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Educational, Scientific and  
Cultural Organization



International  
Hydrological Programme  
of UNESCO



# *Assessing groundwater resources under the pressure of climate change*

## The GRAPHIC Project

Groundwater Resources Assessment  
under the Pressure of Humanity and Climate Change



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# Overview

1. UNESCO IHP
2. IHP VII
3. GRAPHIC



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# UNESCO's International Hydrological Programme (IHP)

- ❑ The only intergovernmental programme of the UN system devoted to:
  - water research, water resources management, and education and capacity building.
  - the scientific study of the hydrological cycle and to formulating strategies and policies for the sustainable management of water resources.



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# UNESCO's International Hydrological Programme (IHP)

- ❑ IHP was conceived as an evolving programme, ready to adapt to societies' needs and transformations.
- ❑ Consultation mechanism
- ❑ Implemented in ***six-year phases***, in order to
  - promptly identify emerging problems,
  - alert decision makers, raise public awareness,
  - provide the resources to respond with appropriate actions.



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# UNESCO IHP-VII

## “Water Dependencies – Systems under Stress and Societal Responses”

- Managing and protecting our planet’s water resources are prerequisite of sustainable development.
- High priority given to the IHP as a prominent vehicle for meeting the UN Millennium Development Goals



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# UNESCO IHP-VII

## 5 Themes

addressing the overall topic of *Water Dependencies* from a wide range of perspectives:

- 1. Adapting to the Impacts of Global Changes on River Basins and Aquifer Systems***
- 2. Strengthening Water Governance for Sustainability***
- 3. Ecohydrology for Sustainability***
- 4. Water and Life-Support Systems***
- 5. Water Education for Sustainable Development***



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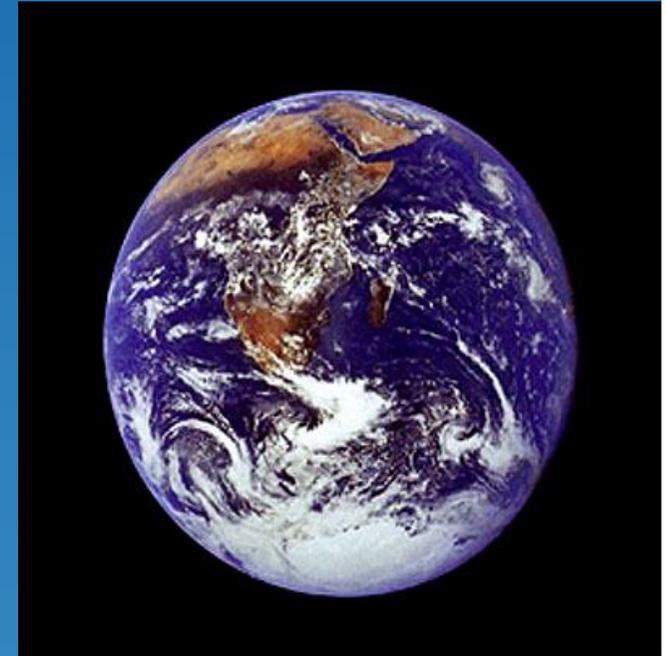
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# GRAPHIC – what's it all about?



*Humans are **changing** the  
global water system  
in a  
globally-significant way  
**without**  
adequate knowledge  
of the system  
**and thus**  
**its response to change***



