



International Groundwater Resources Assessment Centre

The International Groundwater Resources Assessment Centre

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IGRAC

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Groundwater is an extremely important natural resource

A large share of the world's drinking and industrial water supplies depends on it



Groundwater is an extremely important natural resource

It is a major source of irrigation water, particularly in arid zones





International Groundwater Resources Assessment Centre

Groundwater is an extremely important natural resource

It may keep
wetlands
sustainable





International Groundwater Resources Assessment Centre

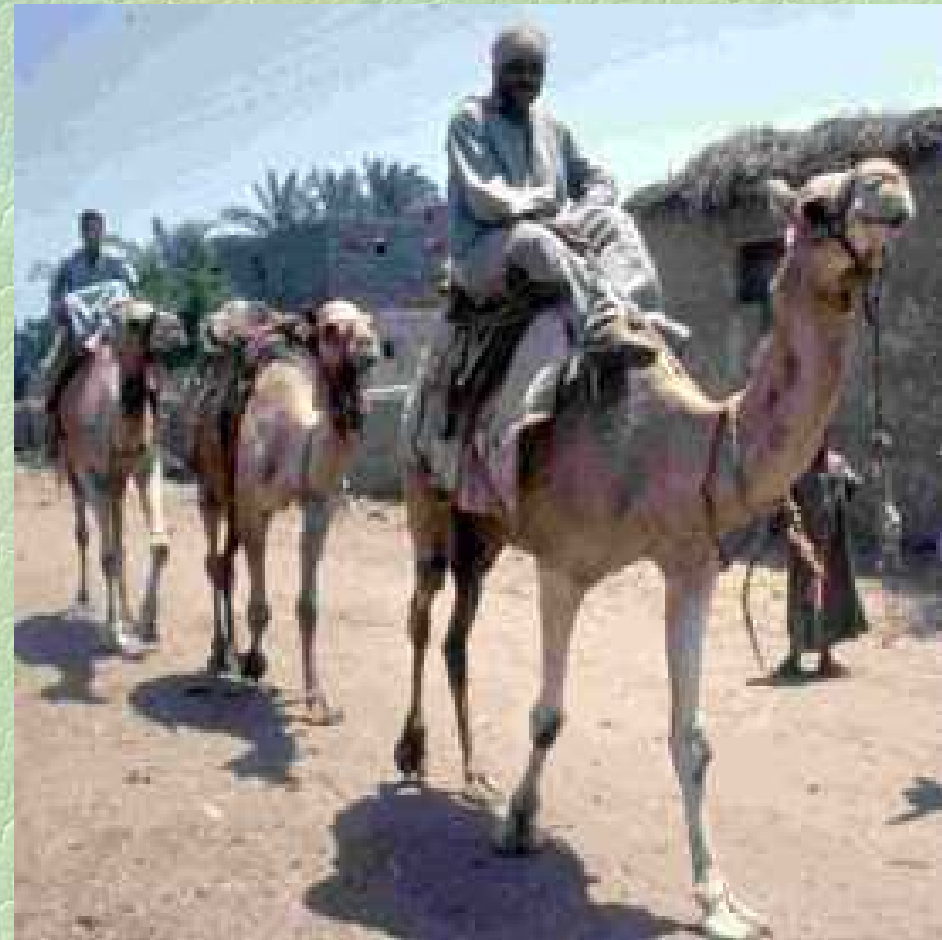
Groundwater is an extremely important natural resource

It may control land subsidence and other environmental processes



Groundwater is an extremely important natural resource

It may bridge dry periods when surface water is lacking



Groundwater is also a vulnerable resource

Falling water-tables

Exhaustion of groundwater storage

Groundwater pollution

Sea water intrusion

Salt water upconing

Land subsidence

Wetland degradation..... etc.

Controlling such problems requires effective groundwater resources management. For that purpose, adequate information and knowledge on groundwater are needed.....

Rationale for an international centre for groundwater resources

- Groundwater is extremely important, but sometimes difficult to develop and often highly vulnerable
- Although groundwater is a locally manageable water resource, activities at a supra-national or global level may create very significant additional value:
 - *management of transboundary aquifers*
 - *internationally consistent data collection and monitoring*
 - *benefit from knowledge gained under similar conditions*
 - *understanding regional or global processes and patterns*
 - *promoting groundwater in water resources planning*

This is why IGRAC has been established



What is IGRAC?

