



# international hydrological programme

# i h p

## Science, Policy and People

From Johannesburg to 2015 – UNESCO IHP's Responses and Outcomes

IHP is the UNESCO intergovernmental scientific cooperative programme in hydrology and water resources.

This brochure provides information about IHP, its working mechanisms and instruments, and summarizes those activities and priorities providing the most significant contributions to sustainable development.

A prerequisite of sustainable development is the proper management and protection of our planet's water resources.

Water education and the advancement, sharing and application of scientific knowledge are the pillars of sustainable water resources management.

Only an informed public and trained workforce can introduce the new development and

consumption patterns required to reorient policies on water resources and to shape globalization with a human face without harmful impact.

Water resources management issues are by definition complex and multidisciplinary. They require scientific, social, cultural and ethical responses built on similar lines.

A UNESCO objective is to help water managers learn how to assemble this puzzle of complex elements.

We hope that this brochure will encourage more and more people, scientists, NGOs, governments, and young experts to join UNESCO's efforts to fill in the pieces to the puzzle.

## Who We Are

The United Nations Organization for Education, Science, and Culture (UNESCO) established IHP in 1975, as

the single intergovernmental programme of the UN system devoted to scientific study of the hydrological cycle and to formulating strategies and policy for the sustainable management of water resources.

IHP was conceived as an evolving programme, ready to adapt to society's needs and transformations. The Programme is implemented in phases of six years, in order to remain prompt in identifying new, emerging problems, alerting decision makers, raising public awareness and providing the necessary resources to respond with action.



### How can we

- **prevent more than three million people from dying each year of waterborne diseases?**
- **curb the overexploitation of water resources?**
- **in sum, ensure everyone has access to clean drinking water?**

Today, integrated water resources management poses scientific, technical, socioeconomic, cultural and ethical challenges. IHP is a multidisciplinary

programme at the forefront of assuming these challenges. To this end, IHP is a prominent UNESCO vehicle for meeting the UN Millennium Goals.

UNESCO's IHP is engaged in raising awareness of the fact that action is urgently needed to support poorer countries in developing the local scientific, technological and institutional capacities necessary for sustainable management of their water resources in terms of quality and quantity.

UNESCO is host to the Secretariat of the UN World Water Assessment Programme (WWAP), to which programme IHP provides a valuable contribution.





IHP is a global effort, with headquarters in Paris. Activities are conducted at international, regional and local scale.

## How We Work

Regional cooperation is an important aspect of this global programme. Offices coordinating activities on surface water and groundwater

resources are situated in Africa, the Arab States, South and Central Asia, Latin America and the Caribbean, Southeast Asia and the Pacific. Water scientists, hydrologists and hydrogeologists are working in UNESCO-established regional and cluster offices in Nairobi, Cairo, Jakarta, New Delhi, Montevideo, Tehran, Apia, Brasilia, Kingston, Moscow, Port au Prince and Venice.



The IHP Secretariat at Headquarters and IHP regional offices work closely with some 160 countries. IHP National Committees are nominated and set up by UNESCO Member States. IHP is also implemented in cooperation with Focal Points or National Correspondents, NGOs, International and Regional Associations, other UN Systems, Agencies and Programmes and local communities.



### WORKING WITH IHP

IHP receives base financial resources from UNESCO. Member States may apply for additional support for specific regional and local activities through the UNESCO Participation Programme. They may also work with UNESCO/IHP to develop project proposals for funding from other agencies, such as the Global Environment Facility (GEF), the United Nations Environment Programme (UNEP), the World Bank, the European Community and private foundations. In cases where external funding becomes available, IHP may work with the country concerned to implement the project.



IHP benefits also from Member States' generous financial and technical contributions.

IHP National Committees, which play a critical role in the Programme's implementation, organize regional meetings regularly and produce National Reports.



# Laying Foundations – Forging Cooperation

Since 1975, IHP has been the stimulus of strong interactions between scientific research applications and education. Far away from international conference centers, UNESCO operations reach into the field – where people live and on a daily basis, face numerous water problems.

## **UNESCO IHE Institute for Water Education**

The UNESCO International Institute for Infrastructural, Hydraulic and Environmental Engineering (UNESCO IHE), situated in Delft, Netherlands, envisions a world in which people use and manage their water and environmental resources in a sustainable manner – a world in which all sectors of society can enjoy the benefits of basic services. UNESCO's mandate to IHE is to strengthen and mobilize a global educational and knowledge base for integrated water resources management and to contribute towards meeting the water-related capacity building needs of developing countries and countries in transition.

IHP applies its know-how in marshaling top scientific talent from around the world to support activities aiming toward better management of the earth's water resources. The examples and illustrations noted here, while not exhaustive, are representative of such activities. Recurring elements emphasize the following: learning by doing; free exchange of information, ideas and expertise through workshops, seminars, symposia and publications;

collaboration among specialists in the natural and social sciences; and dialogue among planners, decision makers, local populations and international communities of scientists and engineers.

A lot has been done, but there is still much more to do!







## **WORLD WATER RESOURCES IN THE 21ST CENTURY**

UNESCO's IHP has prepared a monograph on world water resources. The result of a decade of international, cooperative research, the monograph provides an updated assessment of the world's freshwater resources at the start of the 21st century. The monograph also addresses problems concerning the availability, protection and management of water resources.

## **WATER CHALLENGES IN HUMID TROPICS AND ARID ZONES**

A number of projects aiming to resolve water-related environmental and social problems characteristic of humid tropic, arid and semiarid zones throughout the world have been launched by IHP during the last years. IHP has installed regional centers to deal with these problems with a hands-on approach. Centers already in operation are situated in China, Panama, Malaysia, Egypt, Iran and Chile.

**CATHALAC** – The Water Center for the Humid Tropics of Latin America and the Caribbean (CATHALAC) was brought about by UNESCO, with the support of the Government of Panama, to promote training, research and the transfer of technology within the region. One of the Center's research activities is promoting better understanding of the El Niño-Southern Oscillation (ENSO).

**Wadi Hydrology** – IHP has begun a project on "Wadi Hydrology," focusing on ways to realize the sustainable management of ephemeral rivers. The term "wadi" refers to a seasonal water course in the world's arid regions. Wadis are an excellent source of water supply in many Arabic countries.

## **GROUNDWATER CONSERVATION AND MANAGEMENT IN THE MALDIVES**

Water and sanitation are primary concerns in most of the world's coral islands. The UNESCO New Delhi office has organized a special training programme for staff members working with the islands' agencies to improve local health conditions. This programme includes field and laboratory investigations, lectures, practical exercises and awareness-raising activities for the public. A multimedia presentation has been prepared by the local staff.

## **URBAN WATER RESOURCES IN WESTERN AFRICA**

UNESCO has supported the establishment of a monitoring system to evaluate deterioration in the quality of groundwater resources within some of the larger cities of the Western African countries. The aim of the project is to set up a regional observatory of aquifers vulnerability and early warning contamination for urban and "peri-urban" water supply.



### **ARTIFICIAL RECHARGE**

The growing demand to increase water resources has led to the concept of enhancing natural rates of aquifers, so that the security and quality of the local water supply may be improved and fragile ecosystems restored. IHP and IAHR have joined forces to encourage research and development on Managing Aquifer Recharge (MAR). A pilot study based in India and Nepal is currently assessing the effectiveness of artificial recharge schemes.



### **CLIMATIC CHANGES IN MONGOLIA**

A pilot research project involving the study of Central Asian climatic changes and their influences upon natural and economic conditions in Mongolia has been sponsored by IHP. Noted among the conclusions for the study, carried out by IHP in partnership with several Mongolian institutions, was the finding that global warming and shifts in natural zones left unchecked would adversely affect livestock husbandry and pasture production potential, key resources for the country's economy and domestic consumption.

### **GOUTTE OF WATER**

IHP is launching the Global Observatory of Units for Teaching, Training and Ethics of Water (GOUTTE of Water). Proposed as a worldwide association of university programmes, GOUTTE endeavors to promote the adoption of new principles, ethical norms, and wise practices in the management of water resources and the training of future specialists. GOUTTE is a partnership initiative and a follow-up of the Johannesburg Summit.

