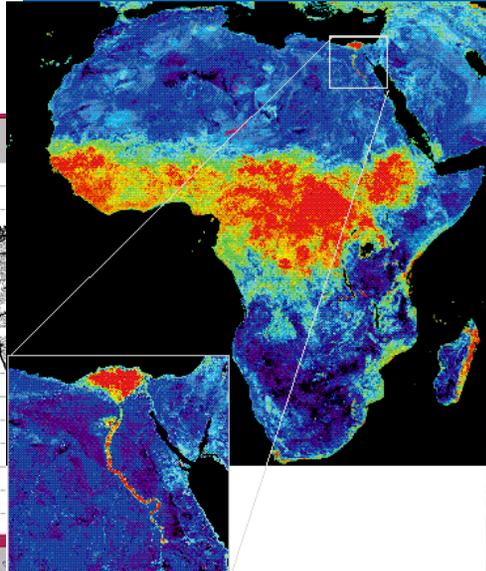
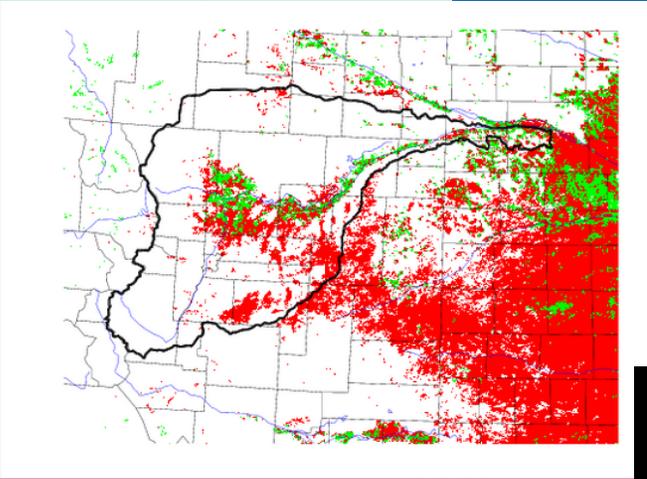
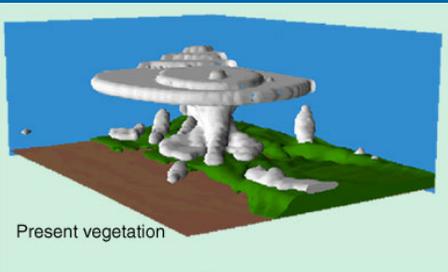
**Progress in
drinking water
coverage, 1990-
2002**

**(UNICEF/WHO
JMP)**

High Technology Earth Systems Tools

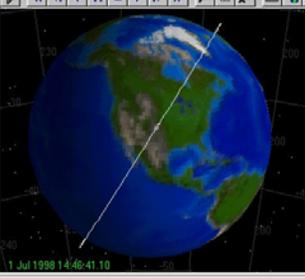
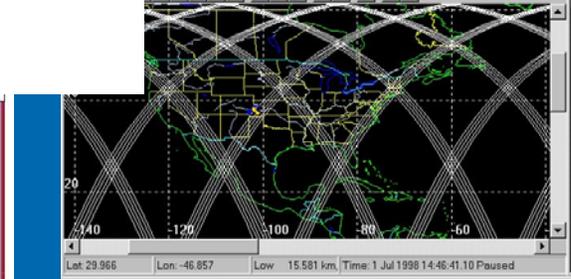
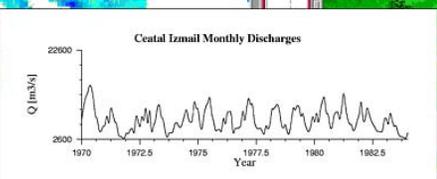
- Satellite data
- Simulation models
- Geospatial analysis tools

They are good tools but.....



FAO Soil Texture

Percentage	
Medium (Loam)	51.0
Medium + Fine (Clay Loam)	17.8
Coarse + Medium (Sandy Loam)	16.6
Coarse + Fine (Loam)	5.2
Fine (Clay)	5.1
Coarse (Sand)	4.3



The International Hydrological Programme



**Intergovernmental scientific programme on
Water Resources of the
UN system**

**Countries established National Committees
that present their priorities for consideration
by the IHP (jointly formulate strategies)**

**Water Resources are recognized as UNESCO
Priority Action**



Water Interactions : Systems at Risk and Social Challenges

Phase VI (2002-2007)