- An initiative of UNESCO and WMO (1999)
- Principle: global sharing of information and knowledge for optimal and sustainable groundwater resources development and management
- Non-commercial profile
- Hosted by the Netherlands Institute of Applied Geoscience TNO at Utrecht, The Netherlands
- Operating under auspices of UNESCO and WMO
- Receiving financial support from the Dutch government for the initial years

IGRAC has started early 2003.....

Scope of activities

- **Establishing a Global Groundwater Information System (GGIS), accessible via the Internet**
- **Producing and promoting guidelines and/or protocols for proper and uniform groundwater data acquisition and for adequate groundwater monitoring**
- **Co-operating in global or regional projects or programmes with a significant groundwater component (WWAP, WSSD, etc.)**

Components of the initial phase

Organisational and institutional

- Starting document
- Getting a contract for funding
- Formation of IGRAC team
- Publicity to IGRAC
- Presence at WWF3
- Office space and facilities
- Auspices of UNESCO and WMO
- By-laws & internal arrangements
- Steering Committee
- Partnerships
- Work Plan, planning and budget

Technical

- Global Groundwater Information System
- Guidelines, Protocols and Monitoring

Ready and accepted

Stagnation

5 out of 8 in place

Ongoing

Achieved

Achieved

Procedure initiated

Ready in first draft

Still to be defined

Ongoing initiatives

Submitted

Development started

Started

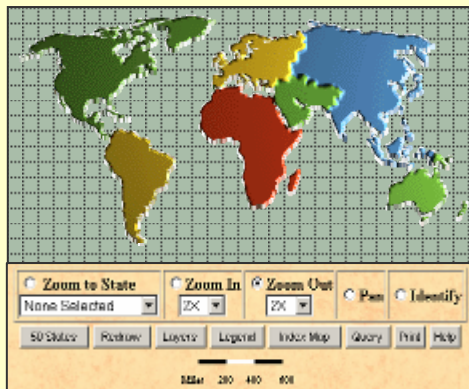
Possible organisation of GGIS

Module 1	Map of countries and groundwater provinces of the world <i>Boundaries and ID numbers/names</i>	Global overview
Module 2	Standard set of 'lumped' attributes for each of the spatial units <i>Administrative, hydrogeological, soc-econ., management data, etc.</i>	
Module 3	Selected information on groundwater systems or themes <i>Available maps, graphs, tables & text useful for third parties</i>	Detailed ground-water info
Module 4	Standardised documentation on gw systems or themes <i>Systematic and detailed information in a standard format</i>	
Module 5	Meta-information on groundwater (geographically linked) <i>Literature, organisations, investigators, web links, tel/fax, e-mail, etc.</i>	Services and enabling environment
Module 6	Web-enabled discussion forums & collaborative environment <i>For specified (groups of) aquifers or types of groundwater problems</i>	

Potential users have to help define needs and priorities.....

GGIS Portal

Maps of countries and groundwater provinces with sets of lumped attributes



Selected or standardised information on groundwater systems and themes





Meta-Information Module

Profile for Kuisken	
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Organisation:	TNO-INTC
Research topic:	Communities of Practice, Knowledge Mapping, Project Management
Abstract:	Scientific Communities of Practice (SCoP) are groups of 20 or more individuals from different parties that share a common interest in a scientific discipline, problem area, research topic or related methods, tools and products.
Keywords:	Best practices Communities of Practice ICT Official Intelligence Decision support systems Environmental systems GIS Groundwater Knowledge Groundwater pollution Groundwater quality Hydroinformatics Knowledge
Languages:	Dutch, English, Serbian