### **WORLD WATER HISTORY**

History being one of the most valuable sources of insight in shaping our vision of the future, UNESCO has supported the preparation of a comprehensive series of volumes on world water history. The series intends to provide the public, academics, and policy makers with an overview of the role of water over the course of mankind.

### **INTERNATIONAL GLOSSARY**

UNESCO and the World Meteorological Organization (WMO) are preparing an updated version of the International Glossary of Hydrology, which work will provide easy-to-use definitions of over 1,700 terms. This source of reference is being written in Arabic, English, French, Russian and Spanish, and it will be available on-line.



# Wise Strategies and Innovative Practices for the 21st Century

IHP networks at international, regional and local levels are calling for broader, more responsive interactions across the spectrum of society and the setting of wise strategies and innovative practices under these conditions. The IHP Programme for 2002-2007 is comprised of five themes, with a focus on the efficient management of water resources and

the world's ecosystems. The Programme intends to provide substantial, "policy-relevant" research results.

Improving human understanding of the hydrological processes through experimentation and modeling and providing new analytical techniques for the management of water resources are high priorities. The need for new, more precise predictions and scenario-case studies on climate changes and socio-economic trends regarding the diverse habitats of our planet is also highlighted. Events such as El Niño, region-specific land and water interactions, coastal and river systems, and underlying aquifers and watersheds are to be analyzed using an integrated approach.

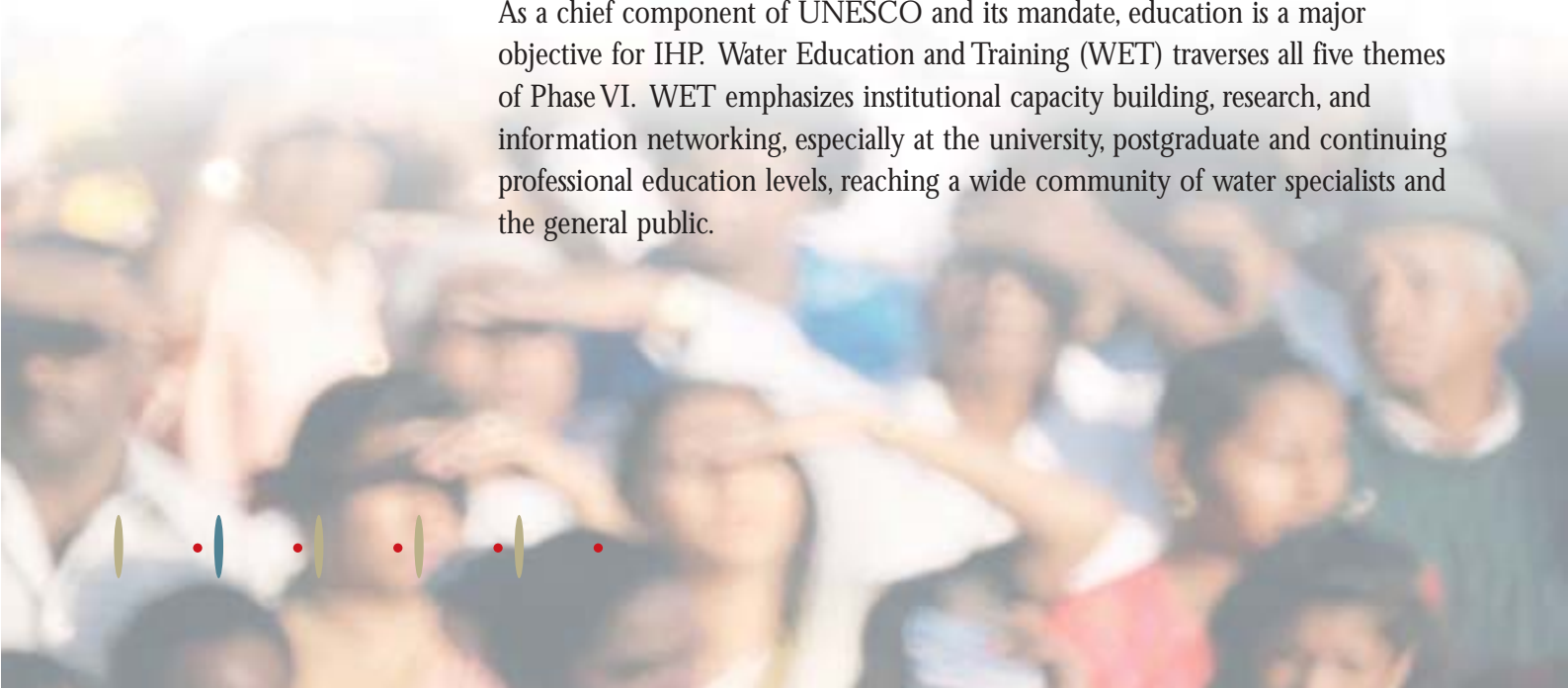
## **WATER INTERACTIONS: SYSTEMS AT RISK AND SOCIAL CHALLENGES – IHP 2002-2007**

- Theme 1 – Global Changes and Water Resources
- Theme 2 – Integrated Watershed and Aquifer Dynamics
- Theme 3 – Land Habitat Hydrology
- Theme 4 – Water and Society
- Theme 5 – Water Education and Training

The rapidly expanding large cities of the developing world are displaying many of the most extreme conditions: teeming human concentrations increased by high rates of rural migration and abysmal disparities between the wealthier and poorer segments of the population, the poorer often served by substandard,

subsidized water supplies at exorbitant prices. IHP has embarked on an active programme in order to produce approaches, tools and guidelines which will allow cities to improve their knowledge and analysis of the urban water situation and to draw up more effective urban water management strategies.

As a chief component of UNESCO and its mandate, education is a major objective for IHP. Water Education and Training (WET) traverses all five themes of Phase VI. WET emphasizes institutional capacity building, research, and information networking, especially at the university, postgraduate and continuing professional education levels, reaching a wide community of water specialists and the general public.



## IHP CENTERS

IHP has a network of regional and international centers. The centers are a cornerstone of UNESCO's strategy to improve scientific understanding of the water cycle and water resources management.

### CENTERS CURRENTLY IN OPERATION ARE

- Regional Centre on Urban Water Management (Tehran, Iran)
- Regional Centre for Training and Water Studies of Arid and Semiarid Zones of Arid and Semiarid Zones (Cairo, Egypt)
- UNESCO IHE Institute for Water Education (Delft, Netherlands)
- CATHALAC – Center for the Humid Tropics of Latin America and the Caribbean (Panama)
- Humid Tropics Hydrology Center for Southeast Asia and the Pacific (Kuala Lumpur, Malaysia)
- IRTCUD – International Research and Training Center on Urban Drainage (Belgrade, Serbia)
- IRTCES – International Research and Training Centre on Erosion and Sedimentation (Beijing, China)

### DUE TO START UP IN 2003 IS

- CAZALAC – Water Centre for Arid and Semiarid Regions of Latin America and the Caribbean (La Serena, Chile)

### FUTURE CENTERS IN THE PIPELINE ARE

- Regional Centre for the Management of Shared Groundwater Resources (Tripoli, Libya), under the auspices of UNESCO and WMO
- Regional Centre on Urban Water Management for Latin America and the Caribbean (Bogota, Colombia)
- Regional Centre for Ecohydrology (Warsaw, Poland)
- Regional Centre on Drought for Sub-Saharan Africa (site to be identified)
- International Groundwater Resources Assessment Centre (site to be identified)

## UNESCO CHAIRS

UNESCO has a network of university chairs, several of which deal with water-related issues and are working in coordination with IHP.

### CURRENT CHAIRS

- International Network of Water Environment Centres in the Balkans (INWEB), Aristotle University (Thessaloniki, Greece)
- Water in Desert and Arid Zones (2001), Al Fateh University (Tripoli, Libya)
- Water Resources (1994), Omdruman Islamic University (Khartoum, Sudan)
- Hydrogeology and Groundwater Resources Management (1999), University of the Western Cape (Bellville, South Africa)
- Environmental Education in Siberia (1995), Altai State Technical University (Barnaul, Russia)
- Gestion Durable de l' Eau (1998), Ecole Hassania des Travaux Publics (Casablanca, Maroc)
- Ecologically Safe Development of Large Regions: The Volga Basin (1997), Nizhny Novgorod State Academy of Architecture and Civil Engineering (Nizhny Novgorod, Russia)
- Water Resources (2001), Irkutsk State University (Irkutsk, Russia)
- Cousteau Ecotechnie (Chair/Network 1997), Unit of Environmental Studies and Development (UESD) (Aswan, Egypt)
- Wadi Hydrology (1999), Faculty of Hydrology, Jordan University (Amman, Jordan)
- Réseau Méditerranéen sur les ressources en eau, le développement durable et la paix (Chair/Network, 1999), Université de Nice-Sophia Antipolis (Nice, France)



## New Initiatives – Science and Policy in Action

The UN Millennium Goals, the World Summit on Sustainable Development (Johannesburg 2002) and the World Water Forums have brought together the key freshwater issues of the world today. These issues

must be translated into scientific challenges and subsequent research programmes and projects.

UNESCO's IHP programme provides the framework and identifies most of the relevant research areas necessary for finding the appropriate answers.

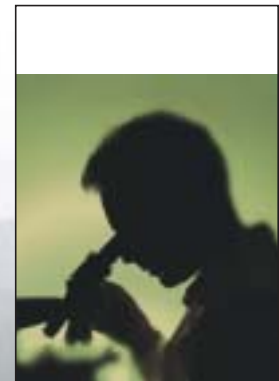
### PEACE THROUGH WATER

IHP has initiated two projects to address the challenges of shared water resources management.

- **PC→CP – "From Potential Conflicts to Cooperation Potential,"** jointly implemented with Green Cross International, aims at identifying and integrating cooperative solutions for the sustainable management of 263 river catchments shared by two or more countries.
- **ISARM – "Internationally-Shared Aquifer Resources Management,"** jointly implemented with IAH, the Food and Agriculture Organization (FAO) and the United Nations Economic Commission for Europe (UNECE), aims to set up a network of specialists and experts for compiling a world inventory of transboundary aquifers and developing wise practices and guidance tools concerning shared groundwater resources management.



- **HELP** – "**Hydrology for the Environment, Life and Policy**" is establishing a global network of catchments to improve the links between hydrology and the needs of society. This IHP-led initiative provides a framework for scientists, managers and policy experts working together to address locally defined water issues.
- **JIIHP** – "**Joint International Isotopes in Hydrology Programme**" is a joint UNESCO-International Atomic Energy Agency (IAEA) endeavor to develop activities integrating isotope methodologies into a broader range of water-resources practices and improving the capacity for understanding hydrological processes and the dynamics of surface and groundwater systems.
- **IGRAC** – "**The Intergovernmental Groundwater Resources Assessment Center**" aims to tackle the general lack of information and awareness about the status of groundwater resources. The Center will act as a catalyst for stimulating national and regional efforts in the monitoring and assessment of aquifer systems. The Center will be established under the auspices of UNESCO and the WMO.



## **THE WATER PORTAL**

The exchange of information and knowledge, as well as the raising of awareness, is fundamental in seeking sustainable solutions for the world's water problems. The UNESCO Water Portal is a global information system that aims not only to enhance the dissemination of information and knowledge related to freshwater worldwide, but also to contribute to the reinforcement of capacity building for Member States. The Portal serves as a viable tool in narrowing the "digital divide."

The Internet address for the UNESCO Water Portal is <http://www.unesco.org/water>.

## **INTERNATIONAL PRIZE ON WATER RESOURCES**

UNESCO awards biannually the International Prize for Water Resources in Arid and Semiarid Zones biannually to scientists and institutions working to find the proper tools to combat water scarcity.

## **Where We Are**

IHP Headquarters are located in Paris, France.  
For more information about IHP, please contact us at

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