**International Hydrological Programme
of UNESCO**

Themes

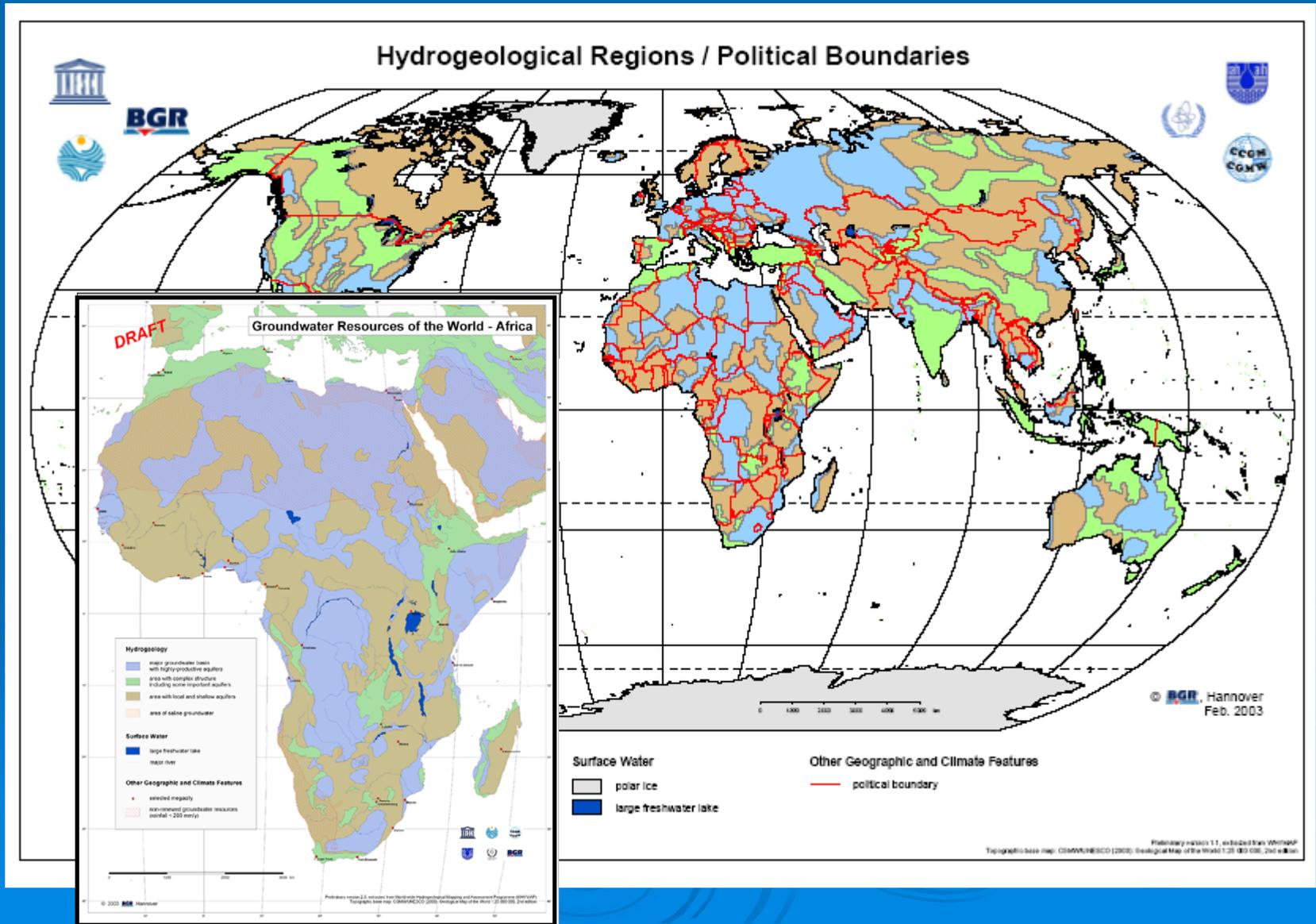
- 1 Global changes and water resources
- 2 Integrated Watershed and Aquifer Dynamics
- 3 Land Habitat Hydrology
- 4 Water and Society
- 5 Water Education and Training

UNESCO-Water

- **UNESCO-IHP**
- **UNESCO-IHE Institute for Water Education, Delft**
- **Secretariat of the World Water Assessment Programme**
- **Regional institutes/centres**
- **UNESCO Chairs in Water**
- **IHP National Committees**