Institutions
people
knowledge
projects
documents

Discussion Forum & Collaborative Environment

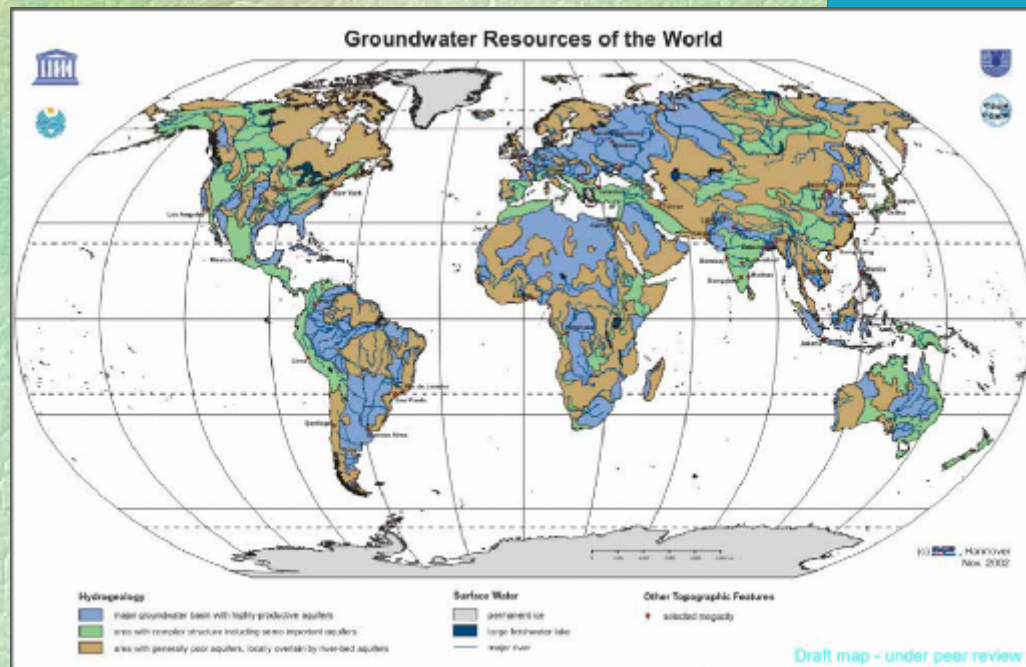
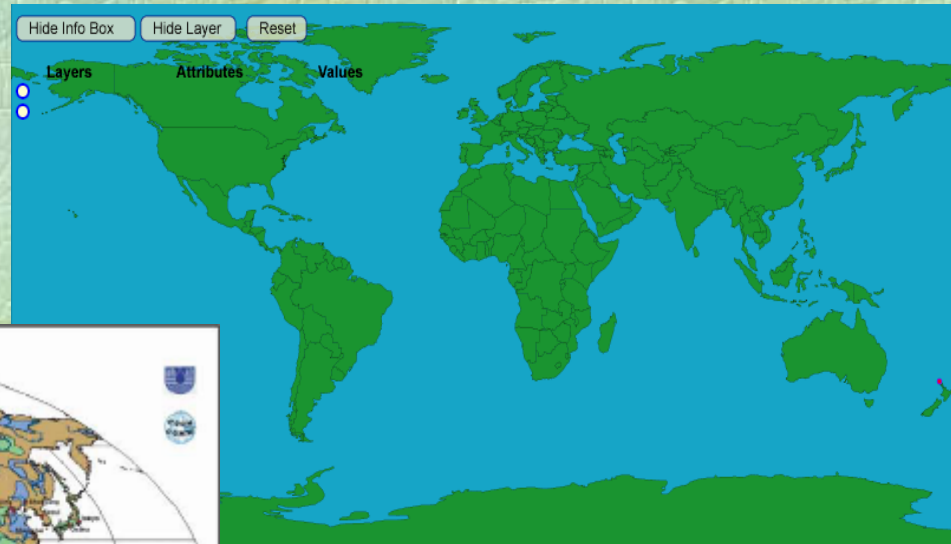
Global overview

Detailed groundwater info

Services and enabling environment

Global Overview within GIS

Overviewing or comparing
selected lumped attributes
per administrative unit



.....or per
hydrogeological
province

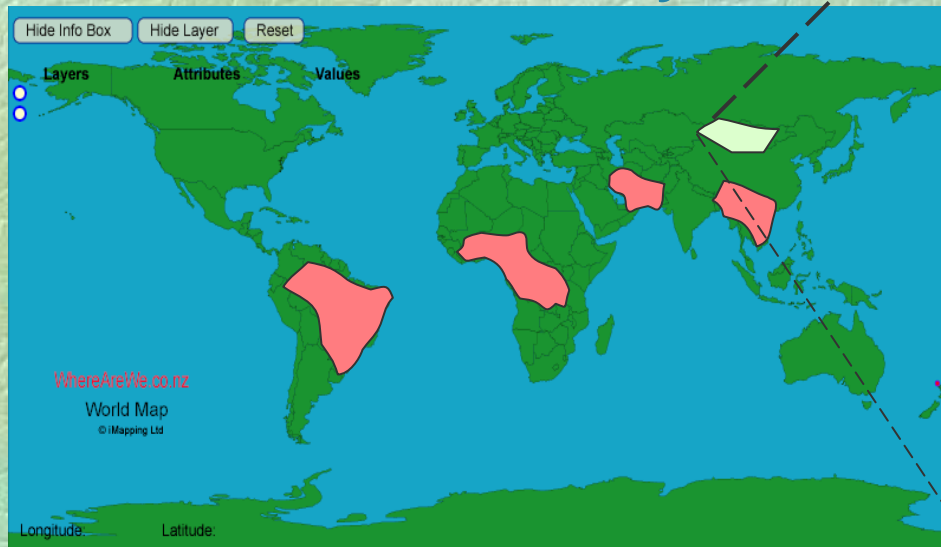
Contents of the Attribute Set

Categories:

- **General administrative information**
- **Information on geological setting and aquifers**
- **Information on groundwater quantity**
- **Information on groundwater quality**
- **Information on groundwater development and management**

Accessing the Global Overview

(1) Find a list of groundwater attributes for country X



Country X

Total area: 4,000,000 km²
 Population: 16.5 million
 Mean annual rainfall: 340 mm
 Dominant aquifer rock: limestone
 Hydraulic aquifer class: fissured
 Mean aquifer thickness: 70 m
 Mean depth to gwater: 20 m
 Gwater abstraction: 2,502 million m³/a
 Gw quality: medium to poor
 Main gw problems: salinity, overdraft etc.....

Meta information

Thematic analysis

Pilot

Discussion fora

(2) Meta info and pilots for country X
 and any other dedicated links to other parts of the GGIS

(3) Show all countries meeting a certain set of criteria
 (search for analogies)

The same can be done for groundwater provinces as spatial units

Programme and progress on GGIS

- **Global Overview is first priority**
- **Global Overview: areal units (*countries, hydrogeological provinces*) + sets of attributes**
- **Activities carried out until now:**
 - *Work Plan for GGIS*
 - *List of attributes defined*
 - *Information collected for 260 countries*
 - *Plan and specification for subcontracting ICT implementation*
- **Target for first basic version operational: August 2003**
- **Good scope for co-operating with WHYMAP**
- **Enhanced version of Global Overview (due by mid 2004) will include hydrogeological provinces and corresponding sets of attributes**

Approach on Guidelines, Protocols & Monitoring



Programme and progress on Guidelines, Protocols & Monitoring

- Inventory of existing guidelines and protocols is first priority
- Activities carried out until now:
 - *Approach for GPM developed*
 - *Search for existing Guidelines and Protocols*
- Target date for inventory report on Guidelines and Protocols: June 2003
- Inventory of 'state of affairs in world-wide groundwater monitoring' will follow end of 2004

Possible co-operation of IGRAC in international projects/programmes

- World Hydrogeological Map (WHYMAP)
- World Water Development Report (UN-WRAP)
- Global Environmental Outlook (UNEP)
- World Summit on Sustainable Development
- Global Runoff Data Centre
- Global Precipitation and Climate Centre
- Global Environmental Monitoring System
- Etc...

IGRAC has to explore such options and find out to what extent it can and should be involved....

