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NATIONAL REPORTS OF THE NATIONAL COMMITTEES FOR THE IHP (2006 – 2008)

SUMMARY

The following National Reports of the National Committees for the IHP cover the activities for the intersessional period between the 17th and the 18th sessions of the Intergovernmental Council of the IHP (June 2006 - May 2008).

Pursuant to a decision by the 14th session of the IHP Council, the Reports are herewith reproduced in electronic format only.

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NATIONAL REPORT ON IHP RELATED ACTIVITIES

A R M E N I A

1. ACTIVITIES UNDERTAKEN IN THE PERIOD JULY 2006 – MAY 2008

1.1 Meetings of the IHP National Committee

1.1.1 Decisions regarding the composition of the IHP National Committee

Armenian National Committee of International Hydrological Programme of UNESCO has been established on 27 September 2007 (Minutes N 01-09/07). The National Committee establishment meeting has been initiated and conducted with the active participation of the following organizations: Technical Consultative Commission on Water Systems Operation and Maintenance, which is the independent panel of highly professional experts established in accordance with the Armenian Water Code to provide consultancy to the Government; Water Problems and Hydraulic Engineering Institute after academician I.V. Eghiazarov, which is the leading scientific-research institute acting in water and hydraulic engineering sector in the country; Yerevan State University of Architecture and Construction, which is the state institution providing higher education in hydraulic engineering and construction as well as in water infrastructure and resources management; Armenian National Society on Hydraulic Researches, which is non-governmental organization involved in various local and international water research projects; and "Paskal" Ltd – a private company involved in the hydrological studies and water resources management related projects. The presidium of the IHP Armenian National Committee includes the following members:

Hovhannes Tokmajyan	Doctor of Technical Science, Professor, Rector of Yerevan State University of Architecture and Construction; Head of Armenian National Committee
Armine Simonyan	Ph.D. in Water Engineering, Member of Armenian Technical Consultative Commission on Water Systems Operation and Maintenance; Environmental and Social Officer of the MCA–Armenia SNCO; Secretary of Armenian National Committee
Grigor Gabayan	Ph.D. in Engineering, Member of Armenian Technical Consultative Commission on Water Systems Operation and Maintenance; Director of "Hydroenergy" Ltd.
Edgar Jrbashyan	Ph.D. in Engineering, Deputy Director of the Water Problems and Hydraulic Engineering Institute after academician I.V. Eghiazarov
Razmik Petevotyan	Ph.D. in Engineering, Docent; Dean of the Faculty of Hydraulic and Civil Engineering of the Yerevan State University of Architecture and Construction
Albert Margaryan	Ph.D. in Engineering, Docent; Chair of Hydraulics of the Yerevan State University of Architecture and Construction
Vilik Sargsyan	Doctor of Technical Sciences, Member of Armenian National Society on Hydraulic Researches
Tigran Kalantaryan	Ph.D. in Engineering, Member of Armenian National Committee Armenian National Society on Hydraulic Researches
Tigran Martirosyan	Ph.D. in Economics, representative of Paskal Ltd.

1.1.2 Status of IHP-VI activities

Since the National Committee was established even less than a year ago, there is no much information to be reported under the section related to current activities. However it is expected that the involvement of the Committee in water sector related activities will grow with time. Among the major current activities the following should be reported:

- Participation in organization of international conference;
- Provision of information regarding the activities of the Armenian National Committee to the International Hydrological Program of UNESCO.

1.1.3 Decisions regarding contribution to/participation in IHP-VII

N/A

1.2 Activities at national level in the framework of the IHP

1.2.1 National/local scientific and technical meetings

Within the reporting period several technical meeting with participation of Armenian National Committee presidium members and invited scientists to draft a proposals for activities planned to be implemented within the 2008-2011.

1.2.2 Participation in IHP Steering Committees/Working Groups

N/A

1.2.3 Research/applied projects supported or sponsored

N/A

1.2.4 Collaboration with other national and international organizations and/or programmes

The Armenian National Committee is currently collaborating with several local organizations involved in the process of organization of the International Scientific-Technical Conference “Architecture and Construction – Topical Problems” to be held in Yerevan on October 2008.

1.2.5 Other initiatives

N/A

1.3 Educational and training courses

1.3.1 Contribution to IHP courses

Yerevan State University of Architecture and Construction, which was involved in the establishment of Armenian National Committee and which is the state institution providing higher education in hydraulic engineering and construction as well as in water infrastructure and resources management accepts students from foreign countries for MS and PhD courses and as well as is implementing exchange programs.

1.3.2 Organization of specific courses

N/A

1.3.3 Participation in IHP courses

N/A

1.4 Cooperation with the UNESCO-IHE Institute for Water Education and/or international/regional water centres under the auspices of UNESCO

N/A

1.5 Publications

N/A

1.6 Participation in international scientific meetings

1.6.1 Meetings hosted by the country

N/A

1.6.2 Participation in meetings abroad

N/A

1.7 Other activities at regional level

1.7.1 Institutional relations/cooperation

N/A

1.7.2 Completed and ongoing scientific projects

N/A

2. FUTURE ACTIVITIES

2.1 Activities planned until December 2009

1. International Conference "Architecture and Construction – Topical Problems"

Armenian National Committee is co-organizator of the International Scientific-Technical Conference "Architecture and Construction – Topical Problems", which will be held in the Yerevan State University of Architecture and Construction in Yerevan, Armenia on October 15-18, 2008. Several water related topics of the conference as the followings: Hydraulic engineering construction, Water systems and their operation, Hydraulics, mechanics of liquids and gases, etc. Several members of the Armenian National Committee are included in the Organizing Committee and the Head of the Armenian National Committee is a co-chairman of the Conference Organizing Committee.

2. Proposal on development and publication of multilingual technical explanatory dictionary of terms in hydrology and hydraulic engineering

A Multilingual Technical Explanatory Dictionary of Terms in Water Resources and Hydraulic Engineering (Armenian, Russian, English and French) is intended to provide definitive descriptions of terms in hydrology, water resources and hydraulic engineering, giving guidance on their appropriate usage and context. The glossary developed and published in series will contain appropriate diagrams, figures, tables, maps and technical explanations, and is envisaged to be considered as a very practical tool to apply this knowledge to solve problems in water resources and systems management as well as to facilitate international technical communication in water resources and systems field. Containing around 4000 commonly-used terms expressed in a user-friendly manner, these books will serve as a valuable resource for both practitioners and academicians.

The explanatory dictionary will be divided into the series of books to be developed and published after each other:

- Volume 1: Hydrology: Surface Water Resources (2008-2009)
- Volume 2: Hydrology: Groundwater Resources (2008-2009)
- Volume 3: Hydraulics: Water systems (2010)
- Volume 4: Water Use: Urban, Irrigation, Hydroenergy, etc. (2010)
- Volume 5: Ecohydrology (2011)

A Multilingual Glossary will be developed by the research engineers and scientists with substantial experience in the respective fields. Hydrologists, civil engineers, environmentalists or any student can use it to define their research in current terminology. It will be of great use and interest to scientists, engineers and ecologists, professionals and students working in hydrology/hydraulics, urban water resource/system planning, management and regulation, and ecology.

3. Proposal on development of debris and flood control strustures and methods for their calculation

Protection of automobile roads and railways, communities and infrastructure from the influence of mudflows and floods has a very important economic and environmental meaning. This problem is especially urgent for the counties with mountainous landscape as is the case with Armenia.

Among the flood protection means the following two types of hydraulic structures (different by the operation type) can be considered:

- Derivation canals, mudflow escape canal and other linear structures, envisaged for the transportation and diversion of mudflows and floods;
- Dams, solid and perforated barrages and other transversal structures, which are aimed at breaking the inflowing mudflows, what in its turn leads to the river bed stabilization. Taking into account the relative cheapness and reliability of such structures, these means are widely used in practice.

Semi-centennial experience on operating such structures reveals serous deficiencies in both the methodology of calculating the criteria of bed-stabilization process and the structures applied. Deficiencies and omission of existing methods for calculation are substantiated by the absence of mathematical model to describe the actual process of this multifactor hydrodynamic process. Design defects are significantly decreasing the efficiency of operation, disturbing natural structure of river-bed regime.

Based on the analysis and processing of the large amount of the laboratory and field experiments and investigations, and taking into account the respectable experience of the proposed experts in resolving various problems related to river-bed processes, it is suggested to develop:

- Theory of river-bed formation process, considering the key factors impacting this process, such as criteria of inflowing sediments and bed of the stream/channel, parameters of mudflow and barrage structure;
- New efficient designs for flood control structures and the methods of their hydraulic calculation.

Investigations and analysis will allow to suggest a package of a programs aimed at determination of the following issues:

- Parameters of mudflow and protective/control structures;
- Parameters of longitudinal and transversal sections of the stabilized beds;
- Criteria of new designs for bed-regulating transversal structures and the duration of filling the structure.

2.2 Activities foreseen for 2010-2011

- Participation in IHP activities and events;
- Continue development and publication of Multilingual Technical Explanatory Dictionary of Terms in Hydrology and Hydraulic Engineering (Volume 3: Hydraulics: Water systems; Volume 4: Water Use: Urban, Irrigation, Hydroenergy, etc; Volume 5: Ecohydrology);
- Participation in organizing and conducting a Conference on trans-boundary water resources management of Kura-Araks water basin (Yerevan, October 2010);

- Development and information dissemination through a web-page of the Armenian National Committee.

2.3 Activities envisaged in the long term

- Participation in IHP activities and events;
- Follow up activities related to the Conference on trans-boundary water resources management of Kura-Araks water basin. Organization of further meeting to discuss this issue.

NATIONAL REPORT ON IHP RELATED ACTIVITIES
AUSTRALIA

1. ACTIVITIES UNDERTAKEN IN THE PERIOD OCTOBER 2006 – May 2008

At the 33rd session of the UNESCO General Conference (2005), Australia was elected to the IHP Intergovernmental Council.

1.1 Meetings of the IHP National Committee

IHP activities in Australia are carried out under the guidance of the national UNESCO Science and Technology Network. In order to facilitate the implementation of UNESCO activities in Australia and the region, a national IHP Australian Network was established in 1995 and this network acts as the IHP National Committee for Australia. There are no formal meetings of the IHP Australian Network. Activities are conducted largely between the members by telecommunications (e-mail). The activities of the IHP network are reported on at meetings of the national UNESCO Science and Technology Network. The Australian National Commission (NATCOM) for UNESCO (www.dfat.gov.au/intorgs/unesco) has 12 members, two parliamentary representatives and four honorary members. Mr Bruce Stewart and Professor Ian White represented the IHP National Network at these meetings.

1.1.1 Decisions regarding the composition of the IHP National Committee

The IHP Australian Network includes the following members. Summary details of all current members are listed below.

Name	Expertise	Organization
Bruce Stewart	Water Resources Assessment	Bureau of Meteorology
Tony Falkland	Island Hydrology	
Trevor Daniell	Urban, Low and High Flow Hydrology	University of Adelaide
Ross James	Hydrological Data & Networks	Bureau of Meteorology
Peter Martin	Public Relations	CRC for Weed Management
Ian White	Hydrology/Water Quality	Australian National University
Erwin Weinmann	Flood management/water resource management	Monash University
Ian Cordery	Flood/Drought Hydrology	University of New South Wales
Peter Dillon	Groundwater	Centre for Groundwater Studies
Anne Jensen	Ecotones	Wetlands Care Australia
Shahbaz Kahn	Sustainable irrigation systems	CSIRO now Unesco (April 2008)
Ray Volker	Groundwater	University of Queensland

1.1.2 Status of IHP-VI activities

The IHP Australian Network brings together many of the key hydrological research groups within Australia. As such, Australia is able to contribute towards IHP activities through the research programs currently existing in Australia. For example, the eWater Cooperative Research Centre (CRC) and other centres for research undertake activities which are closely aligned to the themes of IHP-VI. A description is provided below of some activities pertinent to IHP-VI.

- *Theme 1 - Global Changes and Water Resources*

A subset of the hydrological data collected by the State and Territory water agencies and the Bureau of Meteorology is contributed to international data centres for use in global and regional studies. The eWater Cooperative Research Centre (http://www.ewatercrc.com.au/) is continuing its research program that includes modelling hydroclimatic variability and impact on water

resources and aquatic ecosystems and rare events and resilience in hydrological and ecological risk assessment. The Indian Ocean Climate Initiative (IOCI) (http://www.ioci.org.au), a partnership of research organisations, is researching the impact of climate variability and climate change on the water resources of the southwest region of Australia. CSIRO (http://www.csiro.au/), Australia's national research organisation, has research programs addressing global and regional climate change, climate change impacts on natural resources including water and climate change adaptation strategies. Australian National University (ANU) together with Ecowise Environmental have been researching vulnerability and adaptation to global change in small island countries and have contributed to AusAID's Pacific vulnerability and adaptation project. The ANU, Ecowise Environmental and the University of Adelaide have been investigating the vulnerability of water supply catchments in the Australian Capital Territory to global change.

- *Theme 2 – Integrated Watershed and Aquifer Dynamics*

The Centre for Groundwater Studies (http://www.groundwater.com.au) has an extensive research program including research on groundwater/surface water interaction and is investigating how better to manage groundwater resources especially using aquifer storage and recovery. The ANU is researching artesian groundwater processes and modelling of groundwater changes in the lower Great Artesian Basin and in south eastern Australia. ANU, with Ecowise Environmental, are investigating shallow groundwater recharge, socio-cultural aspects of groundwater management and impacts of climate variability in low coral islands as a follow up to a UNESCO-IHP initiated project. As a result of a National Water Initiative (NWI) agreed by Australian federal and state governments all Australian water agencies are required to develop comprehensive water management plans. The plans are being developed through a process of extensive stakeholder consultation and watershed modelling. The process being employed and the resultant plans provide a valuable resource for similar projects elsewhere in the world.

- *Theme 3 - Land Habitat Hydrology*

The ANU and Ecowise Environmental have ongoing projects in conjunction with UNESCO-IHP investigating shallow groundwater recharge, water quality, impacts of land-use and extraction and socio-cultural aspects of groundwater management and impacts of drought in low coral islands. The ANU together with NSW Department of Primary Industry has been investigating estuary policy and management strategies to improve the health of estuaries. Research into hydrological process in and the sustainable management of wetlands is being undertaken in a number of universities and eWater Cooperative Research Centre and the ANU in conjucion with UNSW and the NSW Sugar Industry has been investigating the use of constructed wetlands to treat drainage from farm lands. The urban environment and water sensitive urban design are also areas of current research.

- *Theme 4 – Water and Society*

The National Land and Water Resources Audit (http://www.nlwra.gov.au/) and http://audit.ea.gov.au/ANRA/atlas_home.cfm) and the Water and the Economy study have produced a considerable body of data and information about the value, use, distribution and quality of water within Australia. Research on property rights of water and the structure, operations and social and economic impacts of water trading markets continues to receive a lot of attention in Australia and is a potential resource for similar projects in other countries. The ANU, the French agency CIRAD and Ecowise Environmental has undertaken research on the use of multi agent systems and companion modelling to support negotations and reduce conflict over groundwater use in low atolls.

- *Theme 5 Water Education and Training*

Each of the Cooperative Research Centres (CRC) is required to undertake an active program of training to ensure their research and technology are transferred into practise as soon as possible. The water related CRCs are:
eWater CRC (http://www.ewatercrc.com.au/)

CRC for Water Quality and Treatment (http://www.waterquality.crc.org.au/)
CRC for Irrigation Futures (www.irrigationfutures.org.au/)

These CRCs are a partnership between universities and other research centres that also have educational and training programs. Some of the research centres are listed separately below.

Centre for Groundwater Studies (http://www.groundwater.com.au)
The purpose of the centre is to provide research, education and specialist services for Australian and International land and water industries with the objective of improving the management of resources affected by groundwater processes.

Centre for Environmental Applied Hydrology (http://www.civag.unimelb.edu.au/ceah)
The Centre for Environmental Applied Hydrology is a research centre within the Departments of Civil and Environmental Engineering and Geography and Environmental Science at the University of Melbourne. Specific expertise covers all aspects of surface and groundwater hydrology, hydraulics and geomorphology.

Fenner School of Environment and Society, Australian National University (http://cres.anu.edu.au) conducts research and postgraduate training in spatial-temporal variability and characterisation of climate, integrated catchment management, groundwater modelling and hydrology, floods and droughts, coastal hydrology and land use, salinity, cultural and indigeneous water issues, water and land policy and related socio-economic interactions, ecological economics.

The International Centre of Excellence in Water Resource Management (ICE WaRM) (http://www.icewarm.com.au/) is made up of a consortium of universities and has a strong focus on education and training. It promotes itself to international water resource management students to further their education in Australia and is also developing online courses for delivery in Australia and overseas.

International Water Centre (www.watercentre.org/) is a joint venture between University of Queensland, Griffith University, Monash University, University of Western Australia, International RiverFoundation, Moreton Bay and Catchments Partnership and the Queensland Government. The Centre aims to take Australia's expertise in whole of water cycle management to organizations in the rest of the World through Applied Research, Education and Training and Knowledge Services.

Professor David Waite, Director of the Centre for Water and Waste Technology & Dr Ashish Sharma, from School of Civil & Environmental Engineering at UNSW, are collaborating with Hohai University of Nanjing to develop joint research & Masters' level training programs in WATER MANAGEMENT through the Australia China Consortium for Water Research (ACCWR)

- *Crosscutting Program Components – FRIEND and HELP*

Collaboration in the Asian Pacific FRIEND project by provision of data, hosting a node of the Internet based Water Archive, and assisting in research activities. The CSIRO Griffith and Charles Sturt University Wagga Wagga is a Regional Coordinating Unit for HELP and the Lower Murrumbidgee Catchment has been classified as a Demonstration HELP basin and was the only Demonstration basin of the HELP Pilot Phase. The Burdekin basin and the Fitzroy basin have been classified as Operational Help basins. Both basins are in Queensland.

1.1.3 Decisions regarding contribution to/participation in IHP-VII

Australia is in a strong position to provide input across the range of Focal Areas identified. The research programs of the CRCs, CSIRO and relevant Australian University groups are closely aligned with the activities proposed within the four major theme areas. Some areas in which initial contributions are anticipated include:

Theme I- Global Change, Watersheds and Aquifers

Objective **:** Achieve improved definition of water dependencies in the face of continuing global change, assess particularly stressed areas and develop institutional synergies to mitigate them.

Primary Focal Area:
Focal Area I-1: Large-scale groundwater dependencies related to global change.

- The Great Australian Artesian basin and associated research activities.
- Frameworks for determining sustainable yield of aquifers

Focal Area I-2: Hydrological extremes in sensitive and stressed biomass and hydroclimatic zones e.g. small island developing states.

- Research activities involving the Pacific Island Countries

Focal Area I-3: Global change and feedback mechanisms of hydrological processes in stressed environments.

- The Murray Darling River Basin and GEWEX related research activities

Focal Area I-4: Changing global dynamics in aquatic environments: degrading ecosystems, especially those susceptible to sea level change, coastal sediment balance and pollutant accumulation.

- Research activities involving the Pacific Island Countries
- eWater CRC Research Activities on water quality and catchment processes
- Groundwater dependent ecosystems

Theme II: Governance and Socio-Economics

Objective: Strengthen good governance, wise stewardship of the resources; achieve capacity development and promote assured flow of finances.

Focal Area II-1: Culture, ethics and legislation for wise stewardship of water.

- Indigenous water knowledge and understanding
- Pacific Island countries culture and water issues

Focal Area II-2: Good Governance, capacity development and stakeholder participation. Empowerment of human resources.

- Assisting in training on MAR (management of aquifer recharge) including management policies, codes of practice
- Frameworks for determining sustainable yield of aquifers
- Aquifer storage and recovery

Focal Area II-3: Affordability, poverty alleviation and assured financing, for effective IWRM. Include ‘water’ in national PRSP'

- Implementation of IWRM in the Pacific Island Countries (assistance to SOPAC)
- Australian National Water Initiative

Focal Area II-4: Shared Water resources and conflict

- Water markets and water trading approaches
- International exchange of data

Theme III: Ecohydrology and Environmental Sustainability

Objective: Enhance the designation of water both as an abiotic resource, and as a service, delivered by eco system processes; identify, quantify and improve the critical linkages for environmental sustainability

Focal Area III-1: Water as a landscape agent: erosive capacity, mobile solvent, habitat for aquatic biota - interdependencies and regulation in biogeochemical cycling.

- Developing policy and programs to support ecosystem enhancement through ecosystem service production

Focal Area III-2: Complementing engineering solutions with ecological measures resulting in sustainable carrying capacity of ecosystems

- Developing policy and programs to support ecosystem enhancement through ecosystem service production
- National Approach to Biodiversity Decline

- Groundwater dependent ecosystems

Focal Area III-3: Urbanization pressures, sustainable cities, towns and villages; water and sanitation for mega cities

- Free exchange of information between the Australian Water Conservation Reuse Research Program and UNESCO

Focal Area III-4: Risk based environmental management (under uncertainty), especially climate change threats to ecosystem functions

- Biodiversity and climate change

Theme IV: Water Quality, Human Health and Food Security

Objective: Improved understanding of the distribution of abiotic and biotic pollutants in the water cycle and their impact on human heath; access to water for long term food security

Focal Area IV-1: Methodologies for safeguards against water borne biotic and abiotic pollutants

Focal Area IV-2: Access to safe water, human health and integrated water resource management.

- A major new research project on storing wetland treated stormwater in a brackish aquifer for recovering potable water. This will be an icon project with much on HACCP that will be transferable to developing countries.

Focal Area IV-3: Non-conventional water resources: brackish water use and waste water re-use.

- major new research project on storing wetland treated stormwater in a brackish aquifer for recovering potable water. This will be an icon project with much on HACCP that will be transferable to developing countries.
- Free exchange of info from Australian Water Conservation Reuse Research Program and UNESCO

Focal Area IV-4: Access to water for food security in environmentally stressed zones.

- Climate variability and change and water resources for agriculture

1.2 Activities at a national level in the framework of the IHP

1.2.1 National/local scientific and technical meetings

- 30th Hydrology and Water Resources Symposium, 4-7 December 2006 Launceston, Tasmania
- 9th Australasian Environmental Isotope Conference and 2nd Australasian Hydrogeology Research Conference with the theme *Integrating research and Innovation*, 13-15 December 2006, Adelaide (http://groundwater.com.au/aust-isotope-and-hydro-conferences.html).
- The biennial convention of the Australian Water Association (AWA) (www.awa.asn.au) is the Australian water industry's largest and most prestigious event. It is an internationally recognised and well attended occasion, attracting delegates from across Australia and around the globe. The Ozwater 2007 Convention & Exhibition, was held 4-8 March 2007 in Sydney.
- 5th Australian Stream Management Conference, 21-25 May 2007, Albury, NSW.
- 3rd AWA WATER REUSE AND RECYCLING CONFERENCE 16th - 18th July 2007. University of New South Wales.
- RAINWATER & URBAN DESIGN 2007, 21-23 August 2007, Sydney. This event incorporated the 13th International Rainwater Catchment Systems Conference, 5th International Water Sensitive Urban Design Conference and 3rd International water Association Rainwater Harvesting and Management Workshop.
- 10th INTERNATIONAL RIVERSYMPOSIUM & ENVIRONMENTAL FLOWS CONFERENCE, Brisbane 3 - 6 September 2007. The symposium includes the Thiess International Riverprize.
- Water for Life Forum 2007: Leading practice in water education was held on 19 September 2007 in Sydney.
- National Water Week, 21-27 October 2007 (www.nationalwaterweek.org.au)
- Greenhouse 2007 convened by CSIRO held 12-5 October 2007 in Sydney had the theme Projections, Probabilities People, Perceptions.

- Hydrological consequences of climate change symposium, November 15-16, 2007, Canberra. brings together Australia's leading climate and water scientists to improve understanding of the likely hydrological consequences of future climate.
- 5th National Waterwatch Conference (www.waterwatch.org.au) was held in Canberra, 26-29 November 2007.
- MODSIM2007, 8-16 December 2007, Christchurch, New Zealand. International Congress on Modelling and Simulation.
- Securing Groundwater Quality in Urban and Industrial Environments. Fremantle, Western Australia, 2-7 December 2007.
- 3rd NATIONAL WATER EDUCATION CONFERENCE, WATER EFFICIENCY 2008 and WICD 2008. All three conferences were held 30 March - 2 April 2008 on Queensland's Gold Coast. Education website (Website 1), Efficiency website (Website 2), WICD website (website 3).
- **2nd International Salinity Forum,** Adelaide, South Australia, 30 March to 4 April 2008
- **Water Down Under 2008,** incorporating the **31st Hydrology and Water Resources Symposium** and the **4th International Conference on Water Resources and Environment Research (ICWRER),** Adelaide Convention Centre, 14-17 April 2008
- ENVIRO08 A conference and exhibition for showcasing the Australian environment industry. Will be held 5-7 May 2008, Melbourne (www.enviroconvention.com.au/).
- A number of meetings of the National Committee on Water Engineering, Institution of Engineer's have been held during this period. Some of the key purposes of these meetings are to coordinate and organise hydrology and water resources symposia and conferences, to coordinate the ongoing revision to the national hydrological design guidelines Australian Rainfall and Runoff, prepare Position Papers on key hydrological issues and to manage the publication of Australian Journal of Water Resources. Position Papers are now all available on the Institution of Engineers, Australia web site: (http://www.eng.newcastle.edu.au/~ncwe/ncwePosPaper/ppHome.htm).

1.2.2 Participation in IHP Steering Committees/Working Groups

Australian experts were nominated for a number of IHP-VI Theme Advisory Boards with Prof. Ian White being appointed as a Regional Representative to the Advisory Board for Theme 4 – Water and Society.

Prof Shahbaz Khan was Chair of the International Steering Committee of the Hydrology for the Environment, Life and Policy (HELP) Program and the Regional Coordinator for the Australasian region. Since April he has been in Unesco Paris as Chief, Sustainable Water Resources Development and Management Section, Division of Water Sciences. Mr Tariq Rana of CSIRO will be the new Regional Coordinator for for UNESCO HELP based at the CSU International Centre of Water for Food Security. Email Tariq.Rana@csiro.au.

CSIRO is the Australian research organisation linked to the Water and Development Information for Arid Lands – A Global Network (G-WADI) project set up by the IHP (www.gwadi.org/).

Prof Ian White was elected to the Governing Board of UNESCO IHE, Institute for Water Education, Delft, the Netherlands in 2006 and is a Member Editorial Board UNESCO- Cambridge University. Press International Hydrology Series.

Prof Trevor Daniell was elected Chairman of the Friend Inter-Group Coordinating Committee at it meeting in Havana, Cuba in December 2006. The 7th FIGCC Meeting was held in Adelaide on April 9th, 2008.

1.2.3 Research/applied projects supported or sponsored

As a follow-up to the UNESCO/SOPAC research projects in Kiribati and Tonga, Professor Ian White, ANU is Project Manger of an ACIAR (Australian Centre for International Agricultural

Research) sponsored project titled: Equitable Groundwater Management for the Development of Atolls and Small Islands. Its overall aim is to provide the basis for the sustainable use and equitable sharing of groundwater resources and their associated catchments between competing sectors, particularly agriculture, combining research on climate, groundwater, cropping and irrigation practices, economics, cultural traditions and social customs, and the aspirations and needs of stakeholders. A start has been made with the first phase of the project in Kiribati focussing on equitable groundwater use in North and South Tarawa. The project is being carried out in conjunction with the French agency CIRAD, the South Pacific Applied Geoscience Commission and government agencies in Kiribati and Tonga. This work is using Multi Agent Systems and a companion modelling approach to develop Negotiation Support Systems to minimise conflicts over water resource development and use.

The Australian Water Research Facility, a partnership between AusAID and the International Water Centre (www.watercentre.org/research/awrf) has a project to research catchment-based risk assessment in the Solomon Islands. The project will develop a framework for determining priorities for water resources management action in catchments.