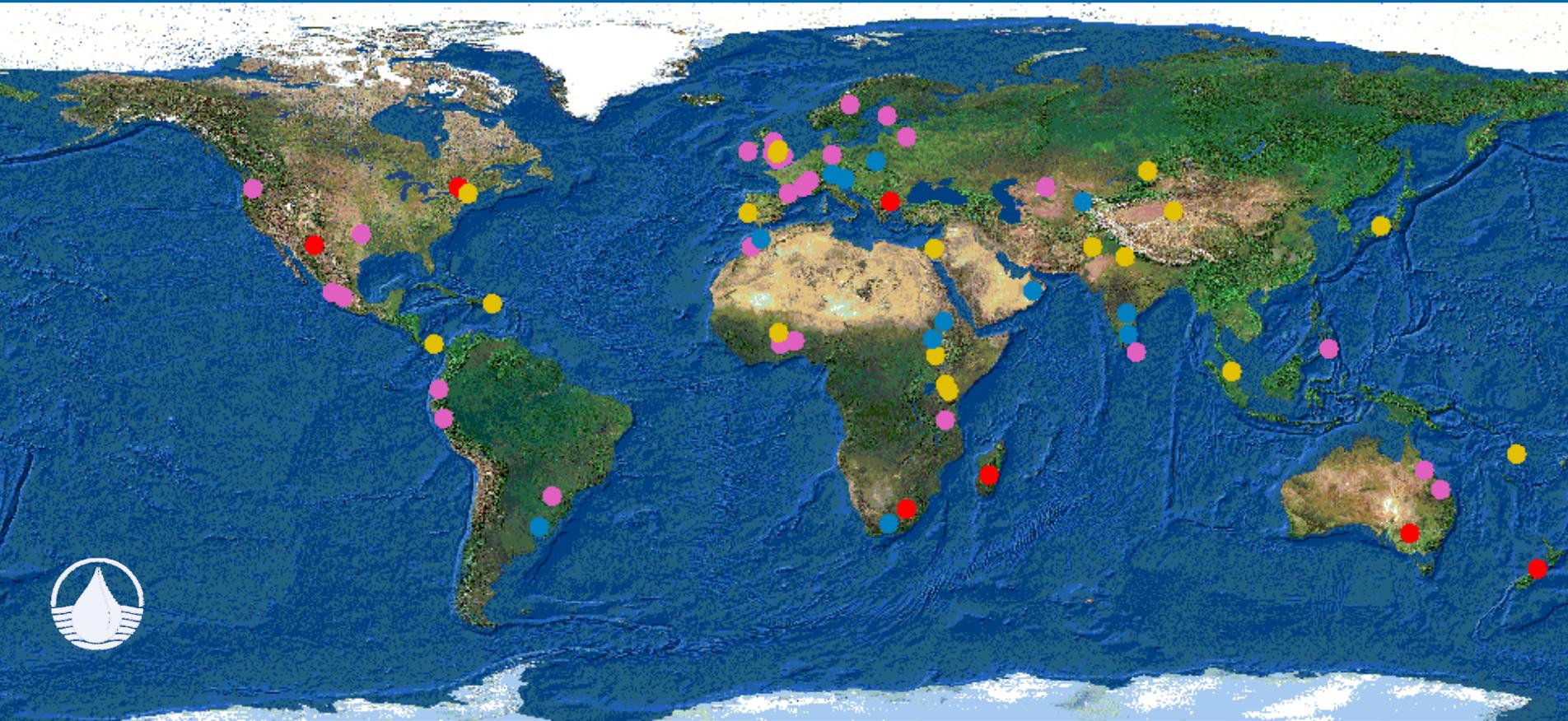
Network, channel to distribute information to water community

„Groundwater Map of the World“



HELP basins

(Hydrology for Environment, Life and Policy)



Demonstration



Operational



Evolving



Proposed



Launching the TIGER initiative

- UNESCO cooperated with ESA since 2003
- International Hydrological Programme (IHP) of UNESCO is facilitating the dialogue between the remote sensing and water communities
- IHP projects, publications, training activities



TIGER

Mission

“Develop sustainable earth observation **information services** for integrated water resources management in developing countries, with a focus on Africa”

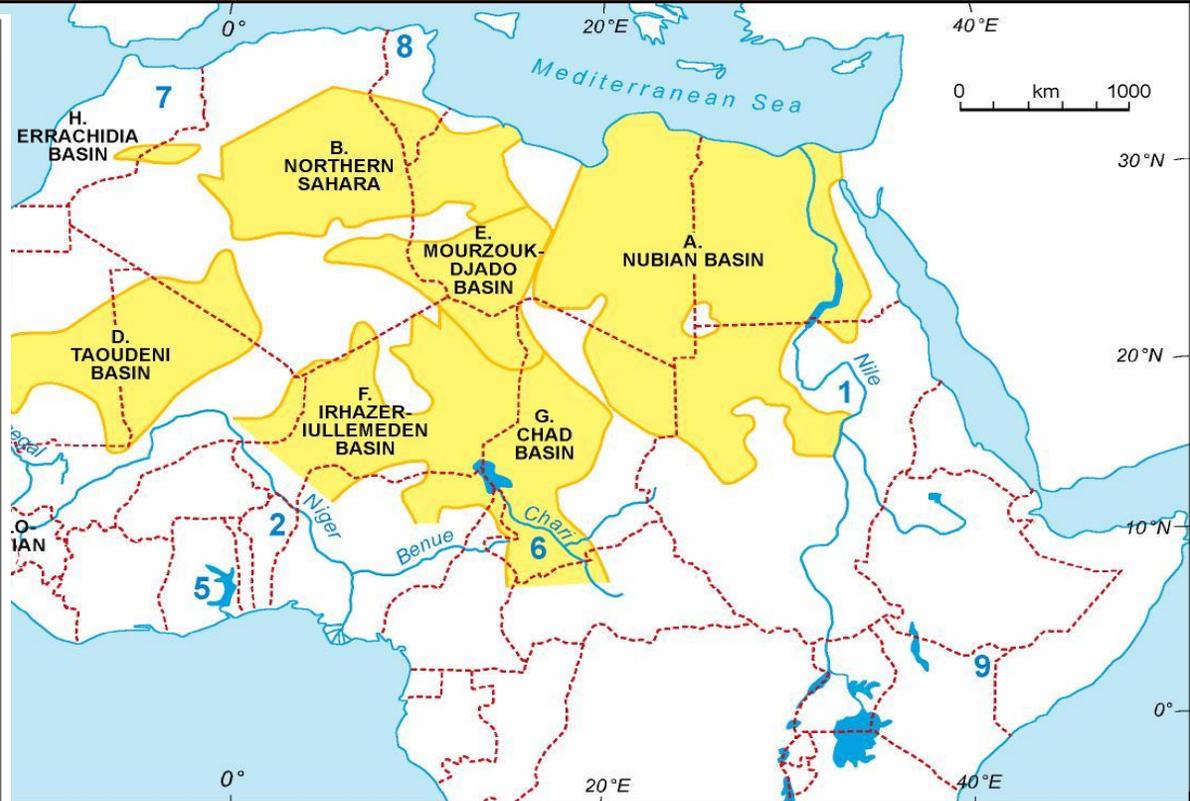
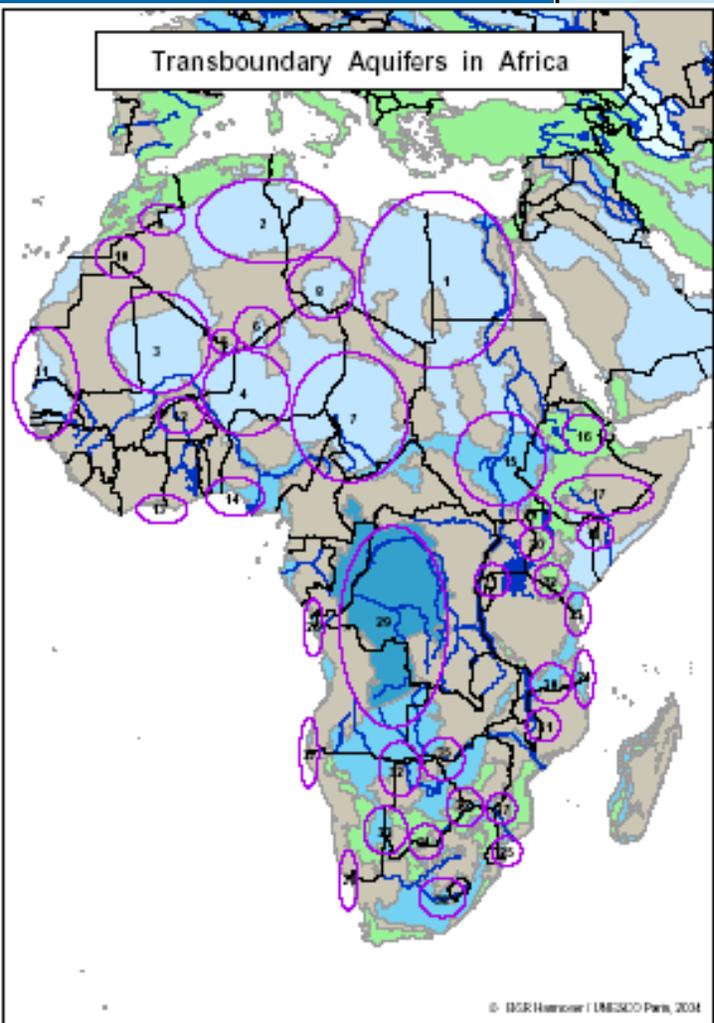
Key requirements

- Sustainability → strategic partners needed
- Appropriateness → level of technology must fit user's capabilities
- User engagement → driven by African users

INVENTORY –Global Atlas by 2007

Transboundary Aquifers in Africa

In common with many parts of the World, Africa too is endowed with transboundary aquifers that have not as yet been completely investigated

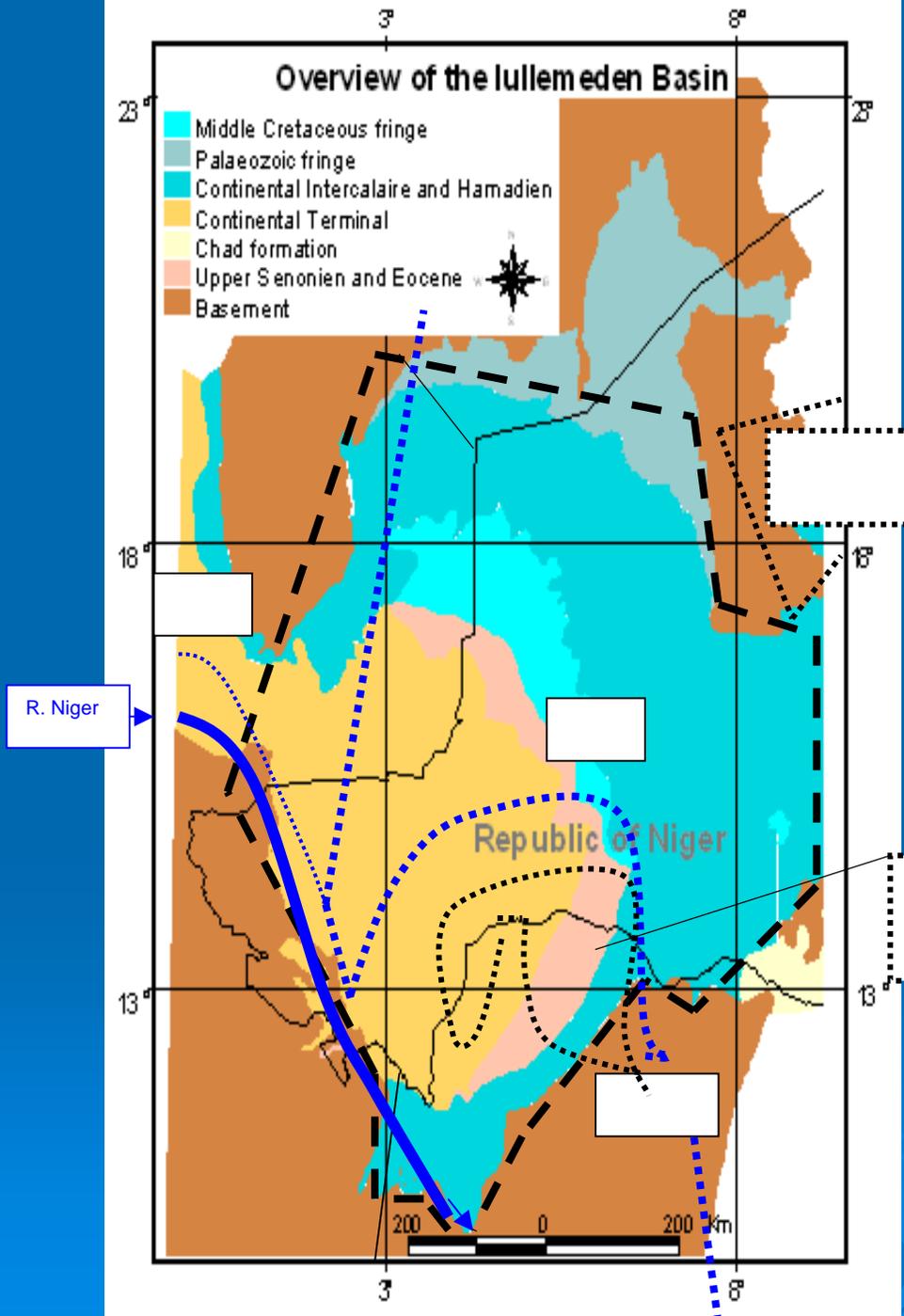


river basins: 1. The Nile 2. Niger 3. Senegal 4. The Gambia
 5. Volta 6. Chari 7. Guir-Saoura 8. Mejerdah
 9. Juba-Shebelle

A. Border crossing aquifers

Managing Hydrogeological Risk in the Iullemeden Aquifer System

- Aquifer shared between Mali, Niger and Nigeria
- Total exploitable water reserves about 2 000 km³
- GEF Medium Size Project
- UNESCO providing scientific supervision



Agriculture, population growth, land degradation, high water use, changing land-use, risk of salinization

Related project:

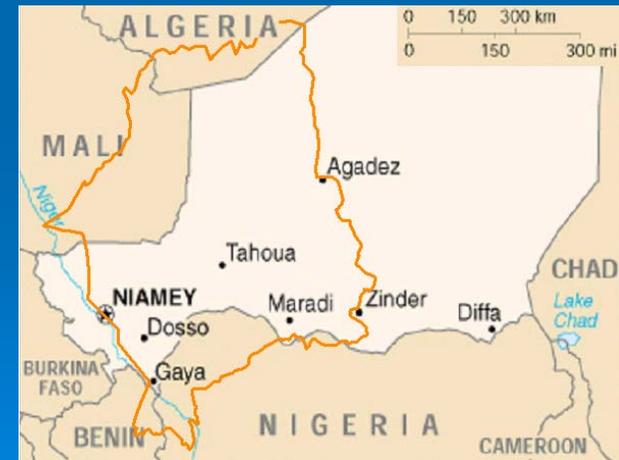
ESA demonstrator project AQUIFER

Primary Project Objective
(GAF AG, Munich
GERMANY)

➤ support the involved
national authorities and
international institutions to
better manage
internationally shared
aquifers

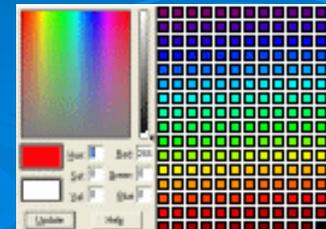
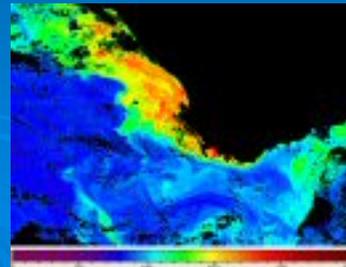
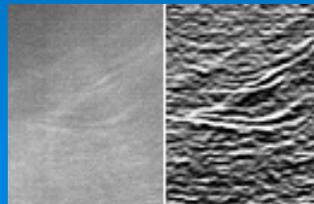
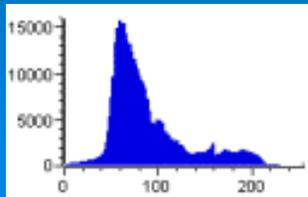
➤ Geographic scope:

- SASS Aquifer System –
Northern Africa
- Iullemeden Aquifer
System



Bilko - Virtual global faculty for remote sensing

Software Bilko is a complete system for learning and teaching remote sensing image analysis skills. Current lessons teach the application of remote sensing to oceanography and coastal management, but Bilko routines may be applied to the analysis of any image in an appropriate format, and include a wide range of standard image processing functions.