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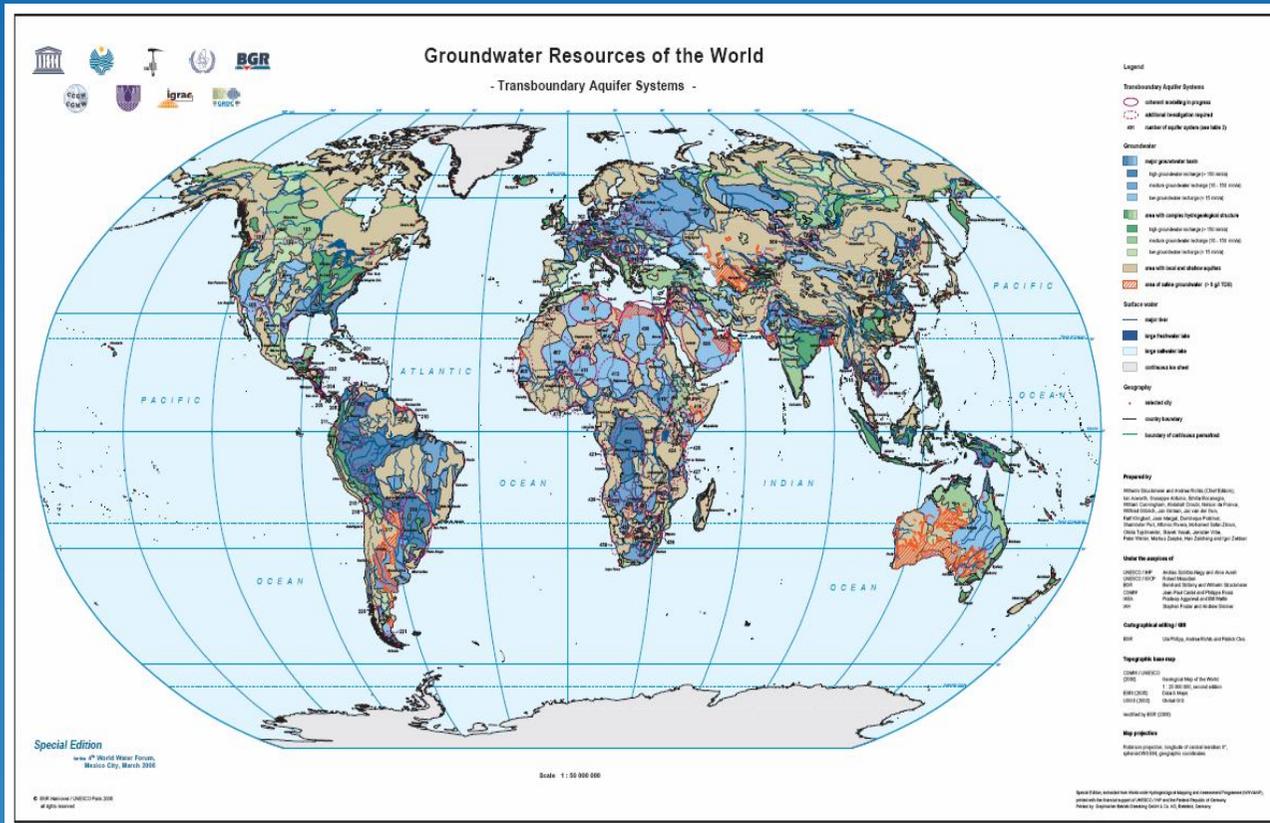
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# GRAPHIC – what's it all about?



More than **1.5 billion** people worldwide rely on **groundwater** for their primary source of **drinking water**.



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# GRAPHIC – what's it all about?

**Groundwater** is an extremely important natural resource as a primary source for **domestic, agriculture, and industry** in many countries.

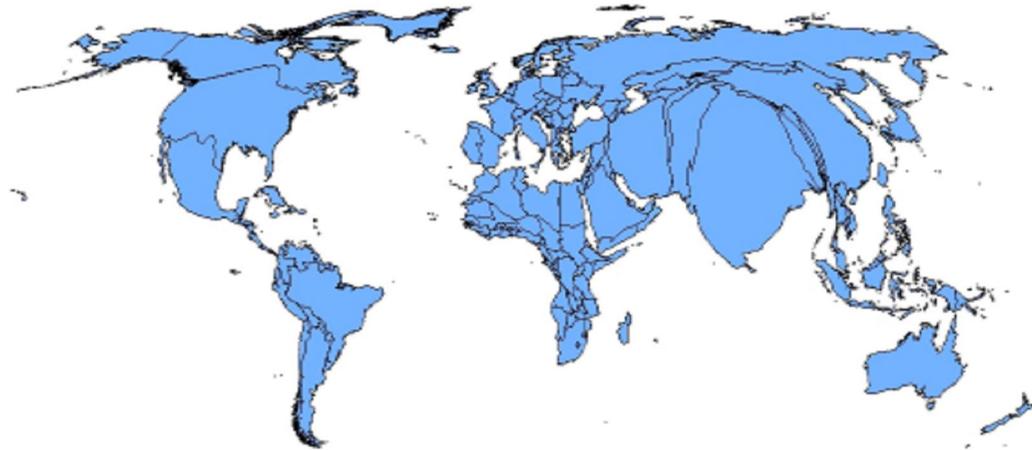


Figure 3 – Essi: **GROUNDWATER DEPENDENCY**

J. Margat, UNESCO-BRGM 2008



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# GRAPHIC How does it work?

- establish an **international network** for groundwater resources **monitoring**
- network of **case studies** in different regions/countries analyzing groundwater sustainability, **identifying** adaptation measures
- **database of findings** to compare data among areas, **evaluating** how factors influence local water **quality** and **quantity**