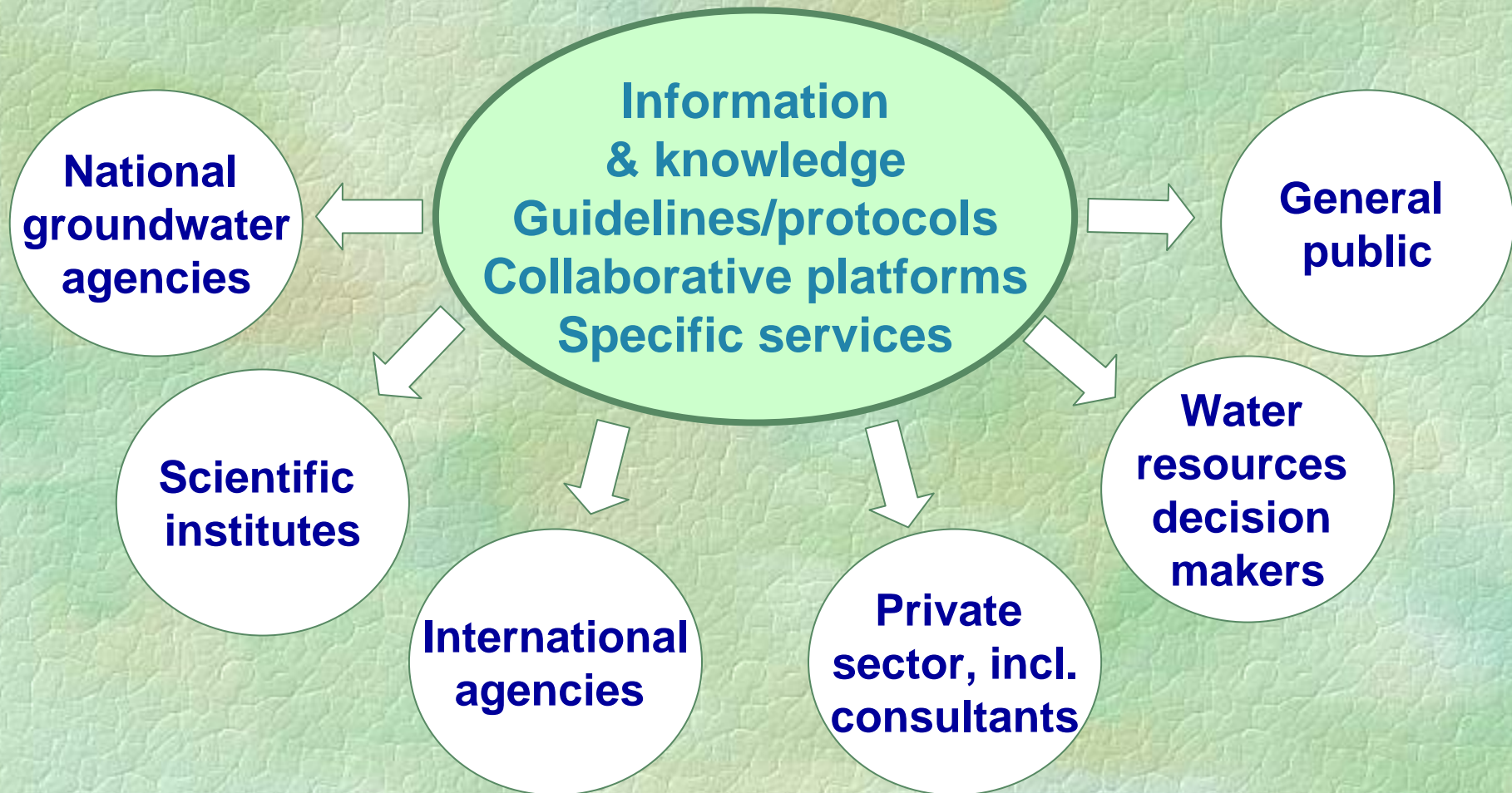
IGRAC: by whom and for whom?

*IGRAC can not function properly
without world-wide inputs and support*



IGRAC: by whom and for whom?

*IGRAC is for everybody:
it may benefit everybody having a stake in groundwater*



Expectations

IGRAC will offer a variety of products and services in a demand-driven approach

**world-wide
inputs**



**world-wide
benefits**

It is expected that these products and services will contribute to improved development and management of the World's precious groundwater resources.....