White I., Falkland A., Metutera T. and Metai E. (2005). Effects of Landuse on Groundwater Quality in a Low Coral Atoll. Coliforms, Nutrients and Metals. ACIAR Project LWR1/2001/050, Equitable Groundwater Management for the Development of Atolls and Small Islands, prepared for the Australian International Agency for Agricultural Research, May 2005

White I., Falkland A., Perez P., Dray A. , Metutera, T. , Metai E., and Overmars M. (2005). Challenges in freshwater management in low coral atolls. Journal of Cleaner Production, Special Edition Water Management in Coastal Zones.

White I., Falkland A., Metutera, T. , Metai E., Perez P., Dray A. and Overmars M. (2005). Climatic And Human Influences On Water Resources In Low Atolls. In Proceedings Of The International Seminar On: Climatic And Anthropogenic Impacts On The Variability Of Water Resources Umr Hydrosciences Montpellier / Unesco / Omm Maison des Sciences de L'eau de Montpellier, 22 - 24 November 2005.

1.2.4 Hydrology for Environment, Life and Policy (HELP)

Australia continues to contribute to the projects established under the HELP banner: the Lower Murrumbidgee catchment in the Murray Darling River Basin, Burdekin River basin (Queensland), Fitzroy River basin (Queensland) and the Mount Lofty Ranges (South Australia).

Lower Murrumbidgee Catchment

Cooperation between researchers, farmers and industry in the Lower Murrumbidgee catchment, and its power to achieve useful and practical on-ground results, is the focus of this HELP initiative. The southern New South Wales catchment has been named as the UNESCO HELP program's first global reference basin. This means that the region's farmers, researchers and irrigation companies will be used as an example to showcase practical solutions for water resources management under competing water uses and economic concerns. The research efforts in the area are addressing problems including rising water tables and salinity, reduced river flows, legislative reforms, competition between water users (including the environment) and falling deep aquifer pressure levels. The catchment is significant; with 2730 farms spread over 560,000 hectares in the Murrumbidgee and Coleambally irrigation areas. Almost a quarter of the water extracted from the Murray-Darling Basin each year is used to produce more than $1 billion worth of crops – almost 16% of Australia's agriculture produce. The lower Murrumbidgee catchment presents an excellent example of community involvement in hydrological research and the development of integrated catchment management policies using a range of tools. In addition,

CSIRO Griffith and Charles Sturt University Wagga Wagga have been accepted as a Regional Coordinating Unit for HELP.

Contact Point: Mr Tariq Rana (CSIRO) (tarig.rana@csiro.au)

Charles Sturt University, Wagga Wagga, New South Wales is nearing completion of the process of establishment the International IHP-HELP Centre of Water for Food Security (IC WATER) as a UNESCO Category II Centre. The Centre aims to emphasize the pursuit of sustainable development and integrated water resources management in rural and peri-urban food production zones, through the development of scientific research, education, training and awareness-raising at all levels. The development of appropriate policies and practices, the international networking of scientists and the transfer of information and knowledge through IHP-HELP twin basin approach. On 28-30 May 2007 Prof Siegfried Demuth and Mr Giuseppe Arduino visited Charles Sturt University to discuss the establishment of the centre.

Contact Point: Dr Shahbaz Khan (CSIRO) (shahbaz.khan@csiro.au)

1.2.5 Collaboration with other national and international organizations and/or programmes

As President of the WMO Commission for Hydrology and also Chair of the Australian IHP Network, Mr Bruce Stewart provides a link between the UNESCO IHP and WMO's Operational Hydrology Programme. Tony Falkland and Ian White are members of the Water Working Group of the Science, Technology and Resources Network of the South Pacific Applied Geoscience Commission. Ian White is a member of the Asian Pacific Association of Hydrology and Water Resources.

1.2.6 National Plan for water security

As a result of 10 years of drought across a large portion of the country, in recognition that past management of water resources has not been affective, and that the recent National Water Initiative was not achieving sufficiently rapid progress in improving water management, the Australian government has embarked upon a National Water Security Plan. The plan has funding of $10B, will run for 10 years and includes the following components.

- a nationwide investment in Australia's irrigation infrastructure to line and pipe major delivery channels;
- a nationwide programme to improve on-farm irrigation technology and metering;
- the sharing or water savings on a 50:50 basis between irrigators and the Commonwealth Government leading to greater water security and increased environmental flows;
- addressing once and for all water over-allocation in the Murray-Darling Basin;
- a new set of governance arrangements for the Murray-Darling Basin;
- a sustainable cap on surface and groundwater use in the Murray-Darling Basin;
- major engineering works at key sites in the Murray-Darling Basin such as the Barmah Choke and Menindee Lakes;
- expanding the role of the Bureau of Meteorology to provide the water data necessary for good decision making by governments and industry;
- a Taskforce to explore future land and water development in northern Australia; and
- completion of the restoration of the Great Artesian Basin.

The release of the National Plan for Water Security has resulted in the passing of the first Water Act. Previously water management was covered by a range of legislation enacted by the eight State and territory governments

1.2.7 Other initiatives

1.3 Educational and training courses

1.3.1 Contribution to IHP courses

The Bureau of Meteorology provided input to the meteorology and climatology components of the SOPAC/UNESCO/WMO Hydrological Training Programme that was funded by NZAID and run over the 3 years to 2006 in Fiji.

1.3.2 Organisation of specific courses

A groundwater training course for the Ministry of Public Works and Utilities, Republic Of Kiribati was held at the Australian National University in 12-21 June 2007. The training course was designed to increase capacity in groundwater assessment, monitoring and management and included the maintenance and calibration of Ministry equipment.

1.3.3 Participation in IHP courses

1.3.4 Other

The Centre for Groundwater Studies (a joint venture between 9 research/educational institutions, government water management organizations and private consultants) organises a wide range of groundwater related training courses. Details of courses can be found at the web site http://www.groundwater.com.au/conf/content.asp. The centre has established strong links with institutions in the region, particularly in Indonesia, Malaysia, Thailand and China.

Funding support was provide to enable Mr Amos Ona from the PNG WWF to gain experience through participation in and presentation of a paper at the RiverSymposium held in Brisbane, September 2007.

The Brisbane-based International Water Centre announced a new Masters of Integrated Water Management course in December 2006. The course brings together expertise from Australia's leading universities to build capacity for today's water resource managers MIW website. The course starts August 2007.

1.3.5 Cooperation with the UNESCO-IHE Institute for Water Education and/or international/regional water centres under the auspices of UNESCO

Charles Sturt University, Wagga Wagga, New South Wales is nearing completion of the process of establishment the International IHP-HELP Centre of Water for Food Security (IC WATER) as a UNESCO Category II Centre. The Centre aims to emphasize the pursuit of sustainable development and integrated water resources management in rural and peri-urban food production zones, through the development of scientific research, education, training and awareness-raising at all levels. The development of appropriate policies and practices, the international networking of scientists and the transfer of information and knowledge through IHP-HELP twin basin approach. On 28-30 May 2007 Prof Siegfried Demuth and Mr Giuseppe Arduino visited Charles Sturt University to discuss the establishment of the centre.

1.4 Publications

White I., Falkland A., Metutera, T. , Metai E., Perez P., Dray A. and Overmars M. (2005). Climatic And Human Influences On Water Resources In Low Atolls. *In Proceedings Of The International Seminar On:* Climatic And Anthropogenic Impacts On The Variability Of Water Resources Umr Hydrosciences Montpellier / UNESCO / OMM, Montpellier, 22 - 24 November 2005.

Daniell T., and White I. (2005) Bushfires and their Implications for Management of Future Water Supplies in the Australian Capital Territory. *In Proceedings Of The International Seminar On:*

Climatic And Anthropogenic Impacts On The Variability Of Water Resources Umr Hydrosciences Montpellier / UNESCO / OMM, Montpellier, 22 - 24 November 2005.

F Ghassemi and I White (2007). Inter-basin Water Transfer: Case Studies from Australia, United States, Canada, China and India., Cambridgement University Press, UNESCO International Hydrology Series, Jan 2007

Cordery, I; Weeks, B; Loy, A; Daniell, T; Knee, R; Minchin, S; Wilson, D (2007) Water Resources Data Collection and Water Accounting, Australian Journal of Water Resources; Volume 11, Issue 2; 2007; 257-266.

Daniell; Trevor, Nathan Rory, Chiew Francis and Osti Alexander, (2008) Chapter 11, Low Flow Forecasting, in World Meteorological Organisation, 2008, Manual on the Estimation and Prediction of Low Flows, Contribution to the topic Disaster Mitigation: Floods and Droughts (hydrological aspects), WMO

White I., Falkland A., Perez P., Dray A., Metutera T., Metai E., And Overmars M. (2007). Challenges In Freshwater Management In Low Coral Atolls. *Journal Of Cleaner Production* 15, 1522-8.

White I., Falkland A., Metutera T., Metai E., Overmars M., Perez P., and Dray A. (2007). Climatic and Human Influences On Groundwater In Low Atolls. *Vadose Zone Journal* 6, 581–590.

White I., Falkland A., Metutera T., Katatia M., Abete-Reema T, Overmars M., Perez P., and Dray A. (2008). Safe Water for People in Low, Small Island Pacific Nations: The rural-urban dilemma. *Development*, **51**, (In press)

1.5 Participation in international scientific meetings

1.5.1 Meetings hosted by Country

See Section 1.2.1 of this report for international conferences hosted.

1.5.2 Participation in meetings abroad

Trevor Daniell participated in the Coordination Committee of the GRDC in Koblenz,19 to 21 September 2007

Trevor Daniell and Francis Chiew participated in the FRIEND 2006 Meeting in Cuba on Climate Variability and Change-Hydrological Impacts.

1.6 Other activities at a regional level

A project titled: Enhanced Application of Climate Predictions in Pacific Island Countries is currently in progress to meet the general goals of improving weather and climate services and products. The AusAID funded project is developing a climate prediction capacity in participating countries, and in particular, is providing a framework for incorporating climate prediction information into planning across a broad range of agencies and industries. The climate prediction system being provided under the project is based upon the seasonal climate prediction system of the Australian Bureau of Meteorology, which has successfully issued climate predictions for some years. (www.bom.gov.au/climate/pi-cpp/)

The Pacific HYCOS Project proposal developed by WMO in 2001 has received funding through the European Union. The Pacific HYCOS Project was launched at a workshop in Brisbane, Australia 16-19 April 2007 organized Bureau of Meteorology (BOM) Australia, World

Meteorological Organisation (WMO), National Institute for Water and Atmosphere Research (NIWA), and Pacific Islands Applied Geoscience Commission (SOPAC). The meeting and workshop was funded by WMO, BOM and SOPAC.

1.6.1 Institutional relations/co-operation

No information available at this time.

1.6.2 Completed and ongoing scientific projects

Refer section 1.2.3 re ongoing Pacific Island projects.

2. Future Activities

2.1 Activities foreseen until December 2008

- 11th INTERNATIONAL RIVERSYMPOSIUM & ENVIRONMENTAL FLOWS CONFERENCE, Brisbane, September 2008.
- National Water Week, October 2008
- 9th National Conference on Hydraulics in Water Engineering, 23 - 26 September 2008 at Darwin Convention Centre. Within this overall theme the conference sub-themes are: Climate Change, Methods in Hydraulics, Applied Hydraulics, Geophysical Hydraulics and Coastal Hydraulics.

2.2 Activities Planned for 2008-2009

- Continuation of assistance to Pacific Island Projects.
- Continuation of involvement in Asian Pacific FRIEND.
- Continuation of involvement in HELP
- Participation in the FRIEND Symposium 2010, Fes, Morocco, 25-29th October.

2.3 Activities envisaged in the long term

No information available at this time.

AUSTRIAN NATIONAL COMMITTEE FOR IHP

Summary Report for the period
July 2006 – May 2008

Austrian Academy of Sciences
Dr. Ignaz Seipel-Platz 2
A-1010 Vienna
Tel. ++43 1 51581 / 1271
Fax: ++43 1 51581 / 1275
e-mail: guenter.koeck@oeaw.ac.at
homepage: http://www.oeaw.ac.at/

D. Gutknecht m.p.
Chairman of IHP/NC

G. Köck m.p.
Austrian Acdemy of Sciences

Vienna
May 2008

AUSTRIAN NATIONAL COMMITTEE FOR IHP

Summary Report for the period July 2006 – May 2008

The Austrian National Committee for IHP (in Austria called "Hydrologie Österreichs") was already established in 1980 and is acting under the auspices of the Austrian Academy of Sciences. The chairman of the Committee is appointed by the Academy.

STRUCTURE OF THE AUSTRIAN NATIONAL COMMITTEE

Chairman: Prof. Dr. Dieter Gutknecht, Vienna University of Technology, Institute for Hydraulics and Water Resources Engeneering, Karlsplatz 13, A-1040 Vienna, Austria. Phone: +43-58801-22301; gutknecht@hydro.tuwien.ac.at

Secretary: Dr. Günter KÖCK, Austrian Academy of Sciences, National and International Research Programmes, Dr. Ignaz Seipel-Platz 2, A-1010 Vienna, Tel. ++43 1 51581-1271, Fax: ++43 1 51581-1275, e-mail: guenter.koeck@oeaw.ac.at

Members of the Austrian Academy of Sciences:	Prof. Dr. Michael Hantel
	Prof. Dr. Helmut Pichler
	Prof. Dr. Peter Steinhauser
	Prof. Dr. Dieter Gutknecht
The Ministry of Science and Research:	MR Dr. Stefan Kolarsky
The Ministry of Foreign Affairs:	MR Dr. Frieda Luggauer-Gollner
The Ministry of Economics and Labour:	Dr. Robert Holnsteiner
The Ministry of Agriculture, Forestry, Environment and Water Management:	MR Dipl.-Ing Dr. Reinhold Godina
Austrian Commission for UNESCO:	Secretary General Mag. Gabriele Eschig
Austrian Geological Survey:	Dr. Gerhard Letouze
Central Institute for Meteorology and Geodynamics:	Director Dr. Fritz Neuwirth
Network Austrian provinces	Dipl.-Ing. Gerald Lindner

FUNDING:

The funding for IGCP, provided by the Austrian Ministry for Science and Research, is currently EURO 200.000,- (= approx. US$ 319.000,-) per year**.** This funding is entirely used for research projects.

NATIONAL COMMITTEE MEETINGS

In the period from July 2006 to May 2008 six meetings of the Austrian National Committee for IGCP took place.

WORKSHOP:

In January 2008 the Austrian National Committee for IHP has organized a workshop to discuss its future research strategies. This workshop attracted strong participation from the national hydrology research community and is the base for the compilation of the upcoming report "State of the Art in Austrian Hydrology". For the period of 2008 – 2011 the Austrian National IHP-Committee will focus theme-supported funding for future

research predominantly on the field ”Hydrological processes in a changing environment with special emphasis on predictability“.

LIST OF PROJECTS:

Multi-data precipitation analysis and prediction
Project manager: L. SKODA, University of Vienna

This project is running on the amalgamation of several precipitation data sources for optimal precipitation analysis and prediction in Austria with very high spatial (1 km) and temporal (1h) resolution. The development of methods for

(1) near real-time Bayesian-type combination of multiple sources of precipitation information involving rain stations, radar, satellite and models; and for
(2) multi-scale realization of precipitation field ensembles conditioned on the available information.

The results will improve the precipitation input to hydrological models especially in remote catchments. Conditioned ensembles of precipitation fields allow predictability studies.

Transformation of observed and computed ice- and snowmelt data to ungauged basins (SNOWTRANS)
Project manager: H. HOLZMANN, University of Natural Resources and Applied Life Sciences Vienna

The project SNOWTRANS was funded by the Austrian Academy of Sciences (ÖAW) for the period 2004 to 2007. It aimed to deliver a better understanding of high Alpine snow- and ice melt processes by means of detailed field measurements and modelling results from a well observed highly glacierized test basin. As a second major task of the SNOWTRANS project various sufficiently calibrated snow- and ice melt models were tested for their applicability for sparsly gauged or ungauged basins.
A series of intensive field observation campaigns were carried out in the Sonnblick test basin including snow course observations (depth, density, snow temperature), discharge observations during the summer period (May to November), glacier monitoring (ice thickness, area, depletion) and meteorological measurements, where most of the latter were provided by the observatory at the mount Sonnblick peak. These data formed a good base to apply different types of hydrological water balance models, where both index based conceptual model (e.g. PREVAH, BOKU-model) as well as physically based concepts (ALPINE3D energy balance model) were used. The focus of the model evaluation was on the reliable estimation of the discharge including the diurnal variation, the correct estimation of snow accumulation and depletion patterns and the correct estimation of the glacier mass balance. The accumulated runoff at the basin outlet was reliably modelled by all concepts. The diurnal variation in discharge during the summer periods was satisfactory simulated by the mixed index approaches considering radiation, where the simple temperature index approach could not reproduce the daily variability. Snow layers exhibited to retain rainfall or melt water considerably, where ice melt rapidly contributed to runoff. The conceptual models exhibited some mass errors in snow accumulation due to the wind drift, where ALPINE3D includes a couple of sub-models capturing snow drift (initialized from turbulent kinetic energy of the mesoscale model ARPS). The results and parameters of

the test basin could be transferred to some local basins within a distance of approx. 100 km.

Aerogeophysics for spatial distribution of soil (GeoPUB)
Project manager: W. KOLLMANN, Austrian Geological Survey Vienna

In the proposed project a detailed investigation in two small areas is planned. Most of the datasets are already available and they will be incorporated into a GIS-System and a ground-truthing of the airborne measurements will be done. The existing software for calculating soil moisture will be improved and a runoff and soil moisture model will be developed. In addition there is an irrigation experiment planned and it will be used to investigate the temporal change of soil moisture. This project has two aims. The first is to examine how apparent spatial statistical properties of soil moisture change with the measurement scale. The second is to examine whether standard geostatistical techniques are applicable to organised soil moisture patterns. The main feature of this project is that we use in-situ soil moisture data togehther with a very high spatial resolution by airborne mapping. In a second step these results will be transferred to a different area followed by ground measurements and an aerogeophysical survey at different times. Building up on these results it should be clear, which demand on information is necessary to model soil moisture and runoff and how good the quality of this information has to be. A research on the available and future spaceborne measurement platforms will be done together with a cost benefit analysis including possible alternatives like helicopter, fixed wing or unmanned aerial vehicles.

Spatial and temporal dynamics of soil moisture in ungauged basins
Project manager: G. BLÖSCHL, Vienna University of Technology

The aim of this project is to identify methods of estimating the space-time dynamics of hydrologically relevant soil moisture for Austrian conditions with a focus on catchments without runoff measurements. The project idea is to combine two sources of information on soil moisture - hydrological models and scatterometer satellite data. The rationale behind this combination is that even though both sources are associated with significant uncertainty it is their combination that helps reduce the uncertainty of the integrated estimates because of the different error structures of the two types of estimates. Estimation of soil moisture for ungauged catchments (i.e. without runoff data) takes advantage of the simulations of the hydrological model and the scatterometer data that extend over the ungauged catchments. The methods are tested for Austrian catchments and their predictive uncertainty is assessed.

PUBLICATIONS:

In order to increase both the scientific output and public access to the results of projects financed by the ÖAW research programmes, the option of online publication (including ISBN and DOI) of project reports was introduced in cooperation with Austrian Academy of Sciences Press. To date 16 project reports (accessible by full-text search with all WWW search engines) can be downloaded from the Austrian Academy of Sciences Press homepage (http://epub.oeaw.ac.at/forschungsprogramme). Among these publications one report contributing to IHP shall be highlighted:

Holzmann, H., W. Schöner, G. Koboltschnig, Ch. Kroisleitner, B. Hynek, R. Mott, G. Michlmayer, W. Schneider, G. Kaiser, M. Vollmann, L. Rauch (2008). SNOWTRANS - Regionalisation of snow- and ice melt processes in the Hohe Tauern mountains in

Austria. Austrian Academy of Sciences Press 2008, Vienna, Digital Edition. ISBN: 978-3-7001-3987-4, DOI: 10.1553/snowtrans07, 34 pp.

The SNOWTRANS-Project has also contributed to:

Böhm, R., W. Schöner, I. Auer, B. Hynek, C. Kroisleitner, G. Weyss (2007). Gletscher im Klimawandel – Vom Eis der Polargebiete zum Goldbergkees in den Hohen Tauern. Zentralanstalt für Meteoroligie und geodynamik, Wien, ISBN 978-3-200-01013-0, 111 pp.

Vienna, May 2008/Dr. Köck

Report of the Canadian Delegation to the IHP-Council
18th Session of the Intergovernmental Council
Paris, 9-14 June 2008

Key National Activities

Canada has completed a number of key hydrological programs and initiatives over the past few years, and has added some new key initiatives to its list of ongoing programs and activities. This overview report provides some examples (not all inclusive) of key Canadian hydrological programs and activities selected from a cross-section of Canadian water-related programs and research initiatives that relate to UNESCO-IHP priorities and focal areas.

Completed Programs/Assessments

Canadian

Environment Canada's National Scientific Assessments

The National Water Research Institute (NWRI), which has been expanded recently to include other Environment Canada water groups and is now known as the Water Science and Technology Directorate (WSTD), leads and publishes scientific assessments of priority freshwater issues in Canada. Written by experts from NWRI, government (federal, provincial, territorial, municipal), universities and industry, these assessments provide a synthesis of current scientific knowledge, trends, and information and program needs with the intent of providing knowledge to assist water science decision-makers, managers and the research community in setting research priorities, making informed decisions, and in developing sound management policies and practices. Currently, there are eight reports in the series:

1. Threats to Sources of Drinking Water and Aquatic Ecosystem Health in Canada (2001)
2. National Assessment of Pulp and paper Environmental Effects Monitoring Data (2003)
3. Threats to Water Availability in Canada (2004)
4. A Decade of Research on the Environmental Impacts of Pulp and Paper Mill Effluents in Canada (1992-2002) (2004)
5. National Assessment of Pulp and Paper Environmental Effects Monitoring Data: Findings from Cycles 1 through 3 (2005)
6. Research into Action to Benefit Canadians (2005)
7. Microbial Source Tracking in Aquatic Ecosystems: The State of the Science and an Assessment of Needs (2006)
8. Pharmaceuticals and Personal Care Products in the Canadian Environment: Research and Policy Directions (2007)

National Agri-Environmental Standards Initiative

The National Agri-Environmental Standards Initiative (NAESI) was a four-year (2004-2008) project between Environment Canada (EC) and Agriculture and Agri-Food Canada (AAFC) and

is one of many initiatives under AAFC's Agriculture Policy Framework (APF). The goals of the National Agri-Environmental Standards Initiative were to:

- Establish non-regulatory national environmental performance standards (with regional application) in four thematic areas (air; biodiversity; pesticides; water) that support common EC and AAFC goals for the environment;
- Evaluate standards attainable by environmentally-beneficial agricultural production and management practices; and
- Increase understanding of relationships between agriculture and the environment.

Under NAESI, agri-environmental performance standards (i.e., outcome-based standards) were established that identify both desired levels of environmental condition and levels considered achievable based on available technology and practice. These standards will be integrated by AAFC into beneficial agricultural management systems and practices to help reduce environmental risks. Additionally, these will provide benefits to the health and supply of water, health of soils, health of air and the atmosphere; and ensure compatibility between biodiversity and agriculture.

Northern River Ecosystem Initiative

The Northern River Ecosystem Initiative (NREI), 1997-2004, has provided new scientific knowledge in response to specific recommendations from its predecessor, the Northern River Basins Study (NRBS), 1990-1996. The two initiatives together provide a remarkable body of science which is, and will continue to be, used by resource managers responsible for economic and environmental sustainability in the northern watersheds of Alberta. The NREI focused its investigative efforts on improving our understanding related to ecological considerations of changes in river flow, effect of climate change on flow, ecological responses to pollution and cumulative effects, vulnerability of drinking water quality, and to a lesser degree, wildlife (birds) response to large scale changes within the watersheds. Commensurate with the undertakings of NREI, provincial and territorial governments, First Nation and Métis communities, and other administrative organizations such as the Mackenzie River Basin Board, undertook policy, regulatory, and watershed initiatives towards achieving sustainability and providing reliable drinking water quality. The production and release of the *NREI Final Report, NREI Synthesis Report and the NREI Key Findings* document, concludes more than a decade of research within the northern river ecosystems studied. The NREI and NRBS have left a legacy of knowledge and awareness of the environment of the northern river basins, providing a foundation for a sustainable environment.

NRCan National Climate Change Impact Assessment

Drawing upon an assessment team comprising many experts from across Canada (from federal, provincial, territorial and First Nations governments, and universities), Natural Resources Canada (NRCan) through its Climate Change Impacts and Adaptations Program has completed an assessment of climate change impacts and adaptations in Canada. Entitled "*From Impacts to Adaptation: Canada in a Changing Climate 2007*", the assessment reflects the advances made in understanding Canada's vulnerability to climate change during the past decade. Through a primarily regional approach, this assessment discusses current and future risks and opportunities

that climate change presents to Canada, with a focus on human and managed systems, and highlights key issues facing each region of the country in a policy-relevant manner. The assessment is based on a critical analysis of existing knowledge, drawn from the published scientific and technical literature (peer-reviewed and grey literature) and from expert (including traditional) knowledge. The current state of understanding is presented, and key knowledge gaps are identified. Advances in understanding adaptation, as well as examples of recent and ongoing adaptation initiatives, are highlighted throughout the report.

Contributions to International Programs/Assessments

Arctic Climate Impact Assessment

The *Arctic Climate Impact Assessment* (ACIA) is the first comprehensive, integrated assessment of climate change and ultraviolet (UV) radiation across the entire Arctic region. The ACIA was launched in 2002 as an international project of the Arctic Council and the International Arctic Science Committee (IASC) and involved >500 scientists and experts (including Arctic indigenous groups). This assessment was completed and published by the Cambridge University Press in 2005 (18 chapters; 1042 p). The assessment had three main objectives:

- To provide a comprehensive and authoritative scientific synthesis of available information about observed and projected changes in climate and UV radiation and the impacts of those changes on ecosystems and human activities in the Arctic. The synthesis also reviews gaps in knowledge and the research required to fill those gaps. The intended audience is the international scientific community, including researchers and directors of research programs.
- To provide an accessible summary of the scientific findings, written in plain language but conveying the key points of the scientific synthesis. This summary, the *ACIA Overview Report*, is for policy makers and the general public.
- To provide policy guidance to the Arctic Council to help guide the individual and collective responses of the Arctic countries to the challenges posed by climate change and UV radiation. The *ACIA Policy Document* accomplishes this task.

Canada was a major contributor to the ACIA assessment: 3 Canadians sat on the Assessment Steering Committee; 6 Canadians were Lead or Co-lead Authors; more than 30 Contributing Authors and 40 Case Study and Consulting Authors (many of which are First Nations and Inuit) were also Canadian. It is notable that much of the work that contributed to Chapter 8 – Freshwater Ecosystems and Fisheries led directly to the *AMBIO Special Issue: Climate Change Impacts on Arctic Freshwater Ecosystems and Fisheries* (Editors: F.J. Wrona; T.D. Prowse; and J.D. Reist).

IPCC 4th Assessment and Water Theme Reports

The Fourth IPCC Assessment Report "Climate Change 2007", comprising 4 volumes and various contributions, was completed with the fourth and last volume being the Synthesis Report (AR-4) which was launched in November 2007. Many Canadian scientists and experts provided significant input to this report, some of whom were acknowledged as sharing, as part the IPCC, the Nobel Peace Prize "for their efforts to build up and disseminate greater knowledge about man-made climate change and to lay the foundations for the measures that are needed to

counteract such change". The ceremony was held last November and the IPCC was awarded jointly with former Vice President of the United States Al Gore.

Following on from the AR-4, the "Technical Paper on Climate Change and Water" was released by the IPCC in April 2008 and it constitutes an important addition to the 4th IPCC Assessment Report. It is notable that Terry Prowse, as a member of the IPCC Working Group II Technical Support Unit, was a co-author of this report.