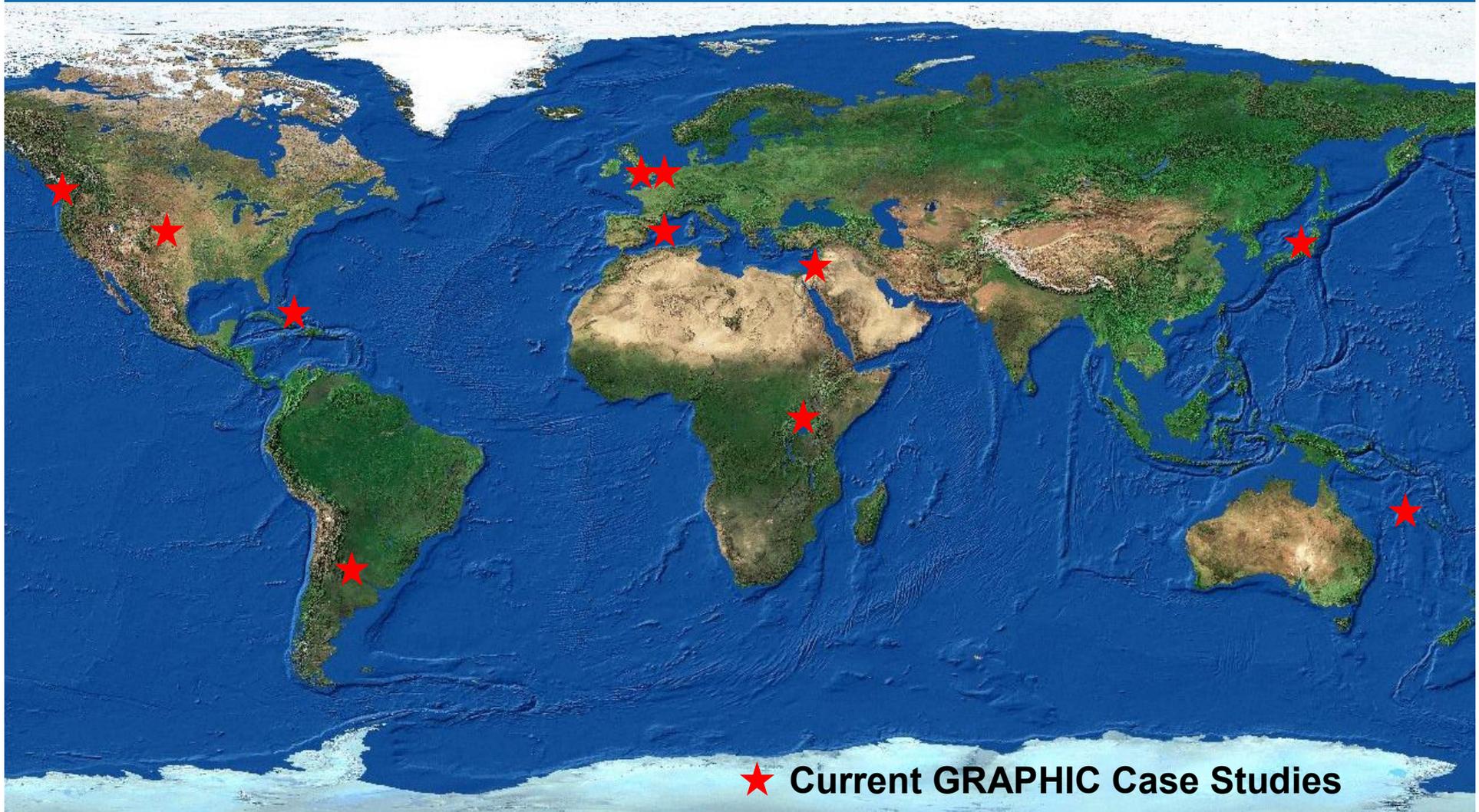
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# GRAPHIC international group of experts and partnerships

## Established partnerships with:

Geological Surveys (TNO, BRGM, USGS, BGR), USDA, NASA, RIHN, IGRAC, IAH, Universities in Canada, The Netherlands, UK, Brazil, Argentina, Spain, Italy, ...), WWAP, UNU-EHS, and others

Linkages with other UNESCO-IHP projects and programmes (ISARM, GWES, G-WADI and others)



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# IHP–VII and GRAPHIC

GRAPHIC contributes to

*THEME 1 of IHP-VII: Adapting to impacts off  
global changes on river basins and aquifer  
systems*



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# IHP–VII and GRAPHIC

Activities under GRAPHIC will contribute to:

- **Assess the impacts** of global change on groundwater resources and support Member States in addressing regional needs through global coordination;
- **Improve understanding of how groundwater contributes to the global water cycle** and evaluate the changes to groundwater storage and flux;
- **Facilitate groundwater assessments** and exchange of information via seminars, workshops and conferences;
- **Better define growing population pressures** on groundwater resources, global warming impacts on groundwater recharge rates, rising sea levels and saltwater intrusion;
- **Raise awareness** of decision makers, implementers, users and the general public of the importance of groundwater as a store of freshwater to encourage improved protection and sustainable use.



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# Our Message

## Improve collaboration between climate and groundwater scientists in the development of adaptive strategies to climate impacts

- Recognise the importance of **improved consideration** of groundwater in climate adaptation and science
- More research in the field of climate impacts on groundwater
- **Promote inclusion** of groundwater in climate models
- Include groundwater in the land-surface models to improve prediction



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