UNESCO volume on Groundwater and Remote Sensing; applications and methods

- an expert group currently being formed for the preparation, coordinated by prof. A. Meijerink/ITC
- manual to give practical examples and cases, discuss spatial aspects of groundwater studies

Among the contents:

- Demonstrate the various aspects of RS contributions for modelling and information systems
- Image processing and hydrogeologic interpretation
- Groundwater management, environmental aspects
- Global databases of interest



Working Group on Training and Education (WGEdu)

The CEOS strategy for Earth observation education and training is the creation of an effective coordination and partnership mechanism among CEOS agencies and institutions offering education and training. The CEOS WGEdu was established by the 13th CEOS Plenary in November 1999. Tasked to develop a plan for future CEOS activities in education and training particularly in developing countries, a coordination and partnership mechanism between CEOS agencies was established. The goal of the WGEdu is to facilitate activities that enhance international education and training in Earth observation techniques, data analysis interpretation, and applications.

UNESCO co-chairs with UN-OOSA the CEOS Working Group on Education, Training and Capacity Building, which has developed a portal on Earth Observation educational materials. The website is: <http://wgedu.ceos.org>.

Earth Observation & GIS for IWRM

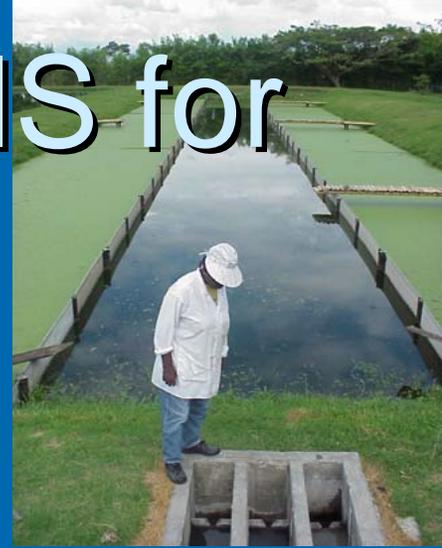


➤ Some Fields of Application

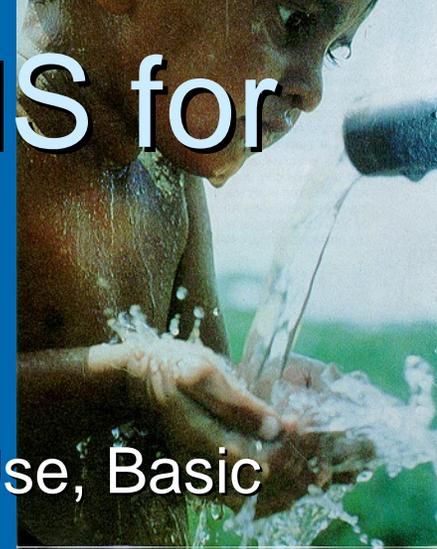
- Water Availability:
 - Backup and extrapolation tool for hydro(geo)logical studies, precipitation, evapotranspiration, surface and groundwater flow, flooding, drought
- Environmental Protection:
 - Broad range assessment tool for natural and man-made processes such as erosion, sedimentation, deforestation, land-use changes, contamination, environmental flow requirements, etc.
- Demography & Water Demand:
 - Analysis of population concentrations, consumption patterns, water allocation, transport & distribution, dams & reservoirs, irrigation & drainage, waste water, navigation, tourism, etc.

Earth Observation & GIS for IWRM - 2

- Some Levels of Application
 - Resource Assessment
 - Database and visualisation tool for WS&S
 - Modelling Tool for Quantity and Quality Flows
 - Real-Time Decision-Support System for Management



Earth Observation & GIS for IWRM - 3



➤ Required Competency Levels

- Basic User Level: Data Entry, Database Use, Basic Mapping, Basic Analysis, DSS, Managers
 - Training Needs: Short Courses, Occasional Updates
- Advanced User Level: Sector Specialists & Sector Researchers
 - Training Needs: Several Short Courses, but preferably University level educational modules, integrated with disciplinary subjectes.
- Expert User Level: Database Administrators, GIS & ICT Support Staff, EO & GIS Researchers
 - Training Needs: Specialised polytechnic and/or university education.

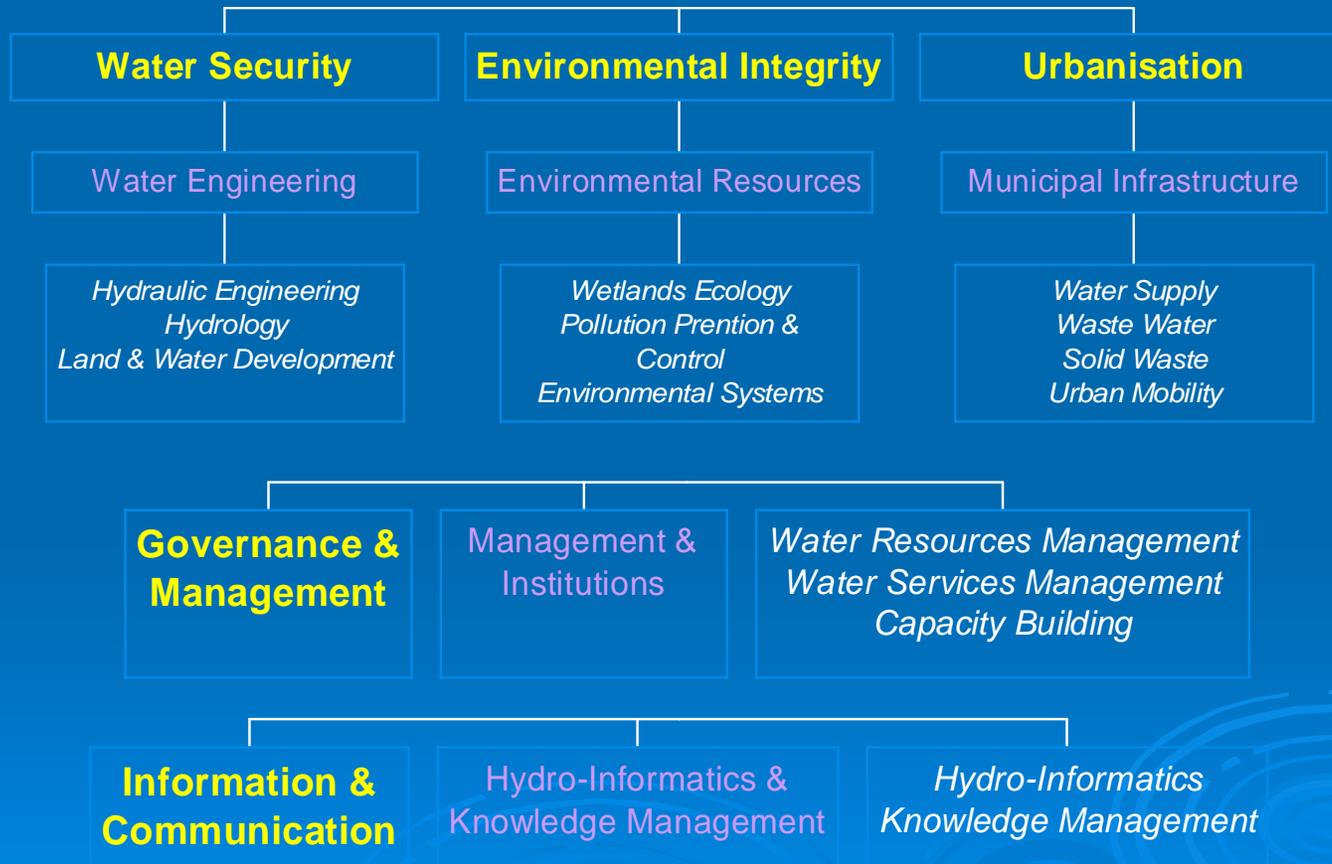
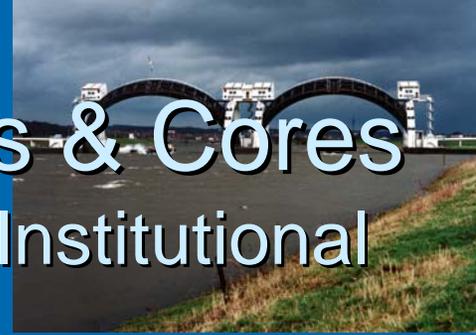
UNESCO-IHE Institute for Water Education

Partner in Capacity Building



Themes, Academic Departments & Cores

Cross-cutting Research, Education and Institutional Development



Capacity Building Models for co-operation



A. RESOLVE IMMEDIATE NEEDS

- A.1 Implementation of Generic Courses
- A.2 Tailor-made Degree/Sandwich Courses
- A.3 Tailor-made Short Courses

B. DEVELOP LOCAL CAPACITY

- B.1 Joint Curriculum Development
- B.2 Course Transfer and Adjustments
- B.3 Staff Development (PhD, MSc)
- B.4 Improvement of Facilities
- B.5 Research and Development
- B.6 Improvement of Management System

Degree studies at UNESCO-IHE Institute for Water Education, Delft, the Netherlands



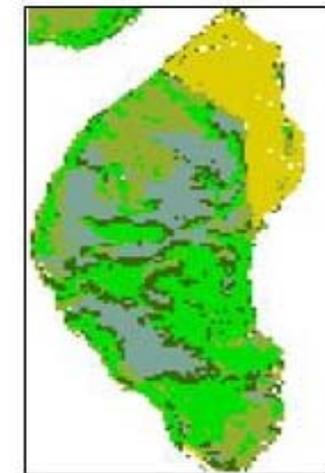
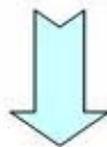
1984



- Dune vegetation
- Mangroves degraded
- Mangroves non degraded



2003



	Was: mangroves non degraded Is: mangroves non degraded	⇒	164 ha
	Was: mangroves degraded Is: mangroves non degraded	⇒	54 ha
	Was: mangroves degraded Is: mangroves degraded	⇒	114 ha
	Was: mangroves non degraded Is: mangroves degraded	⇒	133 ha
	Was: dune vegetation Is: dune vegetation	⇒	100 ha

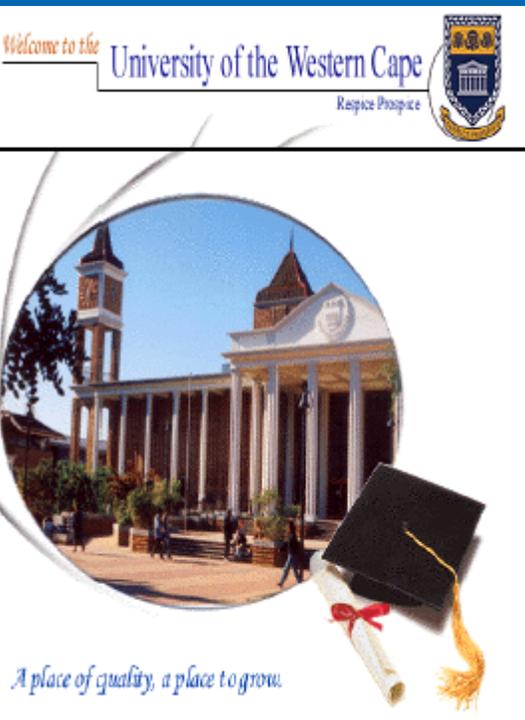
The Use of Remote Sensing for Monitoring Environmental Indicators: the Case of the Incomati Estuary, Mozambique

Margarita LeMarie

Vegetation classification from satellite images of 1984 and 2003
in Xefina Pequena Island and localization of vegetation changes

Centres providing RS application training in Africa

UNESCO Chair scheme, e.g. University of Western Cape (UWC) in South Africa



**Short Training Course on
the Application of Remote Sensing
for Integrated Management of
Water Resources and Ecosystems
24 – 28 October 2005
Organised by
the Earth Sciences Department at
the UWC**



UWC Campus experimental aquifer

SIMDAS, UNESCO's regional flagship programme intends to address the **most urgent and pressing needs** for regional multisectoral cooperation between Southern African countries (14 SADC countries) among themselves and with their multiple external partners

- Climate and global climatic changes and sustainable development
- Remote sensing and integrated study of arid and semi-arid regions of Southern Africa
- Soil and land degradation
- Water resources and sustainable development
- Ecology, ecosystems and their protection and preservation
- Energy and sustainable development
- Environmental systems and integrated management.

UNESCO Water Portal

www.unesco.org/water/

The screenshot shows the UNESCO Water Portal website displayed in Microsoft Internet Explorer. The browser's address bar shows the URL <http://www.unesco.org/water/>. The website header features the UNESCO logo and the word "Water" in a large, bold font. Below the header is a banner image showing a person holding a water container. The main content area is divided into three columns. The left column contains a search box and navigation links for "English Français Español", "Home to Water Portal", and "About the Water Portal". The middle column, titled "IN FOCUS", highlights the "6th United Nations Conference on Desertification and Drought" (COP6) of the UN Convention to Combat Desertification (UNCCD), held in Havana, Cuba, from August 25 to September 5, 2003. The right column, titled "RESOURCES", features the "International Year of Freshwater 2003" and a link to the "International Glossary of Hydrology". The Windows taskbar at the bottom shows the Start button, several application icons, and the system tray with the time 16:57.

UNESCO Water, sustainable development and conservation of freshwater resources in the world - Microsoft Internet Explorer

Fichier Edition Affichage Favoris Outils ?

Précédente Suivante Arrêter Actualiser Démarrage Rechercher Favoris Historique Courrier Imprimer Edition

Adresse <http://www.unesco.org/water/> OK

 **Water**
United Nations Educational
Scientific and Cultural Organization

[English](#) [Français](#) [Español](#)

[Home](#) to Water Portal

[About](#) the Water Portal

IHP - International Hydrological Programme
- National Committees
- IHP-V (1996-2001)
- IHP-VI (2002-2007)
- Conflict Resolution (PC-CP)

IN FOCUS

6th United Nations Conference on Desertification and Drought
The 6th session of the Conference of the Parties (COP6) of the [UN Convention to Combat Desertification](#) (UNCCD), is being held in Havana, Cuba, from 25 August to 5 September 2003. Some 170 countries are participating in the event, which comes at a time when deforestation and changes in land use and climate are having severe environmental and human effects. At the opening session, Ricardo Alarcón, president of the National Assembly of People's Power, linked desertification to poverty and malnutrition. While 24,000 tons of land disappears every year through desertification, salinization affects around 80 million hectares of irrigated land worldwide, and deforestation accounts for the

RESOURCES

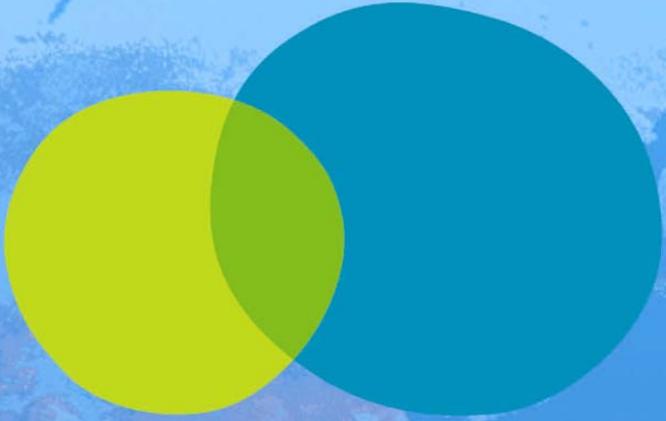
 **International Year of Freshwater 2003**
[[UNESCO Director General's Statement - PDF](#)]

 **International Glossary of Hydrology**
This glossary is a contribution to the International Hydrological Programme of UNESCO by the French National Hydrology Committee. Available in 12 languages.

Intranet local

Start | I... C... U... N... M... | 16:57

Water for People Water for Life



World Water
Assessment Programme



The United Nations
World Water Development Report