Mackenzie GEWEX Study

The Mackenzie GEWEX Study (MAGS) was a collaborative multidisciplinary Research Network comprising nearly 80 government and university scientists from across Canada with expertise in many fields including hydrology, climatology, meteorology, atmospheric physics, remote sensing, computer science, civil engineering, and physical geography. After more than ten years of intensive and extensive research, MAGS successfully concluded in 2005. The overall goals of MAGS were to understand and model the response of the energy and water cycle in northern Canada to climate variability and change, to define the impacts of its atmospheric and hydrological processes and feedbacks on the regional and global climate systems, and to apply improved predictive capabilities to climatic, water resource, environmental and societal issues in the cold regions. Through Phase 1 (1994-2000), MAGS gained good understanding of the atmospheric and hydrological processes that influence the cold regions, and improved insights into the energy and water system of the Mackenzie Basin which is experiencing a distinct warming trend. Phase 2 (2001-2005) concentrated on the modelling of all major components of the physical system and application of unified knowledge and predictive capability to tackle water resource problems in the Mackenzie Basin as well as other parts of Canada.

Second International Conference on Arctic Research Planning (ICARP II)

The goal of ICARP is to prepare Arctic research plans to guide international cooperation over the next 10-15 years. ICARP brings together senior and young scholars, policy experts, Arctic indigenous and other residents, science and land managers as well as funding agencies to discuss and extend the draft science plans taking special note of the problems, priorities and concerns of those who live in or near the Arctic. The Second International Conference on Arctic Research Planning (ICARP II) was held in Copenhagen, Denmark from 10 November through 12 November 2005 and brought together over 58 scientists, policy makers, research managers, indigenous peoples, and others interested in and concerned about the future of arctic research. Through plenary sessions, breakout sessions and informal discussions, conference participants addressed long-term research planning challenges documented in twelve draft research plans. Following the conference 11 thematic Working Groups modified the plans to reflect input from the conference discussions and input from experts at large. Canadian scientists and experts contributed significantly to ICARP II: two Canadians (Barry Goodison; Geoff Holland) sit on the ICARP Steering Committee; Terry Prowse was the Chair of Working Group 7 - Terrestrial and Freshwater Biosphere and Biodiversity; and at least one Canadian was a member of each Working Group.

Following an ICARP II Implementation Workshop, which was held at the Alfred Wegner Institute, Potsdam, Germany (November 19-22, 2006), the plan was adopted as a key thematic area for the World Climate Research Program, Climate and the Cryosphere, CliC. The Chair of the ICARP II Working Group 7 (Terry Prowse) was also asked to join the Scientific Steering Group of CliC to help promote the research objectives outlined in the plan. Canada has adopted some key foci of the plan to guide its involvement with Arctic-HYDRA during the IPY and is now in the process of extending its international involvement with the Japanese *via* Asia-CliC and possible collaboration in some key Canadian northern basins.

New and Ongoing Programs/Activities

Agriculture and Agri-foods Canada Programs

Agriculture and Agri-foods Canada (AAFC) and its Prairie Farm Rehabilitation Administration (PFRA) Branch continue their national roles for environmental and water management programming related to Canadian agriculture and water. Some of their key programs and support related to agriculture and water include: Environmental Farm Planning; National Farm Stewardship Program; National Water Supply Expansion Program; Pesticide Risk Reduction and Minor Use Programs; Information Gaps in Water Quality and Nutrients; National Land and Water Information Service; Integrated Pest Management Research; Prairie Shelterbelt Program; Greencover Canada Program; Watershed Evaluation of BMPs; National Agri-Environmental Health Analysis and Reporting Program; Technical Support for Rural Water Supplies; and Water and Climate Information Products.

ArcticNet

ArcticNet is a Network of Centres of Excellence of Canada that brings together scientists and managers in the natural, human health and social sciences with their partners in Inuit organizations, northern communities, federal and provincial agencies and the private sector to study the impacts of climate change in the coastal Canadian Arctic. The central objective of ArcticNet is to contribute to the development and dissemination of the knowledge needed to formulate adaptation strategies and national policies to help Canadians face the impacts and opportunities of climate change and globalization in the Arctic. Through integrated regional impact studies (more than 20 current studies) on societies and on marine and terrestrial (including freshwater) and coastal ecosystems in Canada's northern regions, ArcticNet offers a unique multi-disciplinary and cross-sectorial environment to train the next generation of specialists, from north and south, needed to manage the Canadian Arctic of tomorrow.

Canadian Drought Research Initiative

The Canadian Drought Research Initiative (Canada DRI) is a Research Network that brings together many university and federal/provincial government researchers to address Canadian drought with expertise encompassing the atmospheric, hydrologic, land surface, and predictive aspects of droughts at a variety of spatial and temporal scales. Because of the enormous economic, environmental and societal impacts, the Drought Research Initiative (DRI) was established in 2005 to coordinate and integrate drought research in Canada. To make progress on

this critical issue, DRI is focusing on the recent drought (1999-2004/05) over the Canadian Prairies. The objective of DRI is to better understand the physical characteristics of and processes influencing Canadian Prairie droughts, and to contribute to their better prediction.

Canadian Water Network

The Canadian Water Network (CWN) was created as one of Canada's Networks of Centres of Excellence (NCE), to build a network that develops opportunities related to the provision of safe, clean water. In collaboration with universities, government and industry, the CWN has developed a variety of scientific projects and initiatives that address key water-related issues facing Canadians while embracing strong multidisciplinary and multi-sectoral partnerships. The CWN applies scientific excellence, communication and network activities within three programs that focus on national issues of strategic importance to the Canadian economy and public good: (1) Protecting Watersheds and Ecosystems; (2) Protecting Public Health; and (3) Ensuring Sustainable Water Infrastructure.

Environment Canada's Priority Ecosystem Programs/Initiatives

Environment Canada has added a new initiative on Lake Winnipeg to its National Network of Regional Ecosystem Initiatives, all of which have a focus on water resources and employ a multi-stakeholder approach to address regional/watershed-based research, science and policy issues. Examples of major initiatives include:

- Atlantic Coastal Action Program, is centred on community-based leadership and delivery to address environmental and sustainable development issues in ecosystems involving watersheds and coastal areas throughout Atlantic Canada;
- St. Lawrence Program, which addresses quantity and quality aspects of river flow originating from the upstream Great Lakes system;
- Great Lakes Program, which addresses water quality/contaminants and the development of remedial action plans. This program has links to International Joint Commission priorities about shared water resources between Canada and the United States;
- Northern Ecosystem Initiative, located in the Northwest Territories, Nunavut and Yukon, with some key components that address climate-change impacts on the hydrology and ecohydrology of cold-regions aquatic ecosystems;
- Georgia Basin Action Plan, located primarily in the Fraser River Basin of British Columbia, that focuses on water quality/quantity and integrated watershed management; and
- Lake Winnipeg Basin Initiative, which take a science-based approach to better understand how to solve the serious water quality issues facing this vital watershed.

Other Federal Water Programs

Ag Canada – NLWIS (National Land and Water Information System)

The National Land and Water Information Service is an Internet-based service being developed over the next four years to provide on-line access to agri-environmental information to help Canadians make responsible land-use decisions. The federal government is investing $100.1 million to implement the new service. The first phase of project implementation began in May

2005. When the project is completed in 2009, the National Land and Water Information Service will be recognized as Canada's source of information, analysis and interpretation of agri-environmental data on land use, soil, water, climate and biodiversity to assist land-use decision makers. These land-use decision makers include governments, community groups, researchers, producers and industry.

Development of the National Land and Water Information Service will build on other efforts to reduce agricultural risks and better use Canada's land, soil, water and biodiversity resources. Among these efforts are initiatives to: (i) identify beneficial management practices (BMPs) that protect land from wind and water erosion, improve water supply and quality, enhance biodiversity and increase carbon sequestration in the soil; (ii) help producers adopt these BMPs for soil, nutrient and livestock management; and (iii) measure and track the environmental performance of Canadian agriculture.

International Joint Commission

The International Joint Commission (IJC), established under the 1909 Boundary Waters Treaty, continues to prevent and resolve disputes between the United States of America and Canada, and pursue the common good of both countries as an independent and objective advisor to the two governments. The IJC acts impartially in reviewing problems and deciding on issues, rather than representing the views of their respective governments, leading to decisions that are both ethical and equitable. Through the IJC, the two countries continue cooperate to manage shared waters wisely and to protect them for the benefit of today's citizens and future generations.

International Polar Year

International Polar Year (IPY) 2007-2008 marks the largest-ever international program of scientific research focussed on the Arctic and Antarctic regions. Canada is playing an important global leadership role for IPY, and beyond, through the support of multi-national research collaborations, the participation of leading Canadian scientists and its role as host to top research teams from around the world. Canada has developed an ambitious program for IPY, providing support of $150 million for 44 Canadian IPY projects, for its scientific effort to create a more complete scientific understanding of the North that can be applied to address issues related to our environment and the well-being of Northern communities. Highlights of the Government of Canada Program for IPY include:

- A targeted science and research program that will build on and support existing programs, networks and facilities to focus on two important challenges for Canada’s northern regions;
- A training program to actively engage young scientists and Northern communities in on-the-ground training in science and research activities. This will lead to a new generation of polar scientists, particularly Northerners and Aboriginal peoples, to carry on strong northern research programs in the decades to follow.
- A communications and outreach program will focus on raising awareness of Northern and polar regions and issues, and celebrating northern, Aboriginal and scientific achievements. IPY will involve northern residents in science and research planning and activities, through training programs, communications activities, and in the management and administration of the program.

Improved Processes and Parameterisation for Prediction in Cold Regions

Improved Processes and Parameterisation for Prediction in Cold Regions (IP3) is a Canada-wide Research Network (comprised of several dozen investigators and collaborators from across Canada, the US, and Europe) devoted to an improved understanding of surface water and weather systems in cold regions, particularly in Canada's Rocky Mountains and western Arctic regions. These issues are of key importance to agriculture and urban and industrial development in the Prairies and northwest. IP3 will develop an improved understanding of cold regions hydrometeorology and test advances in atmospheric and hydrological prediction in the Rocky Mountains and the Arctic along a transect of high latitude and high altitude instrumented research sites that characterize the cold regions of Canada. IP3 is a component of the International Polar Year (IPY), the Climate and Cryosphere project (CliC) of the World Climate Research Programme, and the International Decade for Prediction in Ungauged Basins (PUB).

NRCan Groundwater Program

Groundwater is important to health, economy and ecosystems in Canada. It provides drinking water to about one third of all Canadians and up to 80% of the rural population. It has been routinely surveyed since early last century, yet groundwater has not been mapped in a systematic way across the country. The NRCan Groundwater Mapping program, a current federal groundwater initiative, aims to establish a conceptual framework of national, regional and watershed-scale groundwater flow systems. The first phase of the program "Groundwater Inventory" was conducted from 2003 to 2006 and focused on inventory assessment of Canada's most strategic aquifers to help governments better understand the quantity and quality of existing water resources and the dynamics and vulnerability of key regional aquifers. All information and results provided by the first phase are available on the internet through the National Groundwater Database. The second phase of the program (2006-2009) "Groundwater Mapping Program" essentially follows the same vision of the first phase with some modifications on the regional aquifers studied, enhanced emphasis on data and information with open and user-friendly, easy access to the data and information products, as well as the production of a book with a synthesis of knowledge of the groundwater resources in Canada. A third phase for the Groundwater Program after 2009 is also intended.

Western Canadian Cryospheric Network

The Western Canadian Cryospheric Network (WC^2N) is a consortium of six Canadian universities, two American universities and government and private scientists who are examining the links between climatic change and glacier fluctuations in western Canada. The aim of WC^2N is to understand the behaviour of the climate system and its effects on glacier mass balance in the mountain ranges of British Columbia and western Alberta. This research, without duplication, will be aligned with other proposed and ongoing cryospheric research and monitoring networks in Canada and elsewhere. Taken together, these networks and the resultant synergies will yield a nationwide assessment of the past, present, and future response of Canadian glaciers to changing climates.

National Water Atlas

Agriculture and Agri-foods Canada and Environment Canada are co-leading a new federal initiative with the objective of creating a National Water Atlas (NWA) for Canada. The vision for the NWA is a web-based, dynamic Water Atlas of Canada that presents Canadians with cartographic information on water and water-related resources and issues, synthesized from multiple sources. The purpose is to provide improved access and consistent representation by way of thematic maps and related text on hydrologic information about Canada and to increase public awareness of the fact that water is a precious and limited resource. The target for the contents of the Atlas and its presentation will be useful in providing background information to meet the demand expressed through public interest and education with necessary linkage to more detailed and advanced information to meet the demand expressed for science, economy and policy. The steering committee and project management implementation involves several federal departments, each having key roles and activities related to water resources. These include: Environment Canada; Agriculture and Agri-foods Canada; Natural Resources Canada; Statistics Canada; and Fisheries and Oceans. Current working group thematics are: water availability; hydrometeorology and climate; water quality; water consumption and use; and IT/Geomatics support.

Major Hydrological Sciences Societies

Canadian Geophysical Union - Hydrology Section

Established in 1993, the Canadian Geophysical Union - Hydrology Section (CGU-HS) brings together scientists from all branches of hydrology. Its aims and objectives are to: (i) promote hydrology as a geophysical science; (ii) advance the understanding and application of hydrology and related sciences; (iii) initiate and participate in research and education programs in hydrology, (iv) promote national and international cooperation among scientific and engineering organizations working in hydrology; and (v) disseminate research results and knowledge to the public through scientific discussion, meetings and conferences, publications and other means of information and technology transfer. The Hydrology Section also acts as the umbrella organization for the CGU-HS IASH Nominating Committee.

Canadian Water Resources Association

The Canadian Water Resources Association (CWRA) is a national organization of individuals and organizations interested in the management of Canada's water resources. The membership is composed of private and public sector water resource professionals including managers, administrators, scientists, academics, students and users. CWRA objectives are to: (i) stimulate awareness and understanding of Canada's water resources; (ii) encourage recognition of the high priority and value of water; (iii) provide a forum for the exchange of information and opinion relating to the management of Canada's water; and (iv) participate with appropriate agencies in international water management activities. Association activities include organizing conferences, symposiums and workshops dealing with a wide range of water management issues, quarterly publication of Canadian Water Resources Journal and the newsletter, Water News, as well as publishing papers and reports. Affiliated with CWRA are the Canadian National Committee on

Irrigation and Drainage (CANCID), Canadian Society for Hydrological Sciences (CSHS), and the Project WET which is an international, interdisciplinary, water education program for formal and non-formal educators of kindergarten to grade 12 students intended to supplement a school's existing curriculum.

Canadian Meteorological and Oceanographic Society

The Canadian Meteorological and Oceanographic Society (CMOS) is the national society of individuals and organizations dedicated to advancing atmospheric and oceanic sciences and related environmental disciplines in Canada. The Society's aim is to promote meteorology and oceanography in Canada, and it is a major non-governmental organization serving the interests of meteorologists, climatologists, oceanographers, limnologists, hydrologists and cryospheric scientists in Canada. The Society addresses a broad range of national and international meteorological and oceanographic concerns including weather and weather extremes, global warming, ozone depletion and surface air quality and their effects on all aspects of life in Canada including forestry, agriculture and fisheries. Special interest groups in the Society consider meteorological aspects of hydrology, agriculture, forestry, meso-scale meteorological phenomena and operational meteorology.

Canadian National Chapter – International Association of Hydrogeologists

The Canadian National Chapter (CNC) of the International Association of Hydrogeologists (IAH) is an organization that that offers members a variety of talks, seminars, networking opportunities, and conferences in areas related to groundwater resources sciences and management. The Canadian chapter consists of hydrogeologists, scientists, engineers and water resource managers. Details of the key activities of the CNC-IAH can be found at www.iah.ca.

Canadian National Committee – UNESCO International Hydrological Program

The Water Sciences and Technology Directorate of Environment Canada has rejuvenated and is actively working on strengthening the role of the Canadian National Committee for IHP (CNC-IHP). With IHP-Phase VII (2008-2013) and its new themes and focal areas in mind, the committee membership has been strategically expanded. The committee now consists of:

- Chair/Chief Delegate, Frederick J Wrona, Director, Aquatic Ecosystem Impacts Research Division, Environment Canada
- Senior Science Representative, Terry D Prowse, Senior Scientist, Environment Canada & Canada Research Chair in Climate Impacts on Water Resources, Water and Climate Impacts Research Centre, University of Victoria
- Academia Member, John W Pomeroy, Canada Research Chair in Water Resources and Climate Change, University of Saskatchewan
- Other Government Department Member(s), Alfonso Rivera, Chief Hydrogeologist/Program Manager, Natural Resources Canada (NRCan)
- IAHS Member, Gordon Young, President-elect, International Association of Hydrological Sciences (IAHS)
- CWRA Member, Russell Boals President, Canadian Water Resources Association (CWRA)

- CGU-HS Member, Jim Buttle, President, Canadian Geophysical Union – Hydrology Section (CGU-HS)
- Canadian UNESCO Contact, Dominique Potvin, Chargée de programme, Sciences naturelles/Natural Sciences, Programme Officer, Commission canadienne pour l'UNESCO/Canadian Commission for UNESCO
- Industry Representative - TBD
- Secretary, Peter di Cenzo, Manager, Canadian IHP Secretariat

The Secretariat and leadership for the CNC will continue through the National Water Research Institute, Canada's largest federal water research organization. The Committee is supported by a Secretariat located at the National Hydrology Research Centre, Environment Canada, Saskatoon, funded by Water Sciences and Technology Directorate (Environment Canada) which:

- provides administrative support to the Canadian National Committee
- provides an easily accessible source of information on, and related to, IHP for government, university and non-government scientists, and the general public
- distributes official IHP announcements and documents to the Canadian hydrological community

A report on Canadian hydrological activities relating to IHP-VI (2002-2007) is near completion. The purpose of this report (more than 150 pages) is to provide IHP and our international colleagues key examples (not all inclusive) of Canadian hydrological activities related to IHP-VI and its themes and focal areas, and to direct the reader to easily accessible key documents and websites for more detailed and additional information.

In the coming year it is planned to create a Canadian IHP website, and produce publicity materials such as brochures, pamphlets and posters.

Contributions to UNESCO Sponsored Workshops

UNESCO's IHP and the OAS hold 5th International Workshop of the ISARM Americas Project

The 5th International Workshop of the ISARM (Internationally Shared Aquifer Resources Management] Americas project (UNESCO/OAS ISARM Americas Programme) was held September 17-20, 2007, in Montréal, Canada. The workshop, organized by Alfonso Rivera of Natural Resources Canada, was composed of many events. It was coordinated by UNESCO's International Hydrological Programme (IHP) and the Organization of American States (OAS). The workshop brought together national coordinators of the 20 countries participating in the project and international experts from UNESCO, the International Network of Basin Organizations (INBO) and the International Groundwater Resources Assessment Centre. Ambassador Chusei Yamada, Special Rapporteur of the UN's International Law Commission (ILC) for the topic shared natural resources, also participated in the workshop.

Cooperation between neighbouring countries in the Americas led to the identification of 69 transboundary aquifers. These results are published in the book launched at the workshop (see ISARM book series below). The workshop also provided an opportunity to listen to several international presentations, such as those from Jean-François Donzier on INBO and the EU

Water Framework Directive and Ambassador Yamada on the draft articles on the law of transboundary aquifers. The conference was a great success, as witnessed by the goals reached and comments made by participants during and after the workshop.

Contributions to UNESCO Hydrological Publications

Urban Water Cycle Processes and Interactions

By ***J. Marsalek***, B. Jiménez-Cisneros, M. Karamouz, P.-A. Malmquist, J. Goldenfum and B. Choca, UNESCO IHP Urban Water Series – UNESCO Publishing / Taylor & Francis

Effective management of urban water should be based on a scientific understanding of the impact of human activity on both the urban hydrological cycle – including its processes and interactions – and the environment itself. Such anthropogenic impacts, which vary broadly in time and space, need to be quantified with respect to local climate, urban development, cultural, environmental and religious practices, and other socio-economic factors.

Urban Water Cycle Processes and Interactions represents the fruit of a project by UNESCO's International Hydrological Programme on this topic. The volume begins by introducing the urban water cycle concept and the need for integrated or total management. It then explores in detail the manifold hydrological components of the cycle, the diverse elements of urban infrastructure and water services, and the various effects of urbanization on the environment – from the atmosphere and surface waters to wetlands, soils and groundwater, as well as biodiversity. A concluding series of recommendations for effective urban water management summarize the important findings set forth here.

Water for Our Children: Systems Methods and Tools for Better Management of Water Resources

By ***Slobodan P. Simonovic***
Published jointly by UNESCO IHP and EarthScan (James & James, UK)

Water resources management is increasingly interdisciplinary and must take into account complex socioeconomic factors and environmental variables. This book describes the 'systems approach' and its application to contemporary water resources management, focusing on three main sets of tools: simulation, optimization and multi-objective analysis. This approach is presented within the context of sustainable planning and development under conditions of uncertainty. The book combines theory with many practical examples, as well as including programs and exercises on an accompanying CD-ROM. It composes both an advanced text for students of water resources and civil or environmental engineering and a practical guide for professionals.

Aquatic Habitats in Sustainable Urban Water Management (Science, Policy and Practice)

Edited by Iwona Wagner, ***Jiri Marsalek*** and Pascal Breil
UNESCO-IHP Urban Water Series – UNESCO Publishing / Taylor & Francis

Aquatic Habitats in Sustainable Urban Water Management – the result of collaboration between UNESCO's International Hydrological Programme and its Man and the Biosphere Programme – aims at improving our understanding of aquatic habitats, related ecosystem goods and services, and conservation and sustainable use – with a special focus on their integration into urban water management. The first part of this volume reviews basic concepts and challenges in urban aquatic habitats, as well as strategies for their management integration. The second part examines technical measures related to habitats management and rehabilitation, along with their incorporation into urban planning and their role in human health. The final part looks at current urban aquatic habitat issues and practical approaches to solving them through the lens of case studies from around the globe.

Status and Future Directions

Through its various hydrological programs led or funded by Government Departments and Agencies, Granting Councils, Universities and Industry, Canada is positioned to address many of the core programme themes and related focal areas of the seventh phase of the IHP (2008-2013). Areas of proposed contribution are identified by an *:

Theme 1 Adapting to the Impacts of Global Changes on River Basins and Aquifer Systems
*1.1 Global changes and feedback mechanisms of hydrological processes in stressed systems
*1.2 Climate change impacts on the hydrological cycle, and consequent impact on water resources
*1.3 Hydro-hazards, hydrological extremes and water-related disasters
*1.4 Managing groundwater systems' response to global changes
*1.5 Global change and climate variability in arid and semi-arid regions

Theme 2 Strengthening Water Governance for Sustainability
2.1 Cultural, societal and scientific responses to the crises in water governance
*2.2 Capacity development for improved governance; enhanced legislation for wise stewardship of water resources
2.3 Governance strategies that enhance affordability and assure financing
*2.4 Water as a shared responsibility: managing water across geographical and social boundaries
*2.5 Resolving the water and energy nexus

Theme 3 Eco-hydrology for Sustainability
*3.1 Ecological measures to protect and remediate catchments process
*3.2 Improving ecosystem quality and services by combining structural solutions with ecological biotechnologies
*3.3 Risk-based environmental management and accounting
*3.4 Groundwater dependent ecosystems identification, inventory and assessment

Theme 4 Water and Life Support Systems
*4.1 Protecting water quality for sustainable livelihoods and poverty alleviation
*4.2 Augmenting scarce water resources

*4.3 Achieving sustainable urban water management
*4.4 Achieving sustainable rural water management

Theme 5 Water Education for Sustainability Development
5.1 Tertiary water education and professional development
5.2 Vocational education and training of water technicians
*5.3 Water education in schools
*5.4 Water education for communities, stakeholders and mass-media professionals

Prepared by:

Dr. Fred J. Wrona Chief Delegate
Dr. Terry D. Prowse, Science Advisor
Mr. Peter di Cenzo (Program Secretariat)

Water Science and Technology Directorate
Environment Canada

Canadian Delegation to IHP
on behalf of the Canadian National Committee

National Report on IHP Related Activities

Chinese National Committee

1. ACTIVITIES UNDERTAKEN IN THE PERIOD June 2006 — May 2008

1.1 Meetings of the Chinese National Committee for IHP

1.1.1 Decision regarding the composition of the Chinese National Committee

Mr. Deng Jian, Director-General of Bureau of Hydrology now took the chairmanship according to the regulation of Chinese National Committee for IHP.

Some former members were promoted or retired. New members have been recommended by the National Committee and will be approved by Ministry of Water Resources soon. The approval document on national committee was issued on March 2008. The new national committee includes 29 members for period 2008-2013.

1.1.2 Status of IHP-VI activities

Some key activities are provided in the following paragraphs. More activities with more themes and focal areas are going on, thus a series of national and international workshops will be held when projects are finalized.

National Water Resources Conference was held on 28-29 May 2006 in Erdos City of Inner Mongolia. Water Resources Minister Mr. Wang Shucheng and Vice-minister Mr. Hu Siyi attended the conference. The China's water resources status were reviewed. The priorities of water resources management in 11th five-year period were highlighted, which includes (1) building national water right mechanism for total volume control and quota management; (2) improvement of water fee collection system; (3) water resources development certificated system; (4) pilot and demonstration for building water saving society; (5) water function zoning for pollutant control etc. About 200 participants participated in the conference. Chairman, Vice Chairs and some members of Chinese National Committee were invited.

5th China Water Issues Forum and China Engineering Academy Academician Forum was held from 10-12 November 2006 in Nanjing. The forum was organized by National Key Laboratory of Hydrology and Water Resources, IHP National Committee and other institutions. About 200 participants from universities, institutions and hydrological organizations attended the forum. The forum focused on research and progress of water problem complexity and uncertainty. Some common understandings were listed: (1) water problems complexity and uncertainty need hydrological experiments and new technology application; (2) New technology and methodology research are key to solve the problems; (3) enhancement of PUB should be related with China water problems. Chinese National Committees of IAHS and IHP co-organized the forum.

1.1.3 Decision regarding contribution to/participation in IHP-VII

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1. This report is submitted to the 18th IHP-IGC meeting at Paris, France, 9-14 June 2008.

China Hydrology Regulation was issued officially by the state Council, according to the 496th order of the State Council. It was in power from 1 June 2007. The regulation is the first regulation for guiding hydrological activities in China. It includes seven chapters and 47 articles. Some hot issues, such as data free use for public affairs, standard observation were regulated etc. (Chinese version is available through internet)

China IHP National Committee organized an informal meeting on 11 November 2007 in Nanjing during the workshop. The National Committee Regulation and Secretariat Working Method have been reviewed and approved. A visiting report on 16th Intergovernmental Council meeting in Paris has been delivered to members. The final strategy report for IHP-VII was distributed to members and participants. It is guaranteed to work closely with regional national committees for regional cooperation on IHP-VII.

1.2 ACTIVITIES AT NATIONAL LEVEL IN THE FRAMEWORK OF THE IHP

1.2.1 National/local scientific and technical meetings

National High-level Forum on Hydrological Science and Technology was held on 14 September 2007 in Beijing. About 50 high-level experts and participants attended the forum. The main theme of forum is to debate key requirements of science and technology for China Hydrology to enhance service and improve management. Some projects on basic hydrological experiment were recommended for next five year plan.

China-IHP was co-organizer and main sponsor for the symposium. Some members of China-IHP presented their achievements.

2007' Annual Meeting of CHES (Chinese Hydraulic Engineering Society) held on 30 October, in Suzhou, City, Jiangsu Province.

Mr. Chen Lei, the newly appointed Minister of Ministry of Water Resources (MWR) delivered a keynote speech on the meeting, and about 600 representatives from Yangtze River Water Resources Commission, Yellow River Water Resources Commission, IHP Chinese National Committee etc, also attended the meeting.

Workshop for Extending Hydrological Service was held from 25-27 December 2007. 15 invited experts and 30 delegates from each provincial hydrological bureau were invited to present their opinions. Beside traditional observation, forecasting, calculation, hydrological services extended to water resources assessment, water quality monitoring, groundwater survey, drought monitoring and prediction, ecological hydrology service, flash flood disaster prediction, international rivers flood forecasts etc. Hydrological service and water resources management have been closely coordinated. International hydrological programme will play important role to introduce advanced experiences around the world.

2008' National Hydrological Planning and Plan Meeting was held on 9 January 2008. Mr. Deng Jian, Chairman of CHINA-IHP and Director-General of Hydrology Bureau, delivered a speech in the opening ceremony. Each provincial bureau of hydrology reported their planning and plan. Under the framework of international cooperation, IHP was prior for future cooperation. About 100 participants attended the meeting.

2008' Annual Water Department Directors meeting was held from 24-26 January 2008 in hangzhou, Zhejiang Province. The meeting usually summarized achievements in the last year and arranges important work and highlight guideline for future. More than 120 participants from river basin authorities and provincial water resources directors attended the meeting. Some successful experiences from different sectors presented. Chinese National Committee sent participants to the meeting. The activities and achievements of Chinese National Committee were included in MWR annual report.

The 16th World Water Day and 21st Chinese Water Week were initiated on 22 March 2008. The theme for World Water Day 2008 is "Sanitation Matters." The theme of the Chinese Water Week is "Developing Water for Improving People's Livelihood".

Minister Chen Lei published an article on the People's Daily to commemorate the 16th World Water Day and 21st Chinese Water Week. He wrote that water is closely related to the people's livelihood; flood relief is related to the safety of people's life; drinking water is related to people's health, thus water development is vital for the improvement of people's livelihood.

The Chinese Government has been attached great importance to water development. A series of measures have been taken for flood control and drought relief, safe drinking water supply, reservoir reinforcement, resettlement arrangement and later stage assistant, control of major rivers and lakes, irrigation and drainage and rural water supply.

Chinese National Committee for the IHP was involved in the activities.

National Water Science Conference was held in Beijing from 31 March to 1 April. The conference usually organizes once in four years. Vice-premier Hui Liangyu attended the opening ceremony. Some outstanding young experts and excellent project achievements were awarded. Science and technology innovation for water resources were hot topics. More investment and project budget were appealed for the next years. Hydrology science and water resources management with climate change pressure will be emphasized from the conference documents.

National Hydrology conference was held in Nanning, Guangxi Autonomous Region of Southwestern China, from 2-3 April 2008. Vice minister, Mr. E Jingping, Chair of China-IHP national Committee, Mr. Deng Jian, SG of CHINA-IHP, Ms. Zhu Xiaoyuan and some of members of the National Committee participated the conference. This is the first conference after Hydrology Regulation issued. All participants, especially from provincial hydrological units, highly appreciated the regulation. Four important tasks were emphasized: (1) enhancing hydrological regulations and rules; (2) improving information system for flood control and drought mitigation; (3) increasing investment for hydrological infrastructures; (4) enhancing basic hydrology researches. A logo of China Hydrology was announced for public use.

2008' annual water and soil conservation conference was held in Bijie City of Guizhou Province of Southwestern China from 17-18 April. The conference emphasis water and soil conservation is quite related to eco-civilization. To establish eco-compensation mechanism is new requirement for water and soil erosion. Water conservation oriented people daily life is a new definition for water resources development and management, such as clean drinking water, rural hydropower, water and soil conservation, etc. About 100 participants attended the conference. IHP national committee representatives were involved.

1.2.2 Participation IHP Steering Committees/Working Groups

The 14th Regional Steering Committee Meeting for Southeast Asia and the Pacific and International Symposium on Managing Water Supply for Growing Demand was held in Bangkok, Thailand, 16 - 20 October 2006, Due to misunderstood on financial support problems (China will no longer to be supported from UNESCO Jakarta Office for RSC meeting), Dr. Liu Heng cancelled his participation at the final minutes. Mr Chen Yuanfang was requested , on behalf of Chinese National Committee, to present country report. Several Chinese participants with their papers attended the combined workshop

Dr. Chen Yuanfang, Dr. Xu Zongxue, as a member of FRIEND working group, participated in several meetings on for the Asian Pacific FRIEND.

1.2.3 Research/applied projects supported or sponsored

The website of the Chinese National Committee for IHP has been supported by UNESCO Beijing office and has been updated regularly. It was updated regularly for distributing messages to the public.

Official home page is http://www.chinaihp.org

1.2.4 Collaboration with other national and international organization and/or programs

Hindu-Kush-Himalayan FRIEND Project, Chinese National committee nominated two experts to work with International Centre for Integrated Mountain Development (ICIMOD) and UNESCO-IHP in Katmandu, Nepal. Mr. Liu Heng from Chinese National Committee and Ms Huang Yan from Changjiang Water resources Commission will be on behalf of Chinese National Committee to cooperate with international and local counterparts. Ms Huang Yan now is in the preparing meeting in Katmandu.

22nd Sino-Japan Water Resources Workshop was held from 6-8 November 2007 in Nanjing. Some experts from Japanese Ministry of land, infrastructure and transport and other water related organizations attended the workshop. Three themes are focused on climate change impact on water resources, water information management and water quality protection

UNESCO-IHE governing Board meeting was held on 2 December, 2006. Vice-Chairperson of Chinese National Committee for IHP attended the meeting for reviewing IHE annual workplan and strategy for middle and long-terms.

14th China-Korea water resources management workshop was held on 6-10 May 2008, in Seoul Korea. Mr. Liu Zhiguang, Vice-Chairperson of Chinese IHP National Committee leaded a 9-person delegation to attend the workshop.

The workshop has some topics, such as control indicators of total water volume withdraw in a river basin, reservoir flood-control dynamic stages, river basin simulation model, large-flood control strategy, alternative water source technology etc. The delegation also spend a day fieldtrip of

Korean flood control projects.

1.2.5 Other initiatives

1.3 EDUCATION AND TRAINING COURSE

1.3.1 Contribution to IHP courses

International training and research center for erosion and sedimentation (ITRCES) organized a training course on River Sediment Management and Eco-environment in Beijing from 9-16 October, 2007. Vice-Chair Person of China-IHP had a lecture on Integrated Water Resources Management

UNIDO Hangzhou Regional Center (HRC) for small hydropower, also named as rural small hydropower research institute, enhanced their activities under IHP framework. Four training courses for developing countries are organized in Hangzhou with Chinese government support.

1.3.2 Organization of specific courses

Training course for leaders of hydrological stations was organized from 9-16 November,2007 in Nanjing. The course is a regular course for improving knowledge. 97 station leaders from 18 provinces attended the training course. The course provided advanced technologies for hydrological observation. It is also refreshed for those leaders who working in hydrological stations. China-IHP gave technical support, especially new development of international hydrological programme.

1.3.3 Participation in IHP courses

Each year about 20 participants were sent to UNESCO-IHE with academic recommendation from China-IHP.

Ms Dong Xiuying from the bureau of hydrology, ministry of water resources participated in the Regional Short Training Course on Urban Stormwater Management, held from 3–7 December 2007 in Kuala Lumpur. It was organized by HTC-KL and UNESCO Jakarta and supported by MIHP, ICHARM, JCUD and other agencies.

1.4 PUBLICATION

Proceedings of Workshop on Ecological Effect of Hydro-Engineering, 11-12 November 2007.

1.5 PARTICIPATION IN INTERNATIONAL SCIENTIFIC MEETINGS

1.5.1 Meeting hosted by the country

Workshop on Ecological Effect of Hydro-Engineering, 11-12 November 2007 was held in Nanjing.. this is a participation programme with financial support from UNESCO headquarter. 80 participants attended the workshop, 30 papers were collected and included in the proceeding. Chinese National Committee awarded two persons and one group for their outstanding contribution to international cooperation. Mr. Zhang Hailun got permanent achievement for China-IHP for his long-term working as Secretary-general in IHP National Committee. Mr. Xu Zongxue got outstanding contribution award for international hydrological cooperation. Bureau of Hydrology of Changjiang Water Resources Commission was awarded for their long-term supporting for national

and international hydrological cooperation.

The workshop messages were distributed in the official website of Ministry of Water resources and some key national water organization homepages, Such as: CHINA-IHP: www.chinaihp.org ; NHRI homepages: http://www.nhri.cn/tpxw/20071113083959bdcf05.aspx,

3nd Yellow River Forum was held from 18 to 21 October 2007 in Dongying, the estuary city of Yellow River. More than 2000 participants including 300 international participants from 60 countries attended the forum. The minister of Spanish Environment Ministry and WWC president also attended the forum. 6 themes and 12 sessions were arranged for specific topics. The themes included maintenance of healthy river, hydraulics and non-structure measures, water environment and ecology protection, trans-basin water transfer and water allocation, water right/price and water market as well as specific sessions, such as UNESCO-IHE alumni evaluation session. The forum became a well-known action and will take place each two years in cities along Yellow River.

Vice-Chairperson of China-IHP and some members were presented.

The 8th Sino-Dutch Joint Steering Committee meeting for water sector cooperation was held on 17 October 2007 in Dongying. More than 20 delegates from China, the Netherlands, participated in the meeting. Some existing projects were reviewed. Some potential projects were proposed by each side, including climate change impact on hydrological regime, integrated water resources management. Main actions and activities for next year included investigation and researches, such as ecological function, water resources, soil erosion, landslide, river basin management and planning.

Sino-Spanish Water Forum held in Dongying , Shandong Province, on October 15th, 2007. More than 160 representatives from the Ministry of Water Resources, Ministry of Environment of Spain, river basin commissions, provincial water resources departments and companies took part in the meeting. Mr. Jiao Yong, Vice Minister of Water Resources, on behalf of the Ministry of Water Resources welcomed the Spanish government delegation led by H.E. Ms. Narbona, Minister of Environment as well as the preventatives from Spanish companies. Ms. Narbona delivered a speech at the opening ceremony of the Forum. She also held meetings with Vice Premier Hui Liangyu and Miniter Chen Lei in Beijing before the forum.

Presentations on water resources management, river basin management, water saving irrigation and water affair management in China and Spain are given in the Forum, and participants exchanged views by asking and answering questions. The Spanish Exhibition is also held during the Forum.

Sino-UK steering committee of water resources demand management project meeting was held on 14 May, 2008 in Beijing. Mr. Hu Siyi, Vice-Minister of Water Resoruces and Mr. Davis, Representative of UK DfID in Beijing attended the meeting. The project started from 2006 and will be completed by 2010. Main purpose is to introduce UK water demand management and to apply in Liaoning and Gansu provinces. In this steering committee meeting, experiences from pilot application were summarized. From central government, all these experiences from pilot basins and projects will be disseminated to all country in the next years. IHP-China has been involved for consultation and implementation in Liaoning Province.

1.5.2 Participation in meetings abroad

UNSGAB / the High level Expert Panel on water and disaster meeting was held in Tokyo Japan on 6 September. Vice Chairman of IHP Chinese National Committee was recommended by Ministry of Water Resources to be the member and participated the meeting.

The panel meeting focused on two objectives. The first objective, answers to the theme "Establish, with unified political will, a clear-cut global-level target that articulates the direction for global actions for reducing the loss of life and livelihood caused by water- related disasters"; whereas the second objective answers to the theme "Provide adequate safe water and sanitation during and after disasters".

1.6 OTHER ACTIVITIES AT A REGIONAL LEVEL

1.6.1 Institutional relations / co-operation

To enhance relationship with IAHS at national level, Asian Water Resources Association (AWRA) at regional level, as well as WMO, IAEA, UN-ESCAP at UN system level would be highly concentrated. To cooperate with national committees for hydrological and water resources research in Southeast Asia and the Pacific are key fields.

1.6.2 Completed and ongoing scientific projects

FRIEND projects for flood/low flow forecasting/predictions in Southeast-Asian group work.

2. FUTURE ACTIVITIES

2.1 ACTIVITIES PLANNED TO UNTIL DECEMBER 2007

The National Committee will continue and pay high attention for regional cooperation under IHP framework. WWAP and WWDR are key issues at present, He River is recommended to be a case study in WWDR-III.

With related to Climate change, a project sponsored by UN system with Spanish fund for achieving MDG goals will be implemented.

2.2 ACTIVITIES FORESEEN FOR 2008-2009

Some projects related to IHP-VII themes will be supported by Ministry of Water Resources though IHP national Committee. IHP National will continue to encourage scientific and technical symposia and workshops. Meanwhile, some initiatives for IHP-VII themes will be encouraged and arranged by the National Committee. Cooperation among the Southeast Asia and the Pacific will be top priority. The activities will include, but not only as below:

- Implement a collaborative research project with IRTCES on erosion and sedimentation
- Establish a research center focusing on climate change impact on the hydrological cycle and water resources
- Develop disaster reduction objectives through cooperation with UNSGAB high-level expert panel on water and disaster

- Prepare a country report with a case study to WWDR 3 under climate change issues focusing groundwater system response
- Organize an international workshop on IRBM and/or IWRM, investigate and summarize public participation in some areas
- Cooperate with regional IHP national committees to develop a development strategy on Small Hydropower
- Implement an international initiative of “Lighting up Rural Africa” through cooperation with African counterparts.
- Organize an international or national conference on water, energy and poverty mitigation focusing on small hydropower development
- Implement a research project on risk management focusing environment and society with case of South-North water transfer project
- Participate in national rural drinking water planning and national drinking water sources area protection planning
- Participate in national rural drinking water safety evaluation and planning, develop water quality protection technology
- Workshop on transboundary river water ecosystem security (Cooperate with CITWES: Center of International Transboundary Waters and Ecosystem Security of Tsinghua University)
- Refresher course for UNESCO-IHE alumni on IRBM

2.3 ACTIVITIES ENVISAGED FOR THE LONG TERM

China IHP National Committee will make more contributions to IHP, especially, may host RSC meeting/workshops or join co-team for regional and international cooperation. In the phase IHP-VII, some working groups will be established for more cooperation activities.

Informe sobre actividades realizadas por el Comité Nacional Cubano en el periodo julio 2006 - mayo 2008

1.1 Reuniones del Comité Nacional del PHI

Durante el 2007, el Comité Nacional Cubano del PHI experimentó un proceso de reestructuración y fortalecimiento de su mesa directiva y de sus miembros, que debe traer como consecuencia, por una parte, el continuar la tradición de trabajo de éste y de sus relaciones con el PHI UNESCO y por la otra, una mayor extensión e influencia de sus actividades en el quehacer hídrológico cubano.

Sus actuales miembros aparecen en el Anexo 1.

Desde mayo 2006 hasta noviembre 2007 las reuniones del Comité no fueron sistemáticas, aunque esto no impidió la celebración de numerosas actividades previstas, como expresión del apoyo del Comité al desarrollo de la hidrología en Cuba. Entre ellas, las relacionadas con el apoyo a las actividades del PHI –VI y su participación, aunque limitada, en las contribuciones del PHI – VII.

1.2 Actividades a nivel nacional dentro del marco del PHI

1.2.1 Certámenes científicos y técnicos

El Comité Nacional Cubano del PHI, ha apoyado en el período un numeroso grupo de eventos y talleres científico-técnicos en el campo de la hidrología y la gestión de los recursos hídricos en el país. Entre ellos, se citan :

- Talleres 2006, 2007 en colaboración con la Sociedad de Ingeniería Hidráulica – UNAICC sobre manejo de Cuencas Hidrográficas y de los Recursos Hídricos, así como sobre el funcionamiento de las Redes de Observación del Ciclo Hidrológico, dentro del contexto de las temáticas de la V y VI fases del PHI.
- Jornadas nacionales 2006, 2007 y 2008, conmemorativas del Día Mundial del Agua, Día Interamericano del Agua.
- Coauspicio en 2006, 2007 y 2008 del Proyecto “Trazaguas”, Agua Amiga de las Niñas y los Niños que conlleva la celebración de concurso de dibujos, cuentos, poesía, con la participación de más de 5000 niños por año en todo el país.
- Coauspicio del Curso Internacional de Agua Subterránea y Medio Ambiente (CIASMA), que se celebra anualmente organizado por el CIH - ISPJAE con el apoyo de otras instituciones nacionales (INRH, SIH – UNAICC). Este Curso se inscribió, en su 11na. Edición de 2008, como actividad de capacitación dentro del proyecto GRAPHIC.
- Coauspicio a la organización y celebración del VII Congeso Internacional de Ingeniería Hidráulica, 2007.
- Coauspicio y participación en el evento científico internacional Geocuenca 2007, organizado por la Facultad de Geografía UH, septiembre, La Habana, Cuba.

1.2.2 Proyectos de investigación o de aplicación apoyados o patrocinados

- Apoyo a la ejecución del Programa Ramal Científico-Técnico Gestión Integrada del Agua, así como coauspicio y apoyo de un grupo de Programas Ramales y Nacionales de Ciencia y Técnica (PRCT y PNCT) encaminados fundamentalmente a solucionar o mitigar los problemas de la creciente demanda de agua y el deterioro de su calidad.
- Defensas de Tesis de Maestría y Diplomados en diferentes Facultades (Geografía, Hidráulica) de Universidades del país, en temas relacionados con la gestión del agua, los que han contando con la participación de miembros del Comité Cubano PHI.
- Preparación de estudios y proyectos nacionales y regionales relativos al Manejo de Riesgos y Sostenibilidad de Acuíferos Costeros en las Islas del Caribe, en fase de presentación.

1.2.3 Colaboración con otras organizaciones o programas nacionales e internacionales

CONAPHI Cuba estableció relaciones y vínculos con el Consejo Directivo del Centro del Agua para el Trópico Húmedo para América Latina y el Caribe CATHALAC. Se realizaron cursos cortos de distintas especialidades a profesionales de la Región con el coauspicio de CATHALAC.

1.3 Cooperación con el Instituto UNESCO-IHE para la Educación Relativa al Agua, y otros centros internacionales/regionales relacionados con los recursos hídricos, bajo los auspicios de la UNESCO

1.4 Publicaciones

Diferentes miembros del Comité Cubano PHI han publicado artículos en revistas científico-técnicas cubanas y extranjeras en este período de tiempo. Por parte del CONAPHI Cuba se está en disposición de contribuir con estas producciones a nutrir revistas especializadas, que ya están siendo editadas o de nueva creación en la región.

1.5 Participación certámenes científicos internacionales bajo el auspicio del PHI UNESCO

1.5.1 Certámenes realizados en el país

- Colaboración con la celebración de la 5ta. Conferencia Mundial FRIEND: Variabilidad de los Recursos Hídricos: Procesos, análisis e impactos, realizada en La Habana, Cuba, noviembre – diciembre 2006, el que contó con la participación del Dr. Eduardo Planos (Cuba) como Presidente del Comité Organizador local.
- Colaboración y apoyo a la organización y celebración del Taller de Ecohidrología, como evento previo a la 5ta. Conferencia Friend, 2006
- Colaboración a la organización y celebración del “Curso de Manejo Integrado de los Recursos Hídricos” en el contexto del evento internacional FRIEND (Flow Regimes from International Experimental and Network Data). Este curso fue organizado por la UH y se impartió en coordinación con dos profesores de la Universidad de Buenos Aires, Argentina, durante una semana en la sede del evento Hotel Meliá Cohíba, en Noviembre de 2006.

- Colaboración para la celebración de la reunión OMM-PHI, diciembre 2007, La Habana, con expertos del Caribe, para el Análisis del Manual de desarrollo de Capacidades de los Servicios Meteorológicos e Hidrológicos Nacionales.

1.5.2 Participación en certámenes en el extranjero

- Apoyo a las labores del experto cubano (Dr. Eduardo Planos - INSMET), Coordinador Regional General del Proyecto FRIEND del PHI para América Latina y el Caribe.
- Apoyo y colaboración al experto cubano (Dr. Braulio Lapinel - INSMET), Coordinador regional del tema Sequía del proyecto FRIEND para América Latina y el Caribe. En el marco de las actividades de esta temática, el Instituto de Meteorología de Cuba ha donado a UNESCO el uso del sistema de vigilancia y diagnóstico de la evolución de la sequía que se utiliza en Cuba, el cual ya ha sido instalado por expertos cubanos en Uruguay y Perú
- Participación de un miembro del CONAPHI CUBA, en la persona del Dr. Armando Hernández (CIH – CUJAE), en el "Workshop on Coastal Aquifers" -UNESCO GRAPHIC Project-Groundwater Resources Assessment under the Pressures of Humanity and Climate Changes. Belize, November 19-21, 2007, en el que se presentó la ponencia THE AQUIFER MANAGEMENT AND THE NEW TECHNOLOGIES. STUDIES CASE: SOUTH BASIN OF HAVANA, en el que se expusieron las posibilidades que tiene Cuba de contribuir a los objetivos de GRAPHIC con el uso de las nuevas tecnologías para el manejo de los acuíferos ante los retos de los cambios climáticos y el desarrollo humano.
- Participación de un miembro del CONAPHI Cuba, en la persona del Dr. Armando Hernández, en las actividades de UNESCO GRAPHIC Project "Groundwater Resources Assessment under the Pressures of Humanity and Climate Change" Launching of Andros Case Study Nassau, March 17-19, 2008, presentándose la ponencia: THE SUSTAINABLE MANAGEMENT OF COASTAL AQUIFERS TO FACE CLIMATIC CHANGES. En su desarrollo, se propuso que Cuba podía contribuir con asesoramiento por sus experiencias en la modelación de acuíferos cársicos costeros, intrusión salina e hidrogeología.

2 Actividades futuras

Con la elaboración del Plan de Actividades 2008 por parte del CONAPHI Cuba, se está abriendo lo que pretendemos que sea una nueva fase de trabajo, coincidente con la fase PHI – VII, que debe proporcionar más presencia y contribuciones del quehacer cubano en el campo de la hidrología y la gestión de los recursos hídricos, tanto en PHI – UNESCO, como a nivel bilateral y regional en América Latina y el Caribe. Está previsto el coauspicio de numerosos eventos científico-técnicos nacionales, así como consolidar la participación de especialistas cubanos en actividades del PHI.

Anexo 1. Miembros CONAPHI Cuba (cierre abril 08)

No.	Nombre y Apellidos	Cargo CONAPHI	Institución	Cargo Institución	Localización
1	Dr. Jorge Mario García Fernández	Presidente	Instituto Nacional de Recursos Hidráulicos INRH	Director Cuencas Hidrográficas	Humboldt 106. Plaza. Vedado. La Habana. jorgem@hidro.cu 836 - 3449
2	Ing. Luis E. Cantero Corrales	Vicepresidente	Instituto Nacional de Recursos Hidráulicos INRH	Jefe Despacho Presidente	Humboldt 106. Plaza. Vedado. La Habana. luis@hidro.cu 836 - 5332
3	Ing. Rigoberto Morales Palacios	Vicepresidente	Instituto Nacional de Recursos Hidráulicos INRH	Director Obras Hidráulicas	Humboldt 106. Plaza. Vedado. La Habana. rigo@hidro.cu 836 - 6702
4	Lic. Miguel Alberto Méndez Córdova	Secretario	Comisión Nacional Cubana CNC UNESCO	Funcionario	Ave Hohly 51 esp. 32. Plaza. Vedado. mendez@cncu.minrex.gov.cu 881 - 0088
5	Dr. Rafael Pardo Gómez	Miembro	Centro de Investigaciones Hidráulicas CIH - CUJAE	Director	114 No. 11901 CUJAE. Marianao. rpardo@cih.cujae.edu.cu 262 - 7495
6	Dr. Armando O. Hernández Valdés	Miembro	Centro de Investigaciones Hidráulicas CIH - CUJAE	Profesor	114 No. 11901 CUJAE. Marianao. ahernandez@cih.cujae.edu.cu 260 - 1416
7	Dr. Ivan González	Miembro	Facultad Geografia- UH	Profesor	L No. 353 6 piso. Vedado. Plaza igp@geo.uh.cu 832 - 6290
8	Ing. Aymée Aguirre Hernández	Miembro	Instituto Nacional de Recursos Hidráulicos INRH	VicePresidenta	Humboldt 106. Plaza. Vedado. La Habana. aimee@hidro.cu 836 - 6783
9	Dr. Cristóbal Díaz Morejón	Miembro	DMA- Ministerio de Ciencia, Tecnologia y Medio Ambiente	Funcionario	Capitolio Nacional. Prado y San José.Habana Vieja. cristobal@citma.cu 867 - 0598

			CITMA		
10	Ing. Rafael Feitó Olivera	Miembro	Sociedad Ingeniería Hidráulica Cuba-UNAICC	Presidente	Humboldt 104 esp. Infanta. Vedado. Plaza. rfeitoo@hidraulicos.cu 864 – 2208
11	Dr. Braulio P. Lapinel Pedroso	Miembro	Instituto de Meteorologia - CITMA	Investigador	Loma de Casablanca. Regla. La Habana. braulio.lapinel@insmet.cu 861 – 8375; 868 – 6270
12	Ing. Gisel Pérez Wong	Miembro	Instituto Nacional de Recursos Hidráulicos INRH	Directora Ciencia y Técnica	Humboldt 106. Plaza. Vedado. La Habana. gisel@hidro.cu 834 – 6567
13	Dr. María Elena Ruíz Pérez	Miembro	Universidad Agraria Habana UNAH	Jefe Grupo Investigaciones Agrofísicas	Autopista Nacional km 23,5 mruiz@isch.edu.cu udnaranj@infomed.sld.cu 047 – 863013 ext. 235
14	Dr. Orestes Valdés Valdés	Miembro	Ministerio de Educación MINED	Asesor Educación Ambiental	3ra. Y 16. Miramar. Playa. La Habana. ovaldes@rimed.cu; educamb@dct.rimed.cu 202 – 2259
15	Dr. Angel R. Rey García	Miembro	Instituto Investigaciones Riego y Drenaje MINAG	Director	Ave. Camilo Cienfuegos y calle 27. Arroyo Naranjo. La Habana. rey@iird.cu iird@iird.cu 91 1038 644 1633

Egyptian National Committee of
International Hydrological Program (ENCIHP)
National Report for the IHP Intergovernmental Council 2008

1. Activities Undertaken in the period August 2006-May2008

1.1 Meetings of the IHP National committee

1.1.1 Decisions regarding the composition of the IHP National Committee

Formation for the Egyptian National Committee of the international hydrological programs (ENCIHP) was issued by the ministerial decree No. 48 dated 9/2/1998. The formation consists of twenty members. They are of different disciplines and form a very specialized team. The members of the committee are as follows:

1. Dr. M. B. A. Saad Vice President, Emeritus Professor and Advisor, Ministry of Water Resources and Irrigation (MWRI).
2. Prof. Abel Wahab Amer Member, Professor, Hydraulic and Irrigation Department, Faculty of Engineering, Cairo University.
3. Dr. Mohamed El Moattassem Member, Emeritus Professor, Nile Research Institute, National Water Research Center (NWRC).
4. Dr. Nahed EL-Arabi Member, Director of the Research Institute for Groundwater, (NWRC).
5. Dr. Fathy Gamal Member, Director of the Water Resources Research Institute, (NWRC).
6. Prof. Emad Hussny Hamdy Member, Professor, Faculty of Engineering, Cairo University.
7. Prof. Moustafa Soliman Member, Professor, Hydraulic and Irrigation Department, Faculty of Engineering, Ain Shams University.
8. Dr. Mohamed Ibrahim Member, Consultant at Egyptian Environmental Affairs Agency (EEAA).
9. Dr. Abel Fattah Motawa Member, Head of Nile Water Sector, Ministry of Water Resources and Irrigation, (MWRI).
10. Eng. Abdel Shakour Mouhmed Member, Head of Irrigation Sector, (MWRI).
11. Eng .Mrs. Lillan Monier Member, Chairman, Nile Controls Inspectorate, (MWRI).
12. Eng. Helmi Mahmoud Member, Consultant, (MWRI)
13. Eng. Ali Abu El Suaod Member, General Secretary (ENC)
14. Dr. Mouhamed Dawood Member, the Meteorological Department of Egypt.
15. Dr. Karima Attia Member, Researcher, Nile Research Institute, (NWRC).
16. Mr. Mouhamed Safwat Salem Member, National Commission of UNESCO
17. eng. Nahed khalil Member, Head of Groundwater Sector (MWRI)

18. Dr. Alli Eslam. Member, Chairman of Atomic Energy Authority
19. Dr. Madiha Moustafa Reporter, Director Channel Maintenance Research Institute (CMRI).

The committee was honored by the attendance of: -
Representative of UNESCO Cairo office (Dr. Radwan el Weshah)

The Committee usually organizes periodical meeting every two month, unless there are urgent subjects need to be discussed. The main activities of the committee are to; discuss researches results related to hydrology, cooperate technically with other national and international organizations sharing similar interests, disseminate information and studies related to committee activities, translate interesting books and magazines into Arabic, compose books related to hydrology to be used by the engineers of MWRI, attend conferences and seminars related to committee activities, and transfer of knowledge through training courses. Organized seminars to present interesting topics related to the committee .The committee has a major role in implementing projects of, IHP-VI. And proposes themes and project at IHP-VII

Activities of the committee are summarized bellow: -

- The Committee established a hydrological library, which is provided with IHP publications, and other textbooks related to hydrology as well as other subjects related to freshwater.

- Establishing a web site for the groundwater protection network.

- Organizing an International Course on Environmental hydrology, this is a yearly course, held in Egypt. The course is usually attended by participants from Arab and African Regions.

- Contributing to the formulation of the seventh phase of the International Hydrological Program of (IHP VII) (2008-2012). Comments on proposed themes and suggested area of interest for the Arab region. Preparing implementation plan for selected focal areas.

- The Committee prepared the annul work plan for its activities of the year 2008/2009.

- Participation in the Governmental and Intergovernmental Council meeting

- Continues support for the regional networks, which related to Wadi Hydrology and Groundwater Protection Networks.

- Participation on related internal or external conferences and workshops.
- Dissemination of training courses and fellowships to other partners and give

recommendations.

- Study, translates and summarizes reports to the participants which have been delivered to the Egyptian national committee for hydrology and contain related subject (for example world water for development, Urban ground water pollution, ground water pollution , and new world water- advancing technology to secure supply and sub grade the environment)

- Present and discuss the activity done by other Egyptian committees

- Discussion about the development of the African Countries and identify the role of Egypt.

- Discussion about Nile Basin Initiative and identification of role of Egypt

- Discussion about sedimentation process in alluvial rivers, evaporation control at Lake Nasser, and sedimentation process and control.

- Study the cooperation between different Egyptian committee of UNESCO Programs and establishing joint activities related to Echo hydrology.

- Discuss and present the application of isotopes in hydrology(groundwater seepage , recharge to groundwater from adjacent aquifer , sedimentation at lakes)

- Presentation and discussion with committee staff about the application of isotopes in the fields of water resources development and sedimentation

- Proposals for several seminars and workshops prepared by the Committee and invited other committees and researchers from the NWRC and MWRI for participation. Four Seminar were organized by the Egyptian Committee for IHP they are:-

1. "Decreasing of Evaporation rate from surface water Bonds at Egypt" organized during May 2006
2. "River Nile Flood Prediction", organized during November 2006.
3. "Impact of New project on the flood regime of River Nile" during May 2007.
4. "Impact of Decreasing Water level at Lake Nasser" organized during November 2007. The power point presentations of the four seminars are attached.

- Discussion of the environmental impacts of the proposed project of the connected canal between Red Sea and Dead Sea.
- Discussion about Management of Water Resource considering the new development projects.
- Discussion of the projects proposed at Nile riparian countries.

- Discussion about study entitled "Time dependency 3 rd by Hydrodynamics circulation model for the Red Sea Basin" the team leader of the study is one of the committee members.
- Attained the "River Sedimentation" conference which held at September 2006.
- Attained the "Sedimentation at Basins" which held at November 2006.
- Proposed some changes at the committee regulation.
- Presentation for a book entitled "Policy perspectives for Ecosystem in the pralion peninsula

- Attained the Arab committee for International Hydrological Program which held during November 2007and presented two paper:
    1. Water resources at Egypt.
    2. Impact of climatic changes on Water Resources of Egypt.

- Preparation for several project proposals that will fund by UNESCO.

ihp·hwrp germany

German contributions to the IHP of UNESCO and the HWRP of WMO

2002 – 2007

IHP – International Hydrological Programme of UNESCO
HWRP – Hydrology and Water Resources Programme of WMO

German IHP/HWRP - National Committee

IHP – International Hydrological Programme of UNESCO

HWRP – Hydrology and Water Resource Programme of WMO

BfG – Federal Institute of Hydrology, Koblenz

German National Committee of the
International Hydrological Programme (IHP) of UNESCO and the
Hydrology and Water Resources Programme (HWRP) of WMO
Koblenz 2008

Federal Institute of Hydrology
Am Mainzer Tor 1

56068 Koblenz • Germany

Tel.: +49 (0)261/1306-5313
Fax: +49 (0)261/1306-5422

http://ihp.bafg.de

National IHP/HWRP projects 2002 – 2007

Water issues are dealt with nationally and internationally at various levels and by various organisations. Within the United Nations, only UNESCO and WMO have comprehensive water programmes that consider equally the needs of both highly developed and less developed countries. These are the International Hydrological Programme (IHP) of UNESCO and the Hydrology and Water Resources Programme (HWRP) of WMO.

The tasks of the IHP of UNESCO are scientific research, the application of research results in practice, education and training in all fields of hydrology and water resources management, including the interactions between environment and society with regard to a sustainable development of water resources. The IHP is implemented in six-year phases. This permits the contents of the programmes to be adapted to the prevailing scientific and social developments and requirements.
The theme of phase V (1996 – 2001) was *Hydrology and Water Resources Development in a Vulnerable Environment*.
Phase VI of the IHP (2002 – 2007) was devoted to *Water Interactions: Systems at Risk and Social Challenges* with the focal points Global Changes and Water Resources, Integrated Watershed and Aquifer Dynamics, Land-habitat Hydrology, Water and Society as well as Water Education and Training. The contributions to the IHP are supported by the national committees of the member states. A secretariat at UNESCO in Paris coordinates the programme activities.

The HWRP of WMO promotes the sustainable management of water resources by providing data, models and strategies. The HWRP is carried out in ten-year long-term plans. The fifth WMO long-term plan (2000-2009), valid for the term 2002-2007, was adopted by the 13th Congress in May 1999.

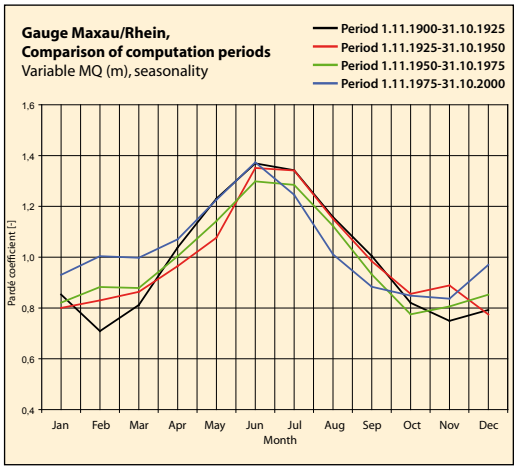
The HWRP is divided into five sub-programmes: Basic Systems in Hydrology, Forecasting and Applications in Hydrology, Sustainable Development of Water Resources, Capacity Building in Hydrology and Water Resources, and Water-related Issues. The objective of the HWRP is to support the hydrological services of the member countries in their operational work and to build up a worldwide hydrological information network. The contributions to the HWRP are prepared by experts from the national hydrological services and international working groups. The hydrological department of WMO supports and coordinates the contributions.

The German IHP/HWRP National Committee

The hydrology programmes of UNESCO and WMO have many overlapping interests.
In Germany, this fact has been acknowledged by establishing a joint national committee, the German National Committee for the IHP of UNESCO and the HWRP of WMO.
In line with the decisions of the National Committee, the German IHP/HWRP Secretariat prepares project suggestions for the participation in the relevant focal themes of IHP and HWRP and implements these projects.

Regional Cooperation Rhine

Cooperation on the Rhine results from collaborative work in the International Commission for the Hydrology of the Rhine Basin (CHR). The CHR works within the scope of the IHP of UNESCO and the HWRP of WMO. It is an instrument of the hydrological and water resources institutions of the Rhine countries and supports transnational hydrological projects.



Changes in the runoff regime of the Rhine, Gauge Maxau (Belz 2007 [1])

Flood estimation

Flood research is indispensable for design and hazard mapping as well as for hydraulic and water management aspects. The distinct characteristics of the catchments from the alpine countries to the Netherlands require different approaches. While in the small catchment areas of the alpine countries in many cases short or no observation series are available, long-term observations, sometimes covering time series of more than 100 years, have been recorded for the large rivers of the lowlands. This large scale of fundamental flood dynamics brings about a multitude of different models.

The CHR has compiled and published a selection of operationally used models and approaches. The publication (CHR report I-19) aims at pointing out the diversity of models being used in practice in the Rhine basin as well as the experience previously collected. Based on this work, a practical help for the estimation of flood peak discharge in ungauged streams was developed in Switzerland. The overall project was concluded with the international conference on Flood Estimation, held 2002 in Bern (Proceedings, CHR report II-17).

Efficiency of measures

A method was developed to examine the efficiency of flood mitigation measures in large catchments (CHR report I-20 and I-21). The impact of regional flood mitigation measures on the flood characteristics of mesoscale catchments was shown for a sub-catchment in the Moselle/Saar area. Design floods for the entire Moselle basin were defined while considering distinct hydrometeorological conditions.
On this basis, it was possible to establish flood scenarios for gauging stations along the rivers Moselle and Rhine, while taking account of different flood mitigation measures and hydrometeorological conditions.

Sediments

By contributing a case study on the Rhine, CHR takes part in the project sediment transport in the catchment of major rivers within the scope of the International Sediment Initiative (ISI) of the IHP of UNESCO. The focus of this study is on the description of erosion and transport processes, analysis methods, sediment balances as well as monitoring and data processing methods. Other focal points of the study are the economic, social and ecological influences of the sediment transport on water management.

Climate change

The significant changes in precipitation during the last 20 years towards an increase in extreme precipitation and a slight seasonal shift make it indispensable to continue giving top priority to research on climate change and its effects on hydrological processes.

Hydrometeorological data sets have to be consistently processed for the Rhine basin. Owing to the long data sets of many years,

the Rhine basin is particularly suitable for further studies. Floods and low flow have various impacts on the environment and on man. They represent natural risks and seem to be reinforced by climatic and human influences. Owing to the predicted rise in global temperature and the consequential intensification of the water cycle it is assumed that hydrological extremes will occur more frequently in future.

A change of dimension and frequency of hydrological extremes has a large influence on water management, aquatic ecosystems and agriculture.

CHR organized expert workshops on this topic in order to promote knowledge exchange and to identify knowledge gaps:

- Climate change, 2003
- Extreme discharges, 2005
- Ensemble Predictions and Uncertainties in Flood Forecasting, 2006
- Low flows and drought, 2007

The runoff regime of the Rhine and its tributaries in the 20th century

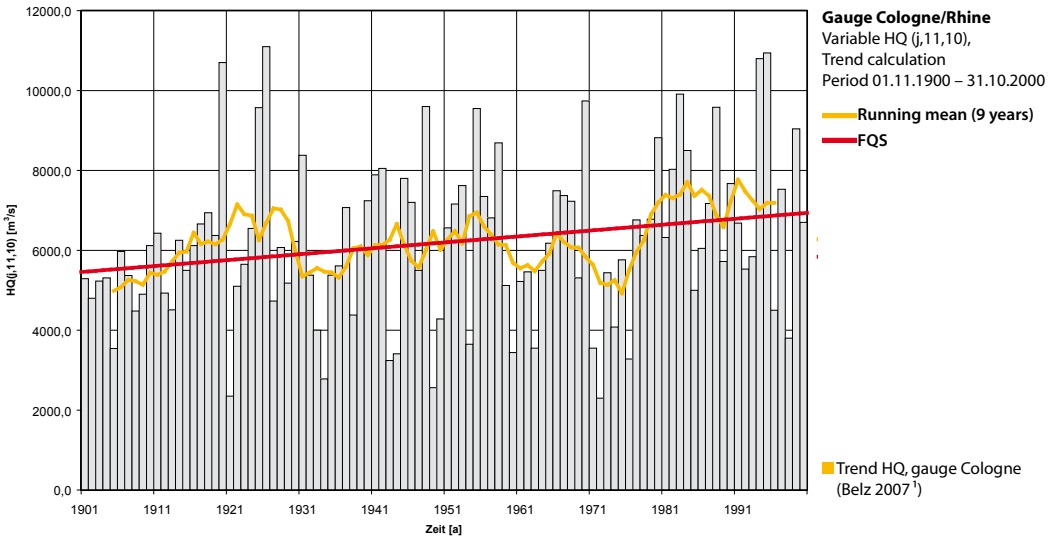
The objective of the project was to investigate the significance of changes in the long-term runoff characteristics and, if possible, to evaluate the causes for the changes and the importance of anthropogenic impacts on the river system.

The study is based on an extensive statistical analysis of suitable hydrological and meteorological parameters. As regards the changes in the runoff regime of the Rhine in the 20th century, it was ascertained that a regional differentiation begins roughly at the mouth of the river Main. The nival regimes in the Upper Rhine and the pluvial regimes in the Middle and Lower Rhine behave similarly. The most significant changes in the entire Rhine basin occur during the winter months. The project results were published in CHR report I-22.

Workshop low flow and drought

Extreme low-flow situations, i.e. droughts, are highly complex hydrometeorological events that have long been looked upon as a natural phenomenon mainly occurring in developing countries. Drought is generally divided into three categories: meteorological, i.e. lack of precipitation; hydrological, i.e. drying out of rivers and aquifers; agricultural, i.e. when agricultural production is no longer feasible.

Doubtlessly, drought is a natural phenomenon with huge effects. Between 1991 and 2000 approximately 280 000 people died worldwide on

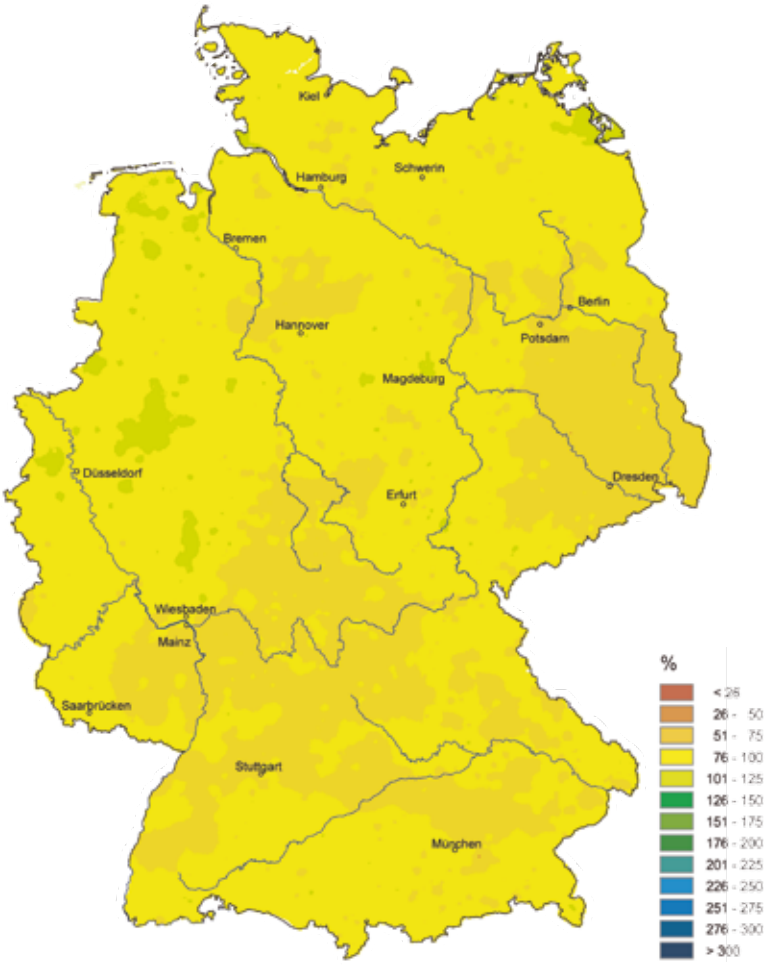


[1] Belz J. et al. (2007)
Das Abflussregime des Rheins und seiner Nebenflüsse im 20. Jahrhundert.
(The runoff regime of the Rhine and its tributaries in the 20th century.)
CHR report 1 – 22

account of drought and damages amounting to billions of dollars were caused (WWDR 2003).

Not just since the dry year 2003 or the first half year of 2006 have low flow and harvest losses in Europe been important fields of duty for the operational hydrological services and water resources planning. Northwestern Europe was already affected by periods of drought as early as in 1949/50 as well as in the 1970s and 1980s. In the past, CHR dealt with the issue of low flow in the Rhine basin several times and put the topic again on the agenda of a workshop in September 2007 in Würzburg. The workshop was jointly organised by UNESCO, CHR and the German IHP/HWRP National Committee.

The workshop addressed three main themes: observed low flow and dry periods, impact of climate change on low flow and drought, management and adaptation strategies.



Precipitation anomaly in % for the summer half year 2003 (deviation from normals 1961 – 1990)
(Source DWD – *German Weather Service*, Koehler,2007[2])

Observed low flow and dry periods

Several options were shown to characterize hydrological drought and low flow, i.e. analyses of space and time, processes and their causes as well as their application in operational hydrological tasks. The latter was implemented in particular by means of case studies from various countries.

Trend studies are an essential element of low-flow analysis. However, it is difficult to differentiate between the individual driving forces. A strong natural variability makes it difficult to identify changes. If long, high quality data series are unavailable, trend analyses become unreliable.

The case studies revealed that the low-flow period in 2003 caused major damage in all Rhine countries, such as problems in the cooling water supply, agricultural crop losses, dam stability problems, recession of discharge and water levels with effects on navigation, decline of groundwater levels, fish mortality or algal bloom. Although it is true that low-flow conditions mainly occur during summer, their intensity is influenced by the hydrometeorological conditions in the previous winter.

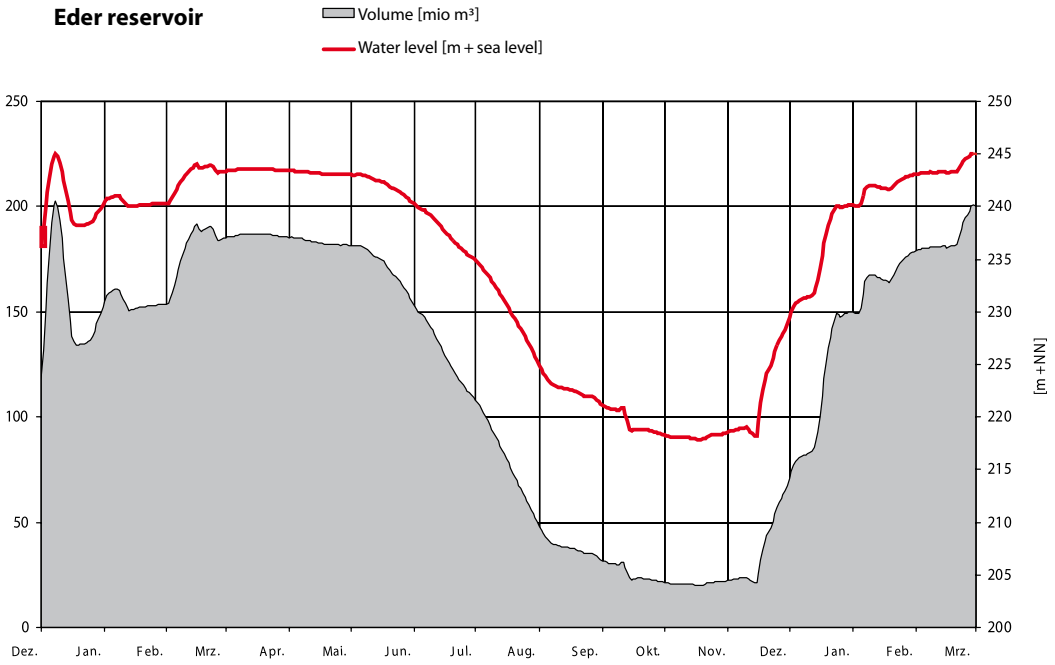
Impact of climate change on low flow and drought

Climate scenarios are generally used in order to be able to assess uncertainties taking effect through climate change on a national or regional level. The global climate scenarios are based on greenhouse gas emissions and are statistically or dynamically adapted to the regional scales.

Scenarios for the Rhine basin have existed since the 1980s and have been continuously further developed owing to increasingly sophisticated hydrological models. The results of these scenario calculations have been relatively constant in the recent years: decreasing runoffs in the summer months, increasing runoffs in the winter months. The design for the current water resources management is based on the historical variations of weather and climate.

As yet, there have been few studies on the assessment of the vulnerability of a management system subject to the uncertainty of future

[2] Koehler, G. et al. (2007)
Überblick zur Niedrigwasserperiode 2003 in Deutschland,
(Overview of the low flow period 2003 in Germany,)
HW 51, H. 3



Variations of water level and stored volume of the Eder reservoir, January 2003 – March 2004 (from NLWK 2004, Koehler, 2007 [2])

change. The operational services require specific information on the spectrum or dimension to be expected and answers to the questions whether the management strategy needs to be changed, which time horizon is to be chosen or which alternatives exist in order to be able to react flexibly.

Especially the time horizon is an essential information as adaptation strategies mostly depend on long-term regional planning measures. These measures have to be regionally devised while considering socio-economic and cultural aspects and land use changes.

Management and adaptation strategies

Seasonal forecasts, real-time forecasts of water level and water temperature, forecasts for ungauged catchments, risk assessments and risk management, the role of interest groups and the citizens participation in decision-making processes have a decisive influence on management strategies. As a means to reduce uncertainties, the ensemble prediction is the primary tool among the forecasts. Model uncertainty can be depicted in a so-called multimodel ensemble, in which the different models start from the same preconditions.

For the estimation of the .95-quantile several methods for the prediction in ungauged catchments were introduced and compared. The usual standard methods, combined with a sound process understanding, achieve better results in regionalisation. The focus is on the adjustment of short data series with respect to timing, alignment of catchments according to seasonal regions, regional regressions of low flow with characteristic values of the catchment, regional adaptation in the runoff data and estimation of uncertainties.

To turn the achieved results into operational water resources management, the information flow between policy-makers or other interest groups and the experts needs to be improved. To this end, both sides have to approach each other. Scientists should be able to express their knowledge in a way which everyone can understand. At the same time, however, it is expected that interest groups seriously deal with the facts. The problem often is that reducing a risk means increasing the risk for the policymaker. Integrating the demands and expectations of interest groups right from the start of an action may facilitate and promote its entire course.

[2] Koehler, G. et al. (2007)
Überblick zur Niedrigwasserperiode 2003 in Deutschland,
(Overview of the low flow period 2003 in Germany,)
HW 51, H. 3

Regional Cooperation Danube

The cooperation of the Danube countries within the scope of the IHP of UNESCO is based on the one hand on project work and on the other hand on regular Danube conferences. Every year, a working meeting of the experts involved in the project is held in one of the 19 Danube countries in order to coordinate the projects.

Regional analysis of annual peak discharges

The study, completed in 2004, started out from the consideration that an integrated and complex water resources management demands an extensive knowledge of the catchments' hydrological parameters.

The definition of the parameters requires more information than collected at the gauging points. Therefore, it is necessary to develop methods for the estimation of hydrological parameters in catchments that are not covered by gauges or in regions with few gauging activities. This study is based on the dates of the annual maximum discharges of 176 stations of the Danube basin. The methods used in the study to define the probability curves and the consequent regionalisation result in a differentiation of five quasi-homogeneous areas.

Characterisation of the runoff regime and its stability behaviour in the Danube basin

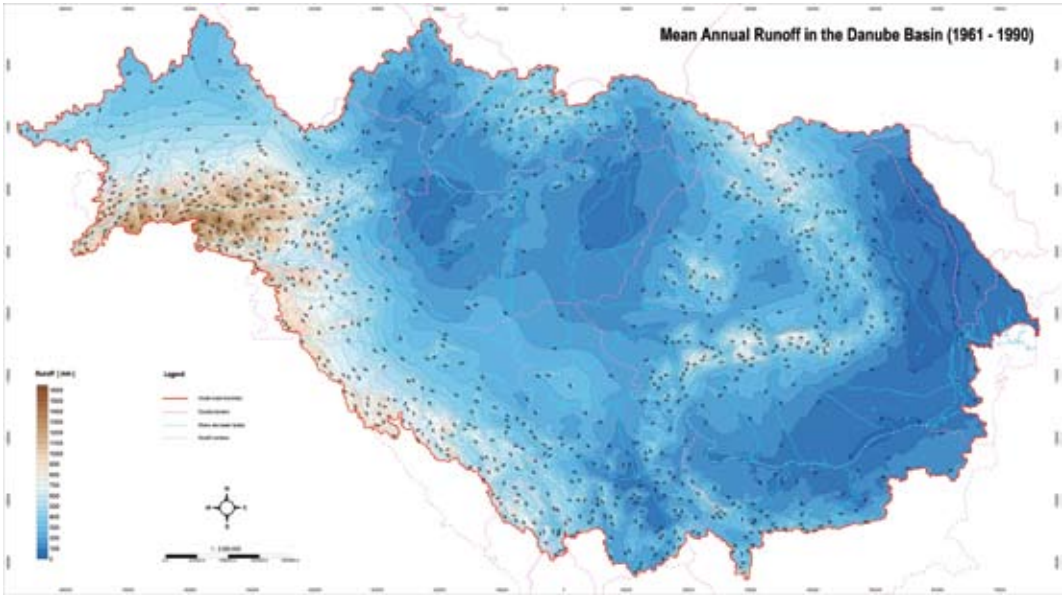
The objective of the study was to define regions in the Danube basin whose runoff regimes show close resemblance. This was achieved by determining the regional distribution of different indices, each representing the stability of a selected element of the interannual distribution of the runoff.

The examination was based on 206 discharge gauging stations for the period from 1950 – 2000. The study was published in 2005.

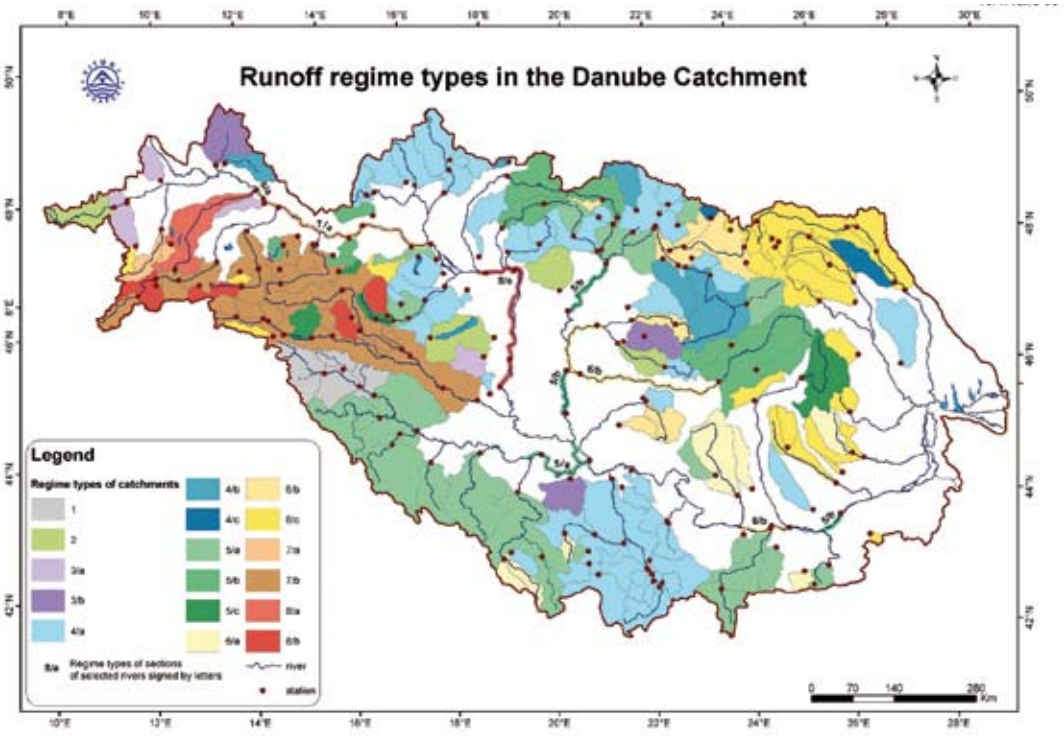
Flow regime of the river Danube and its catchment

The extensive update of evaluations of the Danube's discharge regime and its major tributaries as a follow-up of the Danube monography from the year 1986 was completed in 2006 in German, Russian and English.

The follow-up includes a text part with a characterisation of the natural surroundings and hydrology of the Danube basin and a chapter on extreme events as well as comprehensive enclosures including numerous charts, illustra-



Mean annual runoff in the Danube basin for the period 1961-1990



Different types of runoff regimes in the Danube basin

tions and maps. An attached CD contains the data sets used for the evaluated 45 discharge gauges.

Water balance of the Danube

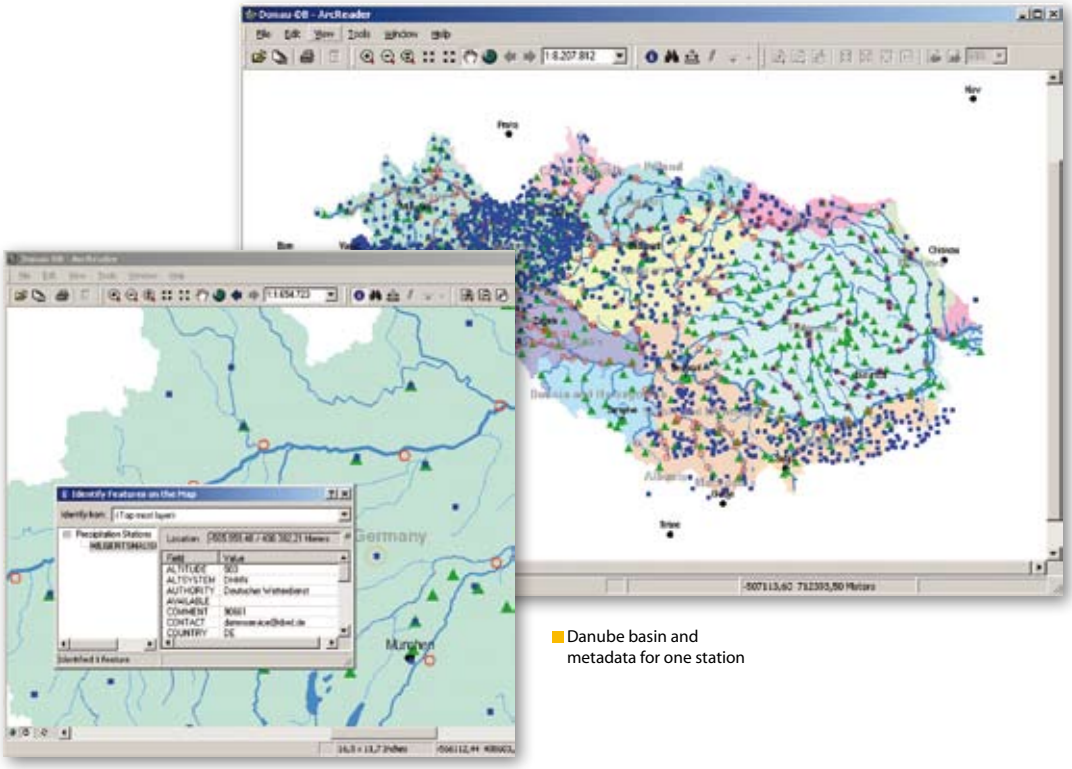
In 2007 the Water Balance of the Danube was published as a follow-up volume of the Danube monography. The "USGS HYDRO1k" model was utilized for general visualization and for the evaluation of the relief on the basis of a digital terrain model. As a first step, the essential hydrological units (basins, sub-basins, inter-basins) were identified for the entire Danube basin with a surface area of each 5000 to 10000 km². When establishing this definition it was also necessary to consider the river basin districts to be defined according to the EU Water Framework Directive within the meaning of their delimitations. Against the background of these provisions, the Danube basin was divided into 109 balance regions.

The water balance model WatBal was applied to each balance region determined in this way. The potential evapotranspiration supplied the input data that were defined independently of the stated model. Budyko's method was chosen for this ascertainment.

The input data were compiled by the individual countries in cooperation with the national hydrological and meteorological services.

The data from 1951 to 2000 were provided as monthly values for the following parameters: air temperature and air humidity for at least three weather stations in each balance region, precipitation data of as many gauging stations as possible and discharge values at the outlet point of the relevant balance region for all selected profiles. Eventually, difficulties in the data provision in individual countries led to the period 1961 - 1990 for data analysis. Water balance modelling was carried out for all 109 balance regions.
The results are represented in charts and maps. The charts show the long-term spatial mean values of air temperature, precipitation, potential evapotranspiration and runoff depth as well as of actual evapotranspiration.

The compilation of "point-related" model results in the form of maps was implemented while using the WatBal model and current GIS technology on the basis of modified parameters of the individual balance regions. In detail, maps of precipitation, the actual evapotranspiration and runoff depth were drawn up.



Danube basin and metadata for one station

A Drift Kriging was used as an interpolation method to draw up the precipitation map. The result was visually validated by means of a comparison between the gauged and the interpolated precipitation values in the sub-basins.

The mean values of the balance regions from the WatBal modelling were taken as a reference for the spatial depiction of the actual evapotranspiration in map form. The actual evapotranspiration, calculated by means of WatBal, relates to the barycentre of the relevant balance area.

The map of actual evapotranspiration for the entire Danube river region was a result of the interpolation of the values of the single balance regions. Drift Kriging was also used in this case.

The map of the mean annual runoff was drawn up analogously to the map of actual evapotranspiration.

The two enclosures attached to the report include, as an additional information, analysis and comparison of the nationally used water balance models by the Austrian project partner as well as a detailed description of the balance areas and the modelling approaches applied up until now to the German part of the Danube basin.

The collected data and present results are a valuable basis allowing the analysis of consequences of climate changes on the water regime in the Danube basin in further work, in particular in water balance studies.

The publication also represents a requested contribution to the work of the International Commission for the Protection of the Danube within the scope of its action programme.

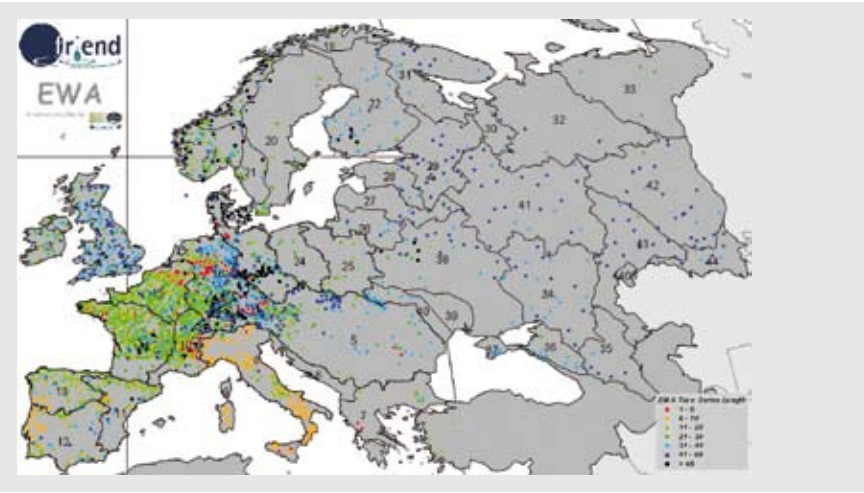
Danube Conferences

Every second year conferences on hydrological forecasting and hydrological bases of water management are held in one of the Danube countries.

The conferences aim at exchanging scientific results, offer a platform for making national projects known and promote cooperation in the Danube basin. Danube conferences took place 2002 in Bucharest, Romania, 2004 in Brno, Czech Republic, and 2006 in Belgrade, Serbia.

Flow Regimes from International and Experimental Network Data (FRIEND)

FRIEND is a cross-cutting programme of the IHP of UNESCO with numerous research institutions, universities and operational departments in more than 90 countries taking part meanwhile. FRIEND's objective is the world-wide study of the spatio-temporal variability of hydrological processes to improve the management of water resources. FRIEND supports transboundary research and the free exchange of information on a regional level. At present, there are eight FRIEND regions worldwide. Every fourth year, international FRIEND conferences are held with the objective of gathering the different regional working groups for a free exchange of opinions and experiences on various main research activities, encouraging them to cooperate closer and of creating a basis for new joint interdisciplinary and interregional projects, i.e. projects going beyond the regional FRIEND groups.



NE-FRIEND gauging stations

European Water Archive

A central project of the NE-FRIEND[3] group is the establishment and operation of the European Water Archive (EWA). EWA was founded in 1985 at the Centre for Ecology and Hydrology, in Wallingford, UK, and subsequently incorporated into the Global Runoff Data Centre (GRDC) in Koblenz. At EWA's disposal are longterm runoff data series of approximately 4000 gauges in 29 countries that the NE-FRIEND group's scientists may use free of charge.

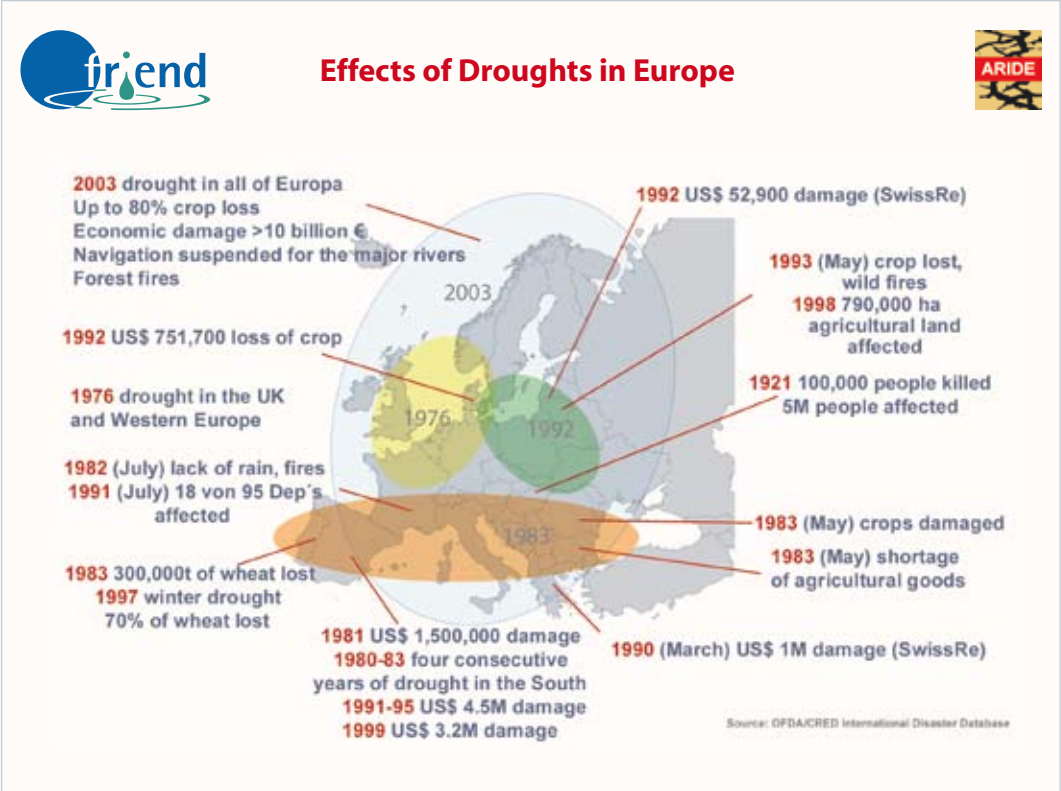
Low flow

In the course of NE-FRIEND's low flow project, methodical studies on low flow and its spatio-temporal variability were examined in different scales. Within the scope of the EU project ARIDE (Assessment of the Regional Impact of Droughts in Europe) investigations on dry periods in Europe were carried out. The data archived by EWA were analysed and transformed into graphic depictions. The results of this project were presented to the scientific public in 2001 at a workshop of the European Geophysical Society and in 2002, within the scope of the international FRIEND conference in Capetown. The work was continued in the EU project ASTHyDA (Analysis, Synthesis and Transfer of Knowledge and Tools on Hydrological Drought Assessment through a European Network). Its objective was to finalize the knowledge of hydrological drought gained in the ARIDE project. Representatives from science and practice discussed the essential outcomes in workshops. The results found their way into university education when the textbook on low flow and drought mentioned below was published.

Textbook on low flow and drought

NE-FRIEND's low-flow working group has published a textbook titled Hydrological Drought – Processes and Estimation Methods for Streamflow and Groundwater. Part I of the textbook describes hydroclimatic fundamentals and the processes causing low flow and drought. Part II deals with hydrological and thematic data, definitions of low flow and drought and various methods for their classification, frequency analyses and different types of estimation methods, stochastic modelling of time series and regionalisation processes. In part III ecological aspects and low flow management are the centre of attention. The influence of land use change, climate change, groundwater abstraction, hydromelioration, urbanisation and increasing

[3] Northern European FRIEND



Effects of drought

industrialisation on low flow are discussed. In the subject area of operational hydrology, different options of implementing low flow tools into water resources management on a global and a regional level are described. Here, special attention is devoted to the demands made by operational services. The textbook addresses both students of hydrology and water resources management and the staff of operational services in water resources administration.

Cooperation with non-European FRIEND groups

The German IHP/HWRP Secretariat has supported the founding of a FRIEND-Hindu Kush-Himalaya (FRIEND-HKH) project. To this end, a workshop on questions of water quality monitoring took place in Kathmandu, Nepal, in March 2003, with German experts on site taking an active part in its organisation.

The FRIEND-HKH working group on snow and glacier hydrology was also supported in cooperation with the Bavarian Academy of Sciences and the University of Freiburg. The project "Regionalization of a Distributed Catchment Model for Highly Glacierized Nepalese Headwater Catchments" was realised, dealing with the simulation of discharges of glacierized catchments in the high-altitude regions of the Himalaya. For this purpose, the raster-based, process-oriented TAC-D model was further developed in order to be able to simulate the water balance according to the data available in individual regions.

5th FRIEND World Conference

The 5th FRIEND World conference dealing with climate variability, climate change and its hydrological effects was held in Havana, Cuba, in 2006. The conference was organized by the FRIEND-AMIGO group and received intensive personal and financial support from the German IHP/HWRP Secretariat. More than 160 participants from 60 countries met on the Caribbean island. 116 lectures and 35 poster contributions dealt with the main issues data, hydrological extremes, hydroclimatology and ecosystems. The participants of the conference also received a copy of the report FRIEND – a global perspective 2002-2006, that was prepared and published by the IHP/HWRP Secretariat.

Training and education

Capacity development is an integral part of both UNESCO's and WMO's programmes. Thematic priorities and scope of performance of postgraduate courses and workshops are determined in coordination with the relevant partner organisations. Representatives from the universities, the IHP National Committee of the country where the courses take place as well as one UNESCO Regional Office are generally the major pillars in achieving efficient performance.

WMO Postgraduate Course in Hydrology – Coastal Hydrology; Nairobi, Kenya

The WMO International Postgraduate Course on Applied Hydrology and Information Systems for Water Management took place at the Institute for Meteorological Training and Research (ITMR) in Nairobi, Kenya. In 2003, the German IHP/HWRP Secretariat had asked two representatives from the university of Siegen to take care of the sections coastal hydrology and GIS applications.

Workshop on groundwater contamination, Bandung, Indonesia

The "Computer-aided Workshop on Groundwater Contamination" in Southeast Asia took place every second year. The previous workshops were held in Manila, in the Philippines (1995), in Phnom Penh, Cambodia (1997), and in Kuala Lumpur, Malaysia (1999). Bandung, Indonesia, was the venue in 2002.

Four lecturers, coming from Australia, Thailand, and Germany, were responsible for the workshop's practical implementation. The funding of the German lecturers and the presentation of the course documents on a CD-ROM were supported by the German IHP/HWRP Secretariat. The provision of the model software ASM in the form of bookware (the software is part of a book) was also made possible by the German IHP/HWRP Secretariat. ASM was primarily used for exercises on the PC for the application of numeric models.

Fieldwork

Each participant received a copy of the exercise book and was thus able to use the programme at his workplace. Principles of groundwater flow, pollutant transport and groundwater modelling up to recent methods of ground water rehabilitation and its planning were presented by means of numeric model methods.

International course on hydrogeology in arid catchments, La Serena, Chile

In 2004 and 2006, the course "Hydrogeology in Arid Catchment Areas" took place in La Serena, Chile. It was organised by the UNESCO Centre of Water in Arid and Semi-arid Zones of South America and the Caribbean CAZALAC (Centro del Agua para Zonas Áridas y Semiáridas de América Latina y El Caribe), the Ruhr University of Bochum, and the university of La Serena. The German IHP/HWRP Secretariat provided financial support for the training course within the scope of its programme for capacity development. A total of 32 participants from Argentina, Bolivia, Chile, Germany, Paraguay and Peru attended the training course.
The course content was aimed at senior level students in the fields of hydrogeology, applied geology, water resources management and at experts engaged in water resources management in institutions and organisations in Latin American countries. The objective of the course was to impart basic knowledge for the

study of groundwater resources. Special emphasis was put on the practical application of field methods and the evaluation of their results that allow to answer questions concerning water quality and quantity.

International German Summer School of Hydrology and Water Management in Mountainous Catchment Areas, Bochum

In August 2007, the International German Summer School of Hydrology (IGSH) was held at the Ruhr University of Bochum for the first time. The IGSH is a platform for conveying hydrological knowledge in two-week courses with annually changing topics. The focus is on practical issues that are offered to an international public. In addition, research oriented workshops are held, aiming at conveying the perspectives of hydrological research. The Summer School takes place at the Ruhr University, Bochum, where further nationally and internationally renowned experts are engaged as lecturers in addition to local university teachers. The working language is English. It is possible to obtain credit points in line with the ECTS system. The theme of the course held in 2007 was Hydrology and Water Management in Mountainous Catchment Areas. The course programme included the following issues:

- soil and surface water
- groundwater
- aqueous transport
- regionalisation
- flood management

The lecture part and tutorial part were complemented by two excursions with field studies.

E-learning portal Sustainable Water Management

Knowledge transfer is going through radical changes. In addition to the classical ways of teaching and disseminating knowledge, new forms of knowledge transfer are further developing. Here, one of the major impulses emanates from e-learning conceptions that enable new and extended types of teaching and learning.

The intention of the project is the orientation of university teaching towards a blended-learning approach, i.e. a combination of traditional teaching with new conceptions based on electronic media. This is meant to modernise and optimise the teaching and learning processes in such a way that they bring about a substantial improvement of education at highly frequented universities.

In cooperation with the UNESCO Chair in Sustainable Water Management at the Hohai University of Nanjing, China, the section of

Gauge

Engineering Hydrology at the RWTH Aachen has implemented a bilingual project on media supported learning, in English and Chinese. Focal issues are sustainable water management including stormwater management.

Scientific Meetings

The meetings that were held are important for the exchange of information and knowledge as well as the planning of working programmes for national or international projects.

Hydrological networks for integrated water resources management, Koblenz 2003

The objective of the Year of Freshwater 2003 proclaimed by the UN was to promote integrated water resources management. New initiatives in water resources management on an international, national and regional level were to be implemented or set in motion.

Integrated water resources management means assessment, planning, distribution and protection of water resources. As a prerequisite, all components of the water cycle as well as quality and quantity of the water required in the sectors agriculture, industry, households and nature must be known and respected.

The water balance, in turn, is influenced by the type of land use. The use of land and water have to be regarded as integral parts.

The management of water resources vitally depends on the consistency of data collection to safeguard a comparability of data. In numerous countries, current hydrological monitoring networks are equipped with modern sensors that allow digital recording and online request of data, hence providing them in realtime.

Hydrological monitoring networks are required for all scales – from the global scale to the regional scale. Fully developed hydrological networks are an essential prerequisite in particular when it comes to finding answers to questions about the influence of climate change on the availability of water and thus sustainable development.

An international workshop on this topic was held in October 2003. The lectures given at the workshop have been published.

Training course

Water as a good and a service; Wageningen, the Netherlands, 2004

The theme of the international workshop in January 2004 comprised water as a resource and good in the socio-economic sense. The complex interrelation between man and the natural resource water influences the evaluation of water.

However, water – including drinking water – is no product in the proper meaning of the word. Therefore, the management of water in the catchment requires integrative approaches and assessment criteria in order to be able to sufficiently record and consider both the conditions of the natural surroundings and the socio-economic conditions.

The Water Framework Directive of the European Union considers the introduction of cost-covering water prices to be an essential element on the way towards a sustainable use of the resource water. The suggestions for the implementation of these objectives give ample scope. The substantial part is that the water price is to be based on extensive economic analyses, i.e. costs for the environment, economic costs and costs for the resource itself.

UNESCO-IHP and IAHS-PUB Workshop; Koblenz, 2004

In a workshop held in May 2004 in Koblenz, representatives from UNESCO/IHP and the "Prediction in Ungauged Basins" (PUB) initiative of the IAHS presented the state of work and the planned upcoming activities of the IHP programmes FRIEND and Hydrology for Environment, Life and Policy (HELP) and of PUB.

The participants identified issues of mutual interest to IHP and PUB. An intense debate took place on how to coordinate joint fields of activity and establish straightforward mechanisms for the common work. Such a cooperation has to equally consider the individual demands in respect of the focus of the study and the objectives as well as the advantages that may result from a coordinated framework of investigation. This may entail new project approaches, whose themes were described as follows:

- analysis of existing data and interpretations of patterns from a process-perspective
- improved learning through the intercomparison of models in a variety of basins
- establishing cooperation between modellers and experimentalists in mesoscale basins

The German IHP/HWRP Secretariat organised this IHP/PUB meeting and ensured the smooth running of this workshop attended by internationally renowned scientists.

International Workshop on Hydrological Extremes; Koblenz 2004

Time and again hydrological extreme events such as drought and flood cause major damages. The risk potential of such extreme events is to be described as extremely high. Monitoring and extensive analyses of data are required to be able to assess the risk potential and minimize it by means of taking suitable action. These problems were discussed during an international workshop in Koblenz in July 2004.

Low flow

Several methods for the analysis of low flow and dry periods were introduced. The development of analysis technologies and research programmes in cooperation with users was referred to as an important task for the future.

A deep understanding of processes is required to make reliable forecasts on the influence of land use as well as of climate changes. Examples were shown on how realtime data transfer supports the identification of regions under water stress and hence enables an efficient management of water resources.

Low flow on the Rhine in 2003

Damages caused by drought have increased in the recent years. Reliable data are needed to reduce socio-economic as well as environmental damage.

The information derived from monitoring and forecasts can be passed on to the relevant local decision-makers in order to minimise possible damage. Weighing up economic necessity on the one hand against protection of resources on the other hand is of central importance.

Flood
The accuracy of flood discharge measurements depends on the type of watercourse, the technical equipment of the gauging station and the intensity of the rainfall event and is between ±3% and ±20%, in extreme cases even worse.

These values can only be achieved by carefully selecting the gauging station, by accurate tests and calibration of the equipment, by choosing a suitable method and infrastructure as well as a high-quality measurement. In small to medium-sized catchments, runoff measurements are particularly necessary for the protection of the population and for optimum resources management. They are also needed for a process analysis and the calibration and validation of models.

The runoff gauging stations should be part of the national gauging network and also available for FRIEND and HELP. Historical data should be integrated more often into frequency analyses. The question is how to handle the different degrees of accuracy.

The topic of flood forecasting was presented in detail, from data acquisition and quantitative precipitation forecasting via hydrological and hydraulic models up to the assessment of forecasting uncertainties and conveying them to the end users. The necessity of improved and innovative gauging technologies, in particular the combination of sensors, e.g. rain gauges, radar and satellite, was underlined.
The assessment of meteorological uncertainty was considered to be the most pressing aspect for the future work.

International Conference on Hydrology of Mountain Environments; Berchtesgaden, 2004

The conference, held in October 2004 in Berchtesgaden, aimed at demonstrating ecohydrological interactions in mountain regions. It was meant to help in the discovery of deficits and to define future requirements for regional research conceptions for the mountains of this world while taking the regional infrastructure and the existing scientific potential into consideration.

The conference was divided into three major themes. The first one comprised the fields of instrumentation, data collection and processing, gauging networks, methods and modelling on the one hand, as well as regional aspects of mountain hydrology on the other hand.

Flood on the Moselle, 2004

The spatial scales of the contributions ranged from hillslope hydrology to discourses on the entire Himalaya region. The content was most varied, covering topics from precipitation estimation via methods of tracer hydrology up to the extensive modelling of a catchment.
A multitude of case examples, especially regarding the effects of climate changes, completed this thematic block.

The second subject area dealt with atmospheric, hydrological and ecohydrological interactions, the role of snow and ice as well as the risk of water-induced geomorphological processes. The themes of the discourses ranged from influences of beaver populations on the runoff behaviour, studies on the glacier retreat in different continents up to reports on debris and mud slides in Japan and Nepal. The last thematic block dealt with integrated model approaches including socio-economic issues and their realisation in biosphere reserves.

Although a number of interesting approaches were presented that took account of hydrology, ecology, changes of land use and environment, there were only few attempts to integrate the field of socio-economics.

The Value of Water – Different Approaches in Transboundary Water Management; Koblenz 2005

The international workshop took place in March 2005 in Koblenz. The objective of the workshop was to demonstrate the distinct assessments, points of view and management approaches in the transboundary water management of different cultural environments. The value of water comprises the complex interrelations between man and water. Depending on the social, cultural or religious background, the value of water is interpreted in a different way. The underlying concepts become especially clear when it comes to the prevention of conflicts and transboundary cooperation. In many regions of the world, water resources are becoming scarcer as a result of excessive use, pollution and mismanagement. The fierce competition of various types of use for water, such as for irrigation purposes, water for industrial use as well as drinking water, can be the source of conflicts. When being transferred to less developed regions and societies, water management approaches in modern Western societies collide with the traditional understanding of the value of water. A technocratic, use- and market-orientated understanding is confronted with traditional moral concepts of local communities. For the latter, the cultural, social and spiritual value of water is of essential importance, while the economic values play a minor role.

In all major world religions water has a central position. It is regarded as a holy gift from God. The religious rules have a large influence on the efforts for a rational management of water resources. The religious significance of water prevalent in many societies is often underestimated.

In many places, groundwater is available as an important natural resource. Many regional aquifers stretch across several countries and their management requires a transboundary coordination in order to prevent irreparable damage such as excessive extraction, salination or contamination. Primarily in arid regions, the catchment boundaries of an aquifer differ significantly from surface watersheds. Stress situations may have quantitative reasons, such as flood or drought or qualitative reasons such as salination, nutrient input or temperature rise.

Fieldwork

The value of water is also mirrored by the endeavours that are taken to reduce qualitative pollutions, such as the input of nutrients, or to stop them altogether. In the assessment and analysis of different types of water use both the conditions of natural spaces as well as the socio-economic circumstances in the catchment have to be adequately registered and taken into account. Risk assessment and risk prevention, such as quantitative stress conditions, are part of management strategies and serve the purpose of optimising the system. The political process is decisive in transboundary cooperation. It can be considerably promoted by means of an economic analysis, mutual conciliation and the demonstration of win-win situations.

The main emphasis is on the cost analysis for a joint use of the water and an improvement of efficiency for all parties involved. Reliable data bases, a transparent flow of information and the involvement of the public in the decision-making processes are a prerequisite for conflict resolutions. The interest in a joint use of one and the same resource works out when all parties involved have a share in its value. The workshop was jointly organised by the Dutch and the German IHP/HWRP Secretariat, in cooperation with the Bonn International Centre for Conversion (BICC), UNESCO and WMO.

International Conference on Integrated Water Resources Management and Global Change: a North-South Analysis; Bonn 2005

The conference, held in February 2005 in Bonn, was aimed at analysing the challenges that global change brings about for integrated water resources management in large river catchments. Scientists and managers of the Northern and Southern hemisphere were to be given the opportunity to discuss international research efforts in the field of water as well as their translation into practical methods and conclusive approaches.

Main themes of the conference were the dialogue between science and politics, international water programmes, perspectives of the interest groups, data, scaling, and integration. One of the discussion's findings was that compensating man's and nature's demands on water is one of the greatest challenges. The lack of interdisciplinary cooperation in the past is not made up solely by a new approach in the form of Integrated Water Resources Management. It is indispensable to bring about a paradigm shift between the groups to bridge the gap between social scientists and natural scientists. Major transfer deficits continue to exist between the Northern and Southern hemisphere. In particular the ability to apply science and its results is frequently inadequate. Well-trained scientists returning to their home countries often find themselves in an unreceptive political environment. Generally, scientists should also play the role of a moderator, who presents scientific results not to enforce political decisions, but to keep local decision-makers informed. The dialogue between scientists and politicians could thus be improved. Communicating uncertain results is particularly difficult. The conference was organised by the Global Water System Project (GWSP), the secretariat of which is located in Bonn.
As regards funding, content, and personnel, the German IHP/HWRP Secretariat was involved in the planning and implementation of the conference, as were also a number of other national and international institutions. The results were published in the Water Resources Management series.

Third international Symposium on Integrated Water Resources Management; Bochum 2006

Held in September 2006, the symposium attracted 276 participants from all over the world. It dealt with the objective of further developing the conception of Integrated Water Resources Management. Notably, the manifold dependencies of society on water and the inherent risks for social, economic and ecological developments were to be outlined.

Training course

Within the scope of the theme "Reducing the Vulnerability of Societies Against Water Related Risks at the Basin Scale" diverse issues concerning the interaction of hydrological and water-management conditions as well as social, economic and ecological uses and demands on the water resources were presented and discussed.
As third meeting in the conference series on Integrated Water Resources Management of the International Association of Hydrological Sciences (IAHS), the meeting was organised by the Institute of Hydrology, Water Resources Management and Environmental Engineering of the Ruhr University Bochum, the UNESCO-IHE Delft and the United Nations University Bonn, Institute for Environment and Human Security.

Training course

The symposium was supported by the German IHP/HWRP Secretariat, the German Federal Ministry of Education and Research, the DFG (German Research Foundation) and the German Committee on Large Dams. The main topics of the symposium were:

- From Headwaters to the Mouth – Vulnerable Interactions between Landscapes, Water and Societies
- Flood Risk – Flood Vulnerability – Flood Protection
- Water Management as a Problem
- Water Management as a Solution

The congress aimed at presenting new solutions to hydrological and water-management problems and at revealing existing scientific deficits and research work required in this field.

The lectures and discussions made clear that there is a great variety of approaches to examine the dependencies of the social and economic development on water resources and to integrate them in planning. This includes studies on the spatial and temporal distribution of water quantity and water quality and the development of modern computer-aided methods for the analysis and forecast of water-management conditions. This also comprises process studies to identify the dependencies of water quantity and quality on meteorological marginal conditions, physical and chemical properties of the catchments and anthropogenic influences as well as planning procedures to improve the technical and institutional fundamentals of water resources management in river basins.

Symposium on Analysis and Modelling of Rainfall – Runoff – Processes; Dresden 2006

In October 2006 the symposium SYNAP 2006 Analysis and Modelling of Rainfall – Runoff – Processes was held at the Dresden University of Technology. As a contribution to the subject area Flood Forecasting of the HWRP of WMO, the symposium received financial support from the German IHP/HWRP Secretariat.

Owing to its central position in the water cycle, the rainfall-runoff-process has always been in the focus of hydrological practice, research and teaching. The symposium's objective was to bring together hydrologists working in science and practice on a national level, for an exchange of ideas. In addition to the analysis and description of running processes, modelling, such as rainfall-runoff-models, water balance models, flood forecasting, coupled water and material flow models etc., contributions on the use of new technologies, such as neural networks or genetic algorithms, were other core themes of the symposium.

Several discourses were dedicated to the climate change to be expected and its possible effects on the rainfall – runoff – process. Parallel to these process-related contributions, the symposium covered an extensive range from hydrometry via approaches on the derivation of model parameters up to reports on experiments and measurements on a laboratory scale and a field scale.

The state and the developments and demands to be expected in the application of rainfall-runoff-models for the solution of complex water-management problems were documented by means of selected case studies.

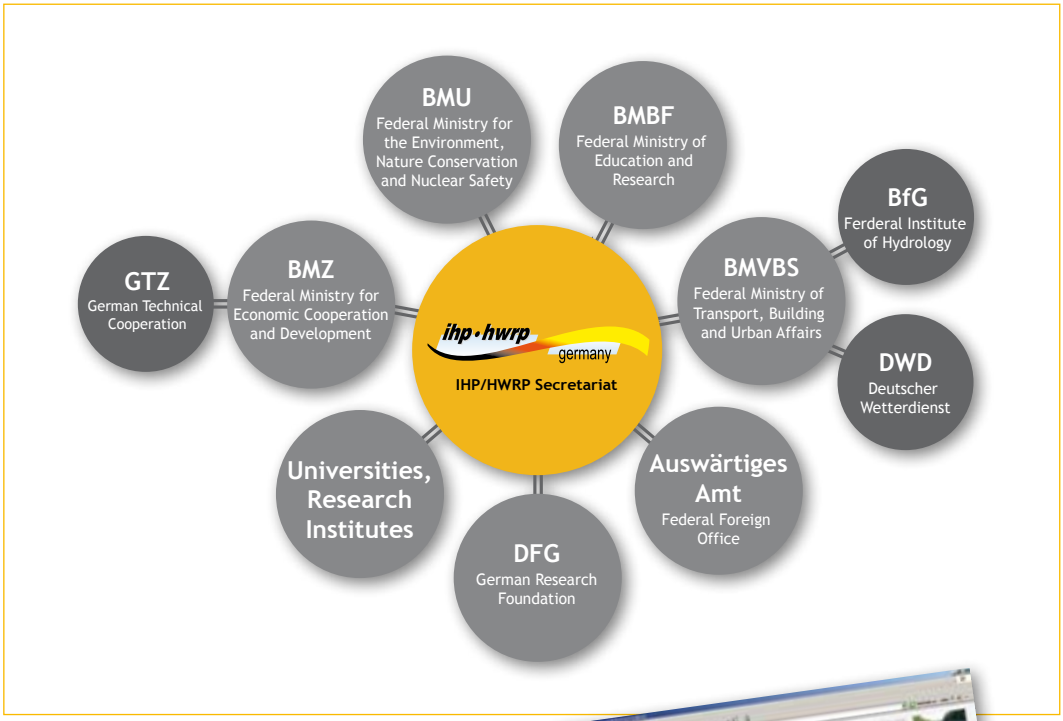
Networks

Supported by the National Committee and the Scientific Advisory Board, networks in the field of water promote the cooperation of specialist administrative institutions, scientific and operational institutions in Germany.

On the one hand, networks are used for brainstorming and the exchange of information, on the other hand, the IHP/HWRP National Committee supports activities and mobility of the persons involved.

The objective is a transparent and active participation in the work of IHP and HWRP. This financial support offered by the German IHP/HWRP National Committees allows the integration of contributions by German universities into UNESCO's and WMO's hydrological programmes.

At the same time, outputs and suggestions from the programmes may inspire the national work thus paving the way for the use of synergies.



Public Relations

Scientific journals, in particular the "Zeitschrift für Hydrologie und Wasserbewirtschaftung (HyWa)" (Journal of Hydrology and Water Resources Management), regularly report on national and international activities. The website of the IHP/HWRP Secretariat informs about the output of international programmes, about current hydrological and meteorological events, the competing demand for water, extreme events, ecosystems as well as about important water resources of the earth.

Publications

Heft 6
Forest hydrology – results of research in Germany and Russia

Heft 5
Irrigation control: towards a new solution of an old problem

Heft 4
Runoff from Nepalese Headwater Catchments – Measurements and Modelling

Heft 1
Problematik der Wasserbewirtschaftung der Insel Föhr
F. Steinmann und H. Ketelsen,
74 pp, Koblenz 2004

Heft 2 *(out of Print)*
Studies in Mountain Hydrology
Edited by Andreas Herrmann and
Ulrich Schröder, 104 pp, Koblenz 2004

Heft 3
Value of Water – Different Approaches in Transboundary Water Management
German IHP/HWRP National Committee,
128 pp, Koblenz 2005

Heft 4
Runoff from Nepalese Headwater Catchments – Measurements and Modelling
M. Konz, L.N. Braun, W. Grabs, A. Shrestha and S. Uhlenbrook, 166 pp, Koblenz 2006

Heft 5
Irrigation control: towards a new solution of an old problem
G.H. Schmitz, N. Schütze and T. Wöhling,
224 pp, Koblenz 2007

Heft 6
Forest hydrology – results of research in Germany and Russia
Editors Part I: H. Puhlmann, R. Schwarze
Editors Part II: S.F. Federov and S.V. Marunich
(dec.) 308 pp, Koblenz 2007

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IHP/HWRP Secretariat
Federal Institute of Hydrology
Am Mainzer Tor 1
56068 Koblenz • Germany

Tel.: 0261/1306-5313
http://ihp.bafg.de

Dr. Johannes Cullmann
E-Mail: cullmann@bafg.de

Gerhard Strigel
E-Mail: strigel@bafg.de

Ulrich Schröder
E-Mail: schroeder@bafg.de

RAPPORT NATIONAL DE LA RÉPUBLIQUE DE HAÏTI

1. ACTIVITES ENTREPRISES PENDANT LA PERIODE JUILLET 2006 – MAI 2008

1.1 Réunions du Comité National du PHI

Le Comité National du PHI de la République d'Haïti se réunit quatre fois par an pour prendre connaissance des nouvelles directives du Secrétariat exécutif du PHI de l'UNESCO et pour discuter des activités à entreprendre et des travaux à réaliser dans le cadre du PHI.

1.1.1. Décisions sur la composition du Comité National du PHI

Le Comité National du PHI de la République d'Haïti est ainsi composé :

NOM	ORGANISATION	DOMAINE D'INTÉRÊT
Professeur Evens EMMANUEL	Laboratoire de Qualité de L'Eau et de l'Environnement (LAQUE), Université Quisqueya	Evaluation des risques sanitaires et écologiques liés aux effluents urbains - Ecohydrologie
Professeur Emmanuel MOLIERE	Ecole Nationale de Géologie Appliquée	Hydrogéologie – ISARM - GRAPHIC
Ing. Pierrot JEUNE	Ecole Nationale de Géologie Appliquée	Gestion intégrée des ressources en eau – ISARM - GRAPHIC
Madame Ketty BALTHAZAD-ACCOU	Ecole Nationale de Géologie Appliquée – Laboratoire de Qualité de L'Eau et de l'Environnement (LAQUE), Université Quisqueya	Microbiologie des écosystèmes aquatiques - Ecohydrologie
Ing. Yvelt CHÉRY	Service National des Ressources en Eau (SNRE), Ministère de l'Agriculture (MARNDR)	Hydrologie/Gestion des Ressources en Eau
Agr. Pierre Karly JEAN JEUNE	Ministère de l'Agriculture, des Ressources Naturelles et du Développement Rural (MARNDR)	Irrigation/Gestion intégré des petits périmètres irrigués
Professeur Jean Fritz CHAMBLIN	Faculté des Sciences, Université Quisqueya	Chimie de l'environnement - Gestion des déchets
Ing. Alfred PIARD	Ministère des Travaux Publics, Transports et Communications	
Ing. Astrel JOSEPH	Ministère de l'Environnement	ISARM - GRAPHIC
Professeur Osnick JOSEPH	Laboratoire de Qualité de L'Eau et de l'Environnement (LAQUE), Université Quisqueya	Traitement des effluents urbains - Gestion intégrée des ressources en eau – ISARM – GRAPHIC

M. Urbain FIFI	Laboratoire de Qualité de L'Eau et de l'Environnement (LAQUE), Université Quisqueya	Hydrogéologie – Gestion intégrée des ressources en eau – ISARM – GRAPHIC
Mlle Farah DORVAL	Laboratoire de Qualité de L'Eau et de l'Environnement (LAQUE), Université Quisqueya	Hydrologie – Gestion intégrée des ressources en eau
Mlle Anie BRAS	Laboratoire de Qualité de L'Eau et de l'Environnement (LAQUE), Université Quisqueya	Gestion des déchets - Gestion intégrée des ressources en eau
Mlle Ruth ANGERVILLE	Laboratoire de Qualité de L'Eau et de l'Environnement (LAQUE), Université Quisqueya	Ecotoxicologie aquatique – Evaluation des risques écologiques des eaux pluviales
Ing. Michel Junior PLANCHER	Laboratoire de Qualité de L'Eau et de l'Environnement (LAQUE), Université Quisqueya	ISARM – GRAPHIC
M. Joaneson LACOUR	Laboratoire de Qualité de L'Eau et de l'Environnement (LAQUE), Université Quisqueya	Traitement biologique des déchets – Suivi biologique des rivières

1.1.2. Bilan des activités du PHI-VI

Au niveau national, plusieurs activités ont été entreprises dans le cadre du PHI-VI. On peut citer notamment : la restructuration du Comité National PHI d'Haïti, la création en 2003 du Master recherche « Ecotoxicologie, environnement et gestion des eaux », l'évaluation en 2007 du Service National des ressources en eau, la réalisation en 2005 de l'atelier international « Eau, source de vie », l'organisation en 2007 de la première commémoration en Haïti de la journée mondiale de l'eau et la création du laboratoire en écotoxicologie tropicale à l'Université Quisqueya.

1.1.3. Décisions sur la contribution ou la participation au PHI-VII

Le Comité Nation d'Haïti a participé au montage du plan stratégique du PHI-VI. Il compte entreprendre des activités dans les thèmes et axes suivants :

- Axe d'étude 1.4 - Gérer la réaction des systèmes d'eau souterraine aux changements planétaires
- Axe d'étude 2.2 - Renforcement des capacités pour une meilleure gouvernance: amélioration de la législation en vue d'une gestion sage des ressources en eau
- Axe d'étude 2.3 – Stratégies de gouvernance renforçant le maintien à un prix abordable et garantissant le financement
- Axe d'étude 2.4 – Gérer l'eau en tant que responsabilité commune par-delà les frontières géographiques et sociales
- THÈME 3 : Écohydrologie au service de la durabilité
- Axe d'étude 4.2 – Augmentation des ressources en eau insuffisantes, en particulier dans les pieds
- THÈME 5 : L'éducation relative à l'eau en vue d'un développement durable

1.2. Activités nationales dans le cadre du PHI

1.2.1. Réunions scientifiques et techniques au niveau national et local

Dans le cadre d'une meilleure diffusion des informations sur les ressources en eau, plusieurs conférences ont été prononcées au niveau national par les différents membres du Comité. Il est important de souligner également l'organisation de plusieurs journées scientifiques sur les thèmes du PHI-VI par le Laboratoire de Qualité de lEau et de l'Environnement de l'Université Quisqueya.

1.2.2. Participation directeurs ou des groupes de travail du PHI

Depuis 2005, Haïti siège au sein du Conseil Intergouvernemental du PHI. Le Comité National représente l'Amérique Latine et les Caraïbes au groupe de travail sur l'éducation et le renforcement des capacités du programme Ecohydrologie. Il est également membre du directoire scientifique et éditorial de la Revue AQUA-LAC de l'UNESCO.

1.2.3. Projets de recherche de base ou appliquée, aidés ou patronnés

Les différents projets de recherche de base ou appliquée sont inscrits dans des programmes de coopération scientifique interuniversitaire, à l'intérieur desquels des membres du comité réalisent leur thèse de doctorat. Les principales thèses de doctorat en cours sont :

1) Ruth ANGERVILLE (2005–2008). Evaluation des risques écotoxicologiques liés au rejet des eaux pluviales urbaines dans les milieux aquatiques : Application à une ville française et à une ville haïtienne. Thèse de l'Institut National des Sciences Appliquées de Lyon. Bourse de Formation à la Recherche de l'Agence Universitaire de la Francophonie (thèse en cours). Direction de la thèse : Dr Evens EMMANUEL, Laboratoire de la Qualité de l'Eau et de l'Environnement de l'Université Quisqueya, et le Directeur de Recherche Yves PERRODIN, Laboratoire des Sciences de l'Environnement de l'Ecole Nationale des Travaux Publics de l'Etat. Eventuelle date de soutenance : décembre 2008.
2) Ketty BALTHAZARD-ACCOU (2007-2010). Mise en place d'un observatoire sur la qualité microbiologique des ressources en eau douce de la communauté urbaine de Port-au-Prince (CUPP). Cotutelle de thèse Université Quisqueya (UniQ) et Université Picardie Jules Verne (UPJV). Direction de la thèse : Dr Evens EMMANUEL, Laboratoire de la Qualité de l'Eau et de l'Environnement de l'Université Quisqueya, et Professeur Christian RACCURT, Laboratoire de parasitologie et mycologie médicales de l'Université de Picardie Jules Verne. Eventuelle date de soutenance : décembre 2010.
3) Osnick JOSEPH (2005–2008). Etude du potentiel d'utilisation de résidus agricoles solides pour le traitement d'eaux polluées. Thèse de l'Institut National des Sciences Appliquées de Lyon. Bourse de FR de l'AUF (thèse en cours). Direction de la thèse : Monsieur le Professeur Rémy GOURDON, Laboratoire de Génie Civil et d'Ingénierie Environnement de l'INSA de Lyon. Date de soutenance : décembre 2008.
4) Sandro ALTENOR (2005–2008). Etudes physico-chimiques d'algues et de charbons actifs issus des déchets lignocellulosiques de la caraïbe et faisabilité de leur application pour le traitement des eaux. Thèse de l'Université des Antilles et de la Guyane. Bourse de FR de l'AUF (thèse en cours). Direction de la thèse : Dr Evens EMMANUEL, Laboratoire de la Qualité de l'Eau et de l'Environnement de

l'Université Quisqueya, et Dr Sarra GASPARD, laboratoire COVACHIMM de l'Université des Antilles et de la Guyane. Date de soutenance : juillet 2008.

5) Urbain FIFI (2006-2009). Impacts des eaux pluviales urbaines sur les eaux souterraines en zone tropicale : Mécanismes de transfert de métaux lourds à travers un sol modèle de Port-au-Prince (Haïti). Ecole Doctorale « Chimie de Lyon » (Chimie, Procédés et Environnement). Cotutelle de thèse Institut National des Sciences Appliquées de Lyon, et l'Université Quisqueya. Direction de la thèse : Dr Evens EMMANUEL, Laboratoire de la Qualité de l'Eau et de l'Environnement de l'Université Quisqueya, et Dr Thierry WINIARSKI, Laboratoire des Sciences de l'Environnement de l'Ecole Nationale des Travaux Publics de l'Etat.Date de soutenance : décembre 2009.
6) Farah DORVAL (2007-2010). Construction et calage d'un modèle de simulation continue des flux produits par les bassins versants. Cotutelle de thèse Institut National des Sciences Appliquées de Lyon, et Université Quisqueya. Direction de la thèse : Dr Evens EMMANUEL, Laboratoire de la Qualité de l'Eau et de l'Environnement de l'Université Quisqueya, et Monsieur le Professeur Bernard CHOCAT, Laboratoire de Génie Civil et d'Ingénierie Environnement de l'INSA de Lyon..Date de soutenance : décembre 2010

1.2.4. Collaboration avec d'autres organisations ou programmes nationaux ou internationaux

Le Comité National du PHI a largement contribué à la création du Comité national MAB. En effet, plusieurs membres du PHI siègent au sien du groupe de réflexion devant structurer et renforcer les activités du MAB en Haïti.

Par ailleurs, plusieurs membres du Comité National participent aux activités du programme ISARM des Amériques. Dans ce cadre, ils collaborent avec les hydrologues du Bureau régional de l'UNESCO, de l'OEA et de l'INDRHI de la République Dominicaine. En octobre 2006, le LAQUE de l'Université Quisaueya a produit le rapport suivant :

« Evens EMMANUEL, Osnick, JOSEPH, Edwine TANIS, Michel PLANCHER Junior, Jean Antoine MARSEILLE, Ketty BALTHAZARD-ACCOU, Joëlle FONTILUS, Joaneson LACOUR. *Utilisation stratégique et durable des eaux souterraines transfrontalières de l'île d'Hispaniola : l'aquifère inter-montagneux de l'Artibonite et l'aquifère côtier de Massacre – République d'Haiti, République Dominicaine*. LAQUE-UniQ – GEF-PNUE-OEA-UNESCO, Port-au-Prince (Haïti), Octobre 2006 ».

D'autres collaborations ont été également développées dans le domaine de l'assistance technique à des ONG's nationales et internationales dans le domaine de la maîtrise des ouvrages et de la qualité de l'eau.

1.2.5. Autres initiatives

- Création en 2006 de la formation doctorale "Ecotoxicologie, environnement et gestion des eaux" du Laboratoire de la Qualité de l'Eau et de l'Environnement. Cette formation rattachée à l'Ecole doctorale "Société et Environnement" de l'Université Quisqueya. Cette école doctorale a reçu du Ministère de l'Education Nationale et de la Formation Professionnelle, une autorisation temporaire de fonctionnement.
- Evaluation du Laboratoire de Qualité de l'Eau et de l'Environnement de l'Université Quisqueya par le PHI régional (Montevideo) en janvier 2008.

1.3. Cours d'éducation et de formation

1.3.1. Contribution aux cours du PHI

Dans le cadre de la chaire UNESCO sur l'eau de *la Escuela Regional de Ingenieria Sanitaria de la Universidad San Carlos de Guatemala*, Le Professeur Evens EMMANUEL a animé en août 2007 un séminaire sur l'évaluation des risques écologiques liés aux effluents industriels.

1.3.2. Organisation de cours spécifiques

En septembre 2003, l'Université Quisqueya (UniQ), en collaboration avec ses principaux partenaires, a mis en place le Master recherche « Ecotoxicologie, Environnement et Gestion des Eaux ». Ce programme vise à former des chercheurs et des spécialistes capables d'appréhender la dimension nationale des problèmes de toxicologie et d'écotoxicologie de l'environnement d'Haïti et de faire des propositions réalistes pour résoudre les problèmes identifiés dans ce domaine. Les principaux objectifs du MEEGE sont :

2. Former des jeunes haïtiens dans le domaine de l'écotoxicologie, de l'environnement et de la gestion des eaux.
3. Donner aux étudiants une base scientifique et technique solide dans les domaines de la toxicité et l'écotoxicité, de l'environnement, et de l'eau.
4. Former par la recherche les ingénieurs et cadres administratifs nécessaires au transfert, à l'implantation et au développement des technologies propres et des outils réglementaires en matière de gestion durable de l'environnement d'Haïti.
5. Former des chercheurs qui devront faire progresser les connaissances et les techniques dans différents domaines tels que :
    - l'intégration de la dimension environnementale pour la conception des procédés industriels ou des filières énergétiques ;
    - la description des mécanismes bio-physico-chimiques gouvernant le devenir des polluants dans les différents milieux ;
    - l'étude de l'impact des polluants sur l'environnement et la santé ainsi que l'évaluation des risques sanitaires et écotoxicologiques,
    - la caractérisation de la qualité des écosystèmes aquatiques.

Un consortium d'universités composé : École Nationale des Travaux Publics de l'Etat (France), Faculté Universitaire des Sciences Agronomiques de Gembloux (Belgique), Institut National de la Recherche Scientifique / INRS Eau, Terre et Environnement – Québec (Canada), Institut National des Sciences Appliquées de Lyon (France), Université des Antilles et de la Guyane (France), assure la gestion académique et scientifique de ce programme. La direction scientifique de cette filière universitaire est assurée par le représentant de l'Institut National des Sciences Appliquées de Lyon (INSA de Lyon).

1.3.3. Participation aux cours du PHI

En janvier 2007, deux membres du comité ont participé au cours *Biological monitoring of rivers* réalisé à Kingston par le PHI de la Jamaïque. Par ailleurs, le Professeur Marcelo GAVIÑO, Coordonnateur régional (Montevideo) du Programme Ecohydrologie a dispensé à Port-au-Prince en janvier 2008 un cours sur l'écohydrologie.

1.4. Coopération avec l'Institut UNESCO-IHE pour l'éducation relative à l'eau, et/ou avec d'autres centres internationaux/régionaux liés à l'eau, sous l'égide de l'UNESCO

Au cours des premières phases du PHI, le Comité national d'Haïti n'a pas pu développer de coopération avec l'Institut UNESCO-IHE pour l'éducation relative à l'eau, et/ou autres centres de l'UNESCO. Cependant, il convient de signaler l'appui du Ministre de l'Education National et Président du Comité national Haïtien de Coopération avec l'UNESCO, Monsieur Gabriel BIEN-AIME, au projet de création d'un « Centre International de l'UNESCO en Ecohydrologie Côtières et Changements Climatiques » de l'Université d'Algarve du Portugal soumis par le Gouvernement du Portugal au Secrétariat exécutif du Programme Hydrologique International (PHI) de l'UNESCO à Paris. Cette action permettra au Comité d'étudier les mécanismes permettant la mise en place de véritables coopérations scientifiques et techniques avec les centres internationaux et régionaux et plus particulièrement avec l'UNESCO-IHE.

En effet, un certain nombre de phénomènes extrêmes sont en train de se manifester dans les écosystèmes lentiques du pays (assèchement de l'étang Bois neuf; élévation du niveau des étangs saumâtre et de Miragoane). Ces phénomènes nécessitent d'être observés, questionnés, étudiés par la mise en route d'expérimentation. Il faudra, compte tenu de l'ampleur, de penser à la proposition de programme de coopération portant sur une assistance technique (Mission d'experts, formation de professionnels (de formateurs) à un haut niveau scientifique) à Haïti dans le domaine de la gestion des écosystèmes lentiques.

1.5. Publications

1. Evens Emmanuel, Kettly Théléys, Joaneson Lacour, Michel Junior Plancher, Ketty Balthazard-Accou, Ruth Angerville, Osnick Joseph. Pollution et altération des eaux terrestres et maritimes. Conséquences de la dégradation quantitative et qualitative de la ressource en termes de perte de biodiversité. In. : Breton J.-M. (ed). Gestion des ressources en eau et développement local durable (Caraïbe – Amérique latine – Océan Indien). Paris: Karthala, 2008, pp 165-184.
2. Osnick Joseph, Urbain Fifi, Farah A. Dorval, Thierry Winiarski , Evens Emmanuel. Spatio-temporal evolution of groundwater salinization of the coastal aquifer of the south-western Cul-de-Sac plain, Haiti. (Submitted: International Journal of AQUA-LAC, May 2008).
1. Philippe Brasseur, Patrice Agnamey, Evens Emmanuel, Jean William Pape J, Christian Raccurt. Cryptosporidium oocysts contamination of surface waters and public water supplies in Port-au-Prince, Haiti. (Accepted: Arch. Environ. Occup. Health, April 2008).
2. O. Joseph, M. Rouez, H. Métivier-Pignon, R. Bayard, E. Emmanuel, R. Gourdon. Anaerobic degradation of sugar cane bagasse for biogas production and enhanced adsorption capacities for heavy metals removal. (Submitted: Bioresource Technology, March 2008).
3. Evens Emmanuel, Joaneson Lacour, Ketty Balthazard-Accou, Osnick Joseph. Ecological hazards assessment of heavy metals and nutrients containing in urban effluents on bay ecosystems of Port-au-Prince (Haiti). (Submitted: International Journal of AQUA-LAC, March 2008).
4. Evens Emmanuel, Marie Gisèle Pierre, Yves Perrodin. Groundwater contamination by microbiological and chemical substances released from

hospital wastewater: health risk assessment for drinking water consumers. (Submitted: Environment International, March 2008).

5. Osnick Joseph, Evens Emmanuel, Thierry Winiarski, Paul Vermande. Analyse de l'évolution de la salinité des ressources en eau souterraine de la zone « Sud-ouest » de l'aquifère de la plaine du Cul-de-sac en Haïti. (Accepted RED, janvier 2008).
6. S. Altenor, B. Carene, E. Emmanuel, J. Lambert, J.J. Ehrhardt and S. Gaspard. Adsorption of single compounds on vetiver roots activated carbons fibres (ACF): Influence of surface functional groups and textural properties. Submitted: Colloids and surface A., January 2008).
7. Anie Bras, Evens Emmanuel, Obicson Lilite, Philippe Brasseur, Jean William Pape, Christian Raccurt. Evaluation du risque dû à Cryptosporidium sp présent dans l'eau de boisson à Port-au-Prince, Haïti. Environnement, Risques et Santé, 2007, 6 (5) 355-364.
8. Evens Emmanuel, Ruth Angerville, Osnick Joseph, Yves Perrodin. Human health risk assessment of lead in drinking water: A case study from Port-au-Prince Haiti. International Journal of Environment and Pollution, 2007, Vol. 31, Nos. 3/4, 280-291.
9. Edwine Tanis, Khalil Hanna, Evens Emmanuel. Sorption of tetracycline onto iron oxides-caoted quartz: experimental and modeling study. (Submitted : J. Coll. Interface Sci, October 2007).
10. Evens Emmanuel, Kettly Théléys, Myrline Mompoint, Jean-Marie Blanchard, Yves Perrodin. Evaluation des dangers environnementaux liés au rejet des eaux urbaines dans la baie de Port-au-Prince en Haïti. RED, 2007, 3 (3):12-17.
11. Ketty Balthazard-Accou, Edwine Tanis, Osnick Joseph, Khalil Hanna, Frantz Metellus, Evens Emmanuel. Etude sommaire du comportement physicochimique de la tétracycline dans une matrice solidifiée au moyen de liant hydraulique. RED, 2006, 2 (3): 24-28
12. Clotilde Boilot, Evens Emmanuel, Yves Perrodin. Etude des effets combines du glutaraldéhyde et des surfactants contenus dans les effluents hospitaliers vis-à-vis de Daphnia magna. DECHETS : Sciences & Techniques, revue francophone d'écologie industrielle, 2006, 42 : 22-28.
13. Joaneson Lacour, Osnick Joseph, Michel Junior Plancher, Ketty Baltahzard-Accou, Annie Pierre, Evens Emmanuel. Evaluation des dangers environnementaux liés aux substances azotées et phosphatées contenus dans les effluents urbains. RED, 2006, 1 (3): 6-13

1.6. Participation aux réunions scientifiques internationales

1.6.1. Réunions tenues dans le pays

Le Comité nation du PHI a participé à trois importantes réunions internationales organisées respectivement par le Ministère de l'Environnement, le Ministère de l'Agriculture des Ressources Naturelles et du Développement Rural, et le Ministère des Travaux Publics, Transports et Communications. Il s'agit de :

- Séminaire national sur les techniques de gestion des ressources en eau. Ministère de l'Environnement, 11-15 juin 2007,
- Diagnostic du Service National des ressources en eau. Ministère de l'Agriculture des Ressources Naturelles et du Développement Rural, 28 juin 2007,
- Colloque sur l'assainissement. Ministère des Travaux Publics, Transports et Communications, mars 2008.

Par ailleurs, il a organisé en septembre 2005 l'atelier international « Eau, source de vie », et a co-organisé les colloques internationaux (i) gestion intégrée de l'eau en Haïti (juin 2002) et (ii) faire face à la pénurie de l'eau (mars, 2007).

a. ATELIER INTERNATIONAL « EAU, SOURCE DE VIE » *: Dépendances à l'égard de l'eau : systèmes en situation de stress et réponses de la société haïtiennes, Port-au-Prince, Septembre 2005*

Contexte

L'eau est l'une des ressources naturelles les plus indispensables à la vie et au développement économique des populations vivantes. Elle est l'un des biens communs qui se retrouvent au cœur de la fondation de la vie communautaire. Constituant un milieu complexe et fragile, à la fois ressource et écosystème, l'eau se présente comme un facteur incontournable sans substitut possible dans presque toutes les activités de production et de consommation de l'espèce humaine. Après usage, les eaux usées résultant des activités humaines sont rejetées le plus souvent dans les écosystèmes naturels.

L'impact des eaux usées urbaines sur les écosystèmes aquatiques est reporté dans la littérature. La décharge de polluants dans les eaux naturelles pose un important problème de qualité de l'eau et de santé des organismes aquatiques. Le rejet continu de substances chimiques dans les écosystèmes aquatiques peut causer des changements sur la structure et le fonctionnement de la communauté biotique, en d'autres termes sur l'intégrité biotique.

Par ailleurs, l'hydrologie a avancé qu'un grand nombre des systèmes planétaires (comme les systèmes hydrologique et écologique) sont fortement interdépendants et un nombre calculable d'entre eux sont désormais visiblement en situation de stress (du fait de la croissance démographique, de l'extension des infrastructures, du changement de mode d'utilisation des terres et de l'accumulation des polluants). Les niveaux de stress dans certaines régions sont suffisamment élevés pour que la société doive s'apprêter à y répondre résolument et concrètement.

Dans la planification stratégique de la septième phase du Programme Hydrologique International (PHI), l'UNESCO offre à ses états membres un cadre méthodologique pour approcher la problématique du stress écologique. Cette approche insiste sur un élargissement du champ d'action du PHI dans plusieurs domaines particuliers comme les questions socioéconomiques, la santé, les eaux souterraines, la gouvernance et l'écohydrologie.

En Haïti, les systèmes hydrologiques et écologiques des espaces urbains sont exposés à des conditions environnementales caractérisées entre autres par (i) une absence station d'épuration des eaux usées, (ii) un réseau de drainage urbain disposant de tronçons non bétonnés, (iii) une géologie et une hydrogéologie dominées par la présence d'un aquifère karstique. Ces facteurs environnementaux peuvent contribuer à l'existence de niveau élevé de stress dans les écosystèmes naturels du pays.

Les problèmes socio politiques, qui ont bouleversé la République d'Haïti au cours des deux dernières années, n'ont pas permis au Comité National Haïtien du PHI d'initier une réflexion approfondie sur les trois fils conducteurs [(i) interdépendances des systèmes, (ii) systèmes en situation de stress, et (iii) réponses de la société], qui sont communs à la problématique environnementale des systèmes hydrologique et écologique. Cependant, dans un contexte global où les systèmes hydrologique et écologique se trouvent donc en situation de stress et constamment menacés par les actions anthropiques, il s'avère nécessaire d'initier au niveau local une réflexion

collective sur l'évaluation et la gestion des risques naturels et chroniques que subissent ces écosystèmes.
La Commission Nationale Haïtienne de Coopération avec l'UNESCO, dans sa responsabilité de renforcer le Comité National Haïtien du PHI, et en collaboration avec ses principaux partenaires nationaux et internationaux, a décidé d'organiser les 14 et 15 avril 2005 à Port-au-Prince un atelier international sur :

« EAU, SOURCE DE VIE »
Dépendances à l'égard de l'eau : systèmes en situation de stress et réponses de la société haïtiennes

Objectifs de l'atelier

- Permettre à la communauté scientifique haïtienne de prendre connaissance : (i) des grandes lignes de la philosophie du PHI ; (ii) de la mission des Comités Nationaux du PHI ; (iii) du rôle de l'enseignement supérieur et de la recherche scientifique dans le fonctionnement des Comités Nationaux du PHI.
- Développer une réflexion sociétale sur les interdépendances des systèmes hydrologique et écologique de la République d'Haïti, et plus particulièrement sur les systèmes en situation de stress en prenant appui sur le cadre conceptuel du PHI-VII.
- Permettre à la communauté scientifique internationale de prendre connaissance de la réalité haïtienne en matière de gestion des systèmes hydrologique et écologique.
- Lancer le projet de création du Prix Junior en Hydrologie et de celui en gestion de l'environnement pour l'année 2005.

Cet atelier sera réalisé en partenariat avec :

- Ministère de l'Education Nationale, de la Jeunesse et des Sports
- Ministère de l'Environnement
- Ministère des Travaux Publics, Transports et Communication
- Ministère de l'Agriculture, des Ressources Naturelles et du Développement Rural
- Représentation de l'UNESCO en Haïti
- Programme Hydrologique International – UNESCO
- Représentation de l'OPS/OMS en Haïti
- Faculté des Sciences de l'Université d'Etat d'Haïti
- Laboratoire de Qualité de l'Eau et de l'Environnement de l'Université Quisqueya
- Association Haïtienne du Génie Sanitaire et des Sciences de l'Environnement

b. Colloque International « Gestion Intégrée de l'eau en Haïti » Port-au-Prince, Juin 2002

Contexte

Pendant des siècles, l'eau a été perçue et traitée comme une ressource inépuisable, abondante et se régénérant d'elle-même. Toutefois, «la rareté généralisée des ressources en eau douce, leur destruction progressive et leur pollution croissante constatée dans de nombreuses régions du monde, ainsi que l'intrusion graduelle d'activités incompatibles» soulèvent des inquiétudes croissantes.
Du fait de l'explosion démographique mondiale, la consommation d'eau a été multipliée par sept au XXe siècle et par deux au cours des vingt dernières années. Deux milliards de personnes dans 80 pays, soit le tiers de la population mondiale, se retrouvent en situation de « contrainte hydrique ». Les nappes phréatiques se dégradent rapidement. Les Nations Unies estiment que 2,3 milliards d'êtres humains devraient être en situation de pénurie grave d'ici 2025.

A la deuxième conférence des Nations Unies sur l'environnement tenue à Rio en 1992, la nécessité d'une gestion globale de l'eau douce est apparue en tant que ressource limitée et vulnérable. L'intégration des plans et des programmes sectoriels relatifs à l'eau dans le cadre des politiques économiques et sociales nationales, sont considérées comme absolument indispensables à toute action dans les décennies à venir.

En Haïti, la région métropolitaine de Port-au-Prince (RMPP), principal centre urbain du pays, par son importance en terme de concentration de la population et des services urbains, connaît de graves problèmes dans le domaine de l'approvisionnement en eau et de l'assainissement. En effet, l'espace urbain de Port-au-Prince, caractérisé par une expansion extrêmement rapide, va connaître dans un délai relativement court une situation de pénurie d'eau potable. Avec une disponibilité de 23,7 millions de m3 d'eau par an (BRGM-GERSAR-LGL, 1989), Port-au-Prince ne fournit que 11.85 m3/an à chacun de ses 2 000 000 habitants. Or, Falkenmark et Widstrand (1992) avancent qu'une alimentation en eau assurant une disponibilité par habitant inférieur à 1700 m3/an pose des problèmes de développement et qu'une dotation minimale en dessous de 1000 m3/an entraîne des pénuries ; elles deviennent très graves en dessous de 500 m3/an. Si on prend l'hypothèse moyenne, une trentaine de pays dont Haïti souffriront de pénurie absolue d'ici 2025, et les difficultés du secteur de l'eau conduiront à des situations conflictuelles entres des utilisateurs concurrents, encore plus graves si d'autres facteurs de tension politique et culturelle viennent s'y ajouter.

Dès le début des années 70 du siècle dernier, on a assisté à une prise de conscience des impacts indésirables des activités anthropiques sur la viabilité des ressources naturelles. Cette prise de conscience a connu diverses tendances qui ont évolué d'une approche rationnelle, vers une approche axée sur la participation des acteurs dans la planification des ressources. Elle a donné naissance à la gestion intégrée qui met l'accent sur le maintien de l'intégrité des écosystèmes, les priorités sociales d'exploitation et la délégation des responsabilités aux communautés. La gestion intégrée des ressources en eau est fondée sur l'idée que l'eau fait partie intégrante de l'écosystème et qu'elle constitue une « ressource naturelle, un bien social et économique dont la quantité et la qualité déterminent l'affectation». Mais à cause de la diversité des usages, des conflits potentiels, de l'inadéquation des systèmes de réglementation, la gestion de l'eau revêt un caractère crucial que ce soit au niveau local, régional, national ou international. Cette complexité a donné lieu à diverses approches ayant chacune une rationalité et un modèle de planification, propres à chacune d'elles.

Dans le souci de permettre à la communauté scientifique international de prendre connaissance de la réalité haïtienne en matière d'eau et d'environnement, l'Université Quisqueya, en collaboration avec ses principaux partenaires dans le domaine de l'eau et de l'environnement, a organisé du 26 au 28 juin 2002 à Port-au-Prince le Colloque International sur la Gestion Intégrée de l'eau en Haïti.

Synthèse du colloque

La réalisation en Haïti de cette manifestation scientifique a été possible grâce au support financier de l'Agence Universitaire de la Francophonie (AUF), du Programme Hydrologique International de l'UNESCO (PHI), de l'Agence Canadienne pour le Développement International (ACDI), de l'Organisation Panaméricaine de la Santé/Organisation Mondiale de la Santé (OPS/OMS) et de la Centrale Autonome Métropolitaine d'Eau Potable (CAMEP). La publication de ces actes est financée par le Réseau Santé Déchets (RSD) de la France, l'Organisation Panaméricaine de la

Santé/Organisation Mondiale de la Santé (OPS/OMS), l'Agence Universitaire de la Francophonie (AUF) et la Fondation Haïtienne de l'Environnement (FHE).
Le colloque sur la Gestion Intégrée de l'Eau en Haïti a réuni une trentaine de spécialistes et des enseignants-chercheurs issus des pays suivants : Haïti, Belgique, Bénin, Canada, Cameroun, Equateur, France et Ouzbékistan. Tous se sont sentis concernés par les différents aspects de la Gestion Intégrée de l'Eau et en ont profité pour présenter des résultats chiffrés, des observations et des pratiques sociales qu'ils ont mis en œuvre dans leur région ou dans leur pays respectif.
Les différentes interventions inscrites dans le programme ont presque toutes eu lieu devant un public d'une centaine de personnes où la population étudiante, fortement représentée, était très attentive. Des professionnels venant des sociétés, des ONG et des ministères ont suivi les travaux.

Les communications ont permis de connaître :

1. la réalité des ressources en eau qui semblent s'amenuiser et qui se dégradent du fait de plusieurs types de pollution.
2. les difficultés d'approvisionnement pour accéder à une eau utilisable pour les différents usages de l'activité humaine.
3. les démarches scientifiques, sociales, administratives mises en place dans les différents pays cités avec des préoccupations souvent voisines de celles des populations et des autorités haïtiennes.
4. d'échanger des documents et des idées pour mieux aborder les questions en cours d'étude.

Voici les différents thèmes abordés tout au cours du colloque :

1. La problématique des ressources en eau,
2. Hydrologie et bassins versants,
3. La gestion durable des systèmes hydriques,
4. Toxicité et impacts vis-à-vis des écosystèmes aquatiques,
5. Traitements et épuration de l'eau,
6. Coopération scientifique internationale.

Chaque thème a fait l'objet d'une conférence introductive qui a permis de comprendre l'ensemble des enjeux.

Thème 1 - PROBLEMATIQUE DES RESSOURCES EN EAU
A.- Constats actuels

- L'EAU est reconnue au niveau international comme une ressource rare, mal-répartie et dont la pollution devient alarmante.

- La gestion de la ressource se heurte à des problèmes :

    a) politiques : mauvaises organisations des institutions concernées, multiplicité des intervenants
    b) sociologiques : manque de solidarité entre les usagers, irresponsabilité des consommateurs,
    c) financiers : carence de moyens financiers dans beaucoup de pays.

B.- Pour l'avenir

- l'approche participative de la gestion est préconisée,
- l'application du principe « usager-pollueur-payeur » doit se répandre,

- la prise en compte de l'aspect culturel et des habitudes de la population est un impératif,
- assurer une politique de la collaboration entre les Etats ; le cas du fleuve de l'Artibonite, entre Haïti et la République Dominicaine a été largement évoqué.

En conclusion, il faut arriver à une gestion dans un contexte de développement durable, c'est-à-dire un modèle qui prendra en compte les aspects environnementaux, économiques et socio-culturels.

Thème 2 - HYDROLOGIE ET BASSINS VERSANTS

1. Le Bassin versant s'avère être le niveau le plus pertinent pour analyser les phénomènes hydrologiques et prendre les mesures adéquates pour les différents aménagements.
2. La connaissance des phénomènes pluvieux est à la base de l'hydrologie, d'où la nécessité d'équiper les bassins versants en instruments de mesure. Ce travail devrait déboucher sur les courbes intensité-durée-fréquence des pluies, nécessaires à la détermination des projets.
3. Les Bassins versants subissent de nombreuses mutations, d'où la nécessité de connaître les activités qui s'y déroulent et leurs implications sur les phénomènes hydrologiques, notamment sur le ruissellement.
4. Les différentes parties d'un bassin versant sont interconnectées et dépendantes les unes des autres d'où la nécessité de tenir compte des influences que les uns (amont) peuvent avoir sur l'autre (aval). Ceci peut en particulier servir à la prévention des conflits.
5. Il est intéressant de faire des communications nationales dans le cadre de la Convention Internationale sur les changements climatiques (émission des Gaz à Effet de Serre, réchauffement de l'atmosphère, diminution des pluies), mais il est beaucoup plus important de conduire les études de vulnérabilité et de définir les mesures d'atténuation (par exemple reforestation) ainsi que leurs conditions de mise en œuvre. Mais surtout, chaque pays doit connecter les problèmes de changement climatiques à ses propres problèmes de développement et préparer des projets qui en tiennent compte, en intégrant des mécanismes de développement propre (pour la circulation des véhicules, et pour tous les gaz ayant un effet de serre notamment les CFC).
6. Il faudrait trouver un système pour regrouper les informations dispersées sur un bassin versant ou dans un pays; par exemple l'Office International de l'eau aide à remettre en place des « observatoires » dans différents pays. C'est une possibilité à examiner.

Thème 3 - CONDITIONS POUR LA GESTION DURABLE DES SYSTEMES HYDRIQUES

1. Analyse systématique des conséquences des activités anthropiques sur la modification du cycle de l'eau ; procéder à des études d'impact sur l'environnement.
2. Revisiter le concept de pollueur- payeur en prenant en compte l'importance du secteur informel dans lequel se déroule plus de la moitié des activités génératrices de pollution.
3. Intégrer les usagers dans la définition des mesures de protection des systèmes hydriques. Assurer aux plus démunis une augmentation de leurs revenus avec pour contre-partie l'abandon des pratiques non respectueuses de l'environnement.
4. Renforcer les capacités des collectivités locales de manière à ce qu'elles puissent assurer le suivi de la qualité des eaux et mettre en œuvre les dispositions réglementaires.

5. Former davantage de techniciens de l'eau capable de créer des unités privées pour le suivi de la qualité de l'eau et de l'ensemble du système hydrique.
6. Etablir des plans d'action prenant en compte la sensibilisation, la formation et la diversité des pratiques et des acteurs.
7. Définir des programmes de Recherche-Action ou de Recherche-développement, en adéquation avec les priorités de développement et avec la gestion durable des systèmes hydriques.
8. Promouvoir les approches de gestion participative des systèmes d'approvisionnement et d'assainissement en incluant les élus locaux.

Thème 4 - TOXICITE ET IMPACTS VIS-A-VIS DES ECOSYSTEMES AQUATIQUES

L'eau est soumise à différents types de dégradations qui toutes à différents niveaux présentent des influences néfastes sur la santé humaine et animale.

La première présentation a rappelé que les oocystes d'un protozoaire (cryptosporidium) introduits dans le système d'adduction d'eau par pollution fécale provoquent des diarrhées chez les consommateurs de ces eaux contaminées qui entraînent la mort des sujets immunodéprimés en l'absence de médicaments actifs sur ce parasitaire. A Port-au-Prince, une étude a montré que ces formes enkystées se retrouvent en quantité non négligeable dans les eaux de surface mais aussi dans les réservoirs et dans l'eau de distribution de certains quartiers. Par contre, la situation dans les eaux de source en altitude (Kenscoff) est encore préservée.

Une deuxième présentation a mis l'accent sur un autre type de pollution assez spécifique constituée par des composés organiques halogénés présents dans les effluents hospitaliers désinfectés à l'aide de composés chlorés avant la mise en œuvre des procédés de décantation et de filtration. Le suivi de la teneur en chlorure de ces effluents pourrait être un indicateur de la toxicité aiguë de ces rejets liquides sur les organismes aquatiques.

3ème présentation : Les examens morphologiques ainsi que les perturbations physiologiques des poissons qui ont été en présence d'une façon ponctuelle (toxicité aiguë) ou continue (toxicité chronique) avec des pesticides agricoles peuvent être des indicateurs de la pollution causée par ces polluants.

L'objet du quatrième exposé porte sur une gestion intégrée de décharges, en fonction de leur classification, afin d'en limiter les effets néfastes sur la qualité des eaux. La démonstration s'appuie sur l'expérience acquise par ces chercheurs dans les pays de l'Afrique et de la Caraïbe.

5ème présentation : L'Evaluation de différentes pollutions peut être facilitée par la mise au point d'une nouvelle technique : les biocapteurs qui mesurent l'intensité des perturbations biochimiques introduites (telles que la fluorescence) par les polluants. Les recherches actuelles portent sur l'abaissement de leur limite de quantification, sur les problèmes de sélectivité/spécificité et de linéarité de la réponse.

Thème 5 - TRAITEMENT ET EPURATION DE L'EAU

L'épuration des eaux usées est un impératif pour préserver l'environnement et les ressources en eau sur le plan clinique et biologique. De nombreux Pays en Voie de Développement comme Haïti, ne disposent d'aucune station d'épuration des eaux usées.

Dans un passé récent, des stations d'épuration ont été installées dans divers pays en développement mais elles se sont souvent révélées peu adaptées. Des solutions basées sur des ressources locales se font jour : lagunage avec épuration végétale par des algues ou des macrophytes, utilisation d'absorbants à base de charbon actif d'origine végétale et de zéolithes.

Ces recherches nécessitent des études complémentaires, sur le plan technique et économique mais elles constituent d'intéressantes perspectives d'avenir pour l'épuration des effluents, voire le recyclage de certains éléments.
Concernant les déchets particuliers, tels que les graisses, des approches relativement simples, basées sur l'action de micro-organismes ont été proposées. Enfin, l'efficacité d'un traitement épuratoire devrait toujours être mesurée, à l'exemple d'une station d'épuration sur la côte de la Mer Rouge dont les impacts sur l'écologie des milieux coralliens ont été évalués comme faibles par des chercheurs de l'Inde.

LA COOPERATION SCIENTIFIQUE INTERNATIONALE
Une table ronde a permis un échange de vues sur la coopération scientifique internationale.

a) Les panélistes reconnaissent que les résultats de la coopération scientifique n'ont été ni à la hauteur des ambitions des partenaires, ni à la mesure des moyens humains et financiers investis.
b) Ils reconnaissent tous la nécessité d'améliorer le processus : partenariat, nouvelle coopération ou bien « arrangement où tout le monde gagne ».
c) Selon les panélistes, cette amélioration doit porter sur une définition plus claire des priorités et des besoins des partenaires institutionnels.
d) Les intervenants estiment que, comme entreprise de transfert de savoirs et de savoir-faire, le partenariat scientifique doit donner lieu à des solutions adaptées à l'environnement des partenaires du Sud.
e) Ils prônent aussi de renforcer la coopération entre partenaires du Sud, dans la mesure où les contextes des pays du Sud offrent de grandes ressemblances. Ce colloque a été exemplaire à cet égard.
f) Les panélistes reconnaissent la nécessité d'évaluer périodiquement le processus de la coopération scientifique afin de le rendre plus efficace. Il nécessite de la durée, mais ne doit pas rester permanent.
g) A côté des attributs de rentabilité interne nécessaires à la coopération, les panélistes entendent fonder le partenariat scientifique sur un ensemble de valeurs comme la solidarité et le respect des spécificités culturelles.

L'ancien Premier Ministre haïtien, Monsieur Jacques Edouard Alexis a assisté à deux séances. Il a déclaré : « ***L'important, ce sera le suivi du colloque*** ».

Ce suivi peut ce faire à trois niveaux :

- l'Information qui a été donné aux ***étudiants*** permettra d'initier des vocations professionnelles et peut-être des vocations de chercheurs.
- ***Pour les universitaires***, certains exposés ont démontré que les actions de recherche pourraient être entreprises, poursuivies et améliorées en Haïti si quelques équipes pluridisciplinaires se constituent et se dotent d'un minimum de matériels scientifiques. Une partie de leur financement est à rechercher dans des projets ou des programmes de recherche-action, dans des consultations pour divers organismes et pour les pouvoirs publics, dans des actions de coopération et de partenariats avec des collègues étrangers.
- ***Pour les gestionnaires de l'eau***, c 'est dans chaque pays et spécialement en Haïti qu'il faut utiliser les échanges qui ont eu lieu dans le colloque.

c. Colloque international « Faire face à la pénurie d'eau » 22 et 23 mars 2007, Port-au-Prince, Haïti

Contexte du colloque
L'Assemblée générale des Nations Unies a adopté le 22 décembre 1992 la résolution A/RES/47/193 qui déclara le 22 mars de chaque année « Journée mondiale de

l'eau », à compter de l'année 1993, conformément aux recommandations de la Conférence des Nations Unies sur l'environnement et le développement (CNUED), exprimées dans le Chapitre 18 (Ressources en eau douce) d'Action 21. Cette résolution invitait les États à consacrer ce jour selon le contexte national, en concrétisant des actions telles que la sensibilisation du public par des publications, des diffusions de documentaires, l'organisation de conférences, de tables rondes, de séminaires et d'expositions liés à la conservation et au développement des ressources en eau et à la mise en œuvre des recommandations d'Action 21.

« ***Faire face à la pénurie d'eau*** » est le thème retenu pour la « Journée mondiale de l'eau 2007 ». Ce thème adopté par tous les membres de l'ONU, lors de la semaine mondiale de l'eau à Stockholm (Suède) en août 2006, met l'accent sur l'envergure croissante de la pénurie d'eau dans le monde entier et, par conséquent, sur le besoin d'intégration et de coopération renforcées, aux fins d'assurer une gestion durable, efficace et équitable des ressources en eau rares, aux niveaux international et local.

La pénurie d'eau, temporaire ou structurelle, résulte d'une insuffisance quantitative et/ou qualitative de la ressource hydrique disponible par rapport à la demande. Elle fait appel à la réflexion pour une meilleure répartition et préservation de l'eau, réflexion essentielle quand il s'agit de traiter du développement durable des sociétés. Les tensions inhérentes à la diversité des usages en font une question empreinte de complexité et de conflictualité. La connaissance à la fois des écosystèmes et de leur gestion, des conflits et des risques, et de l'évolution des arbitrages de plus en plus dépendants de régulations collectives, sous-tend l'action[1].

La demande en eau s'est développée plus qu'au double du taux d'accroissement de la population au cours du siècle dernier. Bien qu'il ne s'agisse pas encore d'une pénurie globale de l'eau à proprement parler, un nombre croissant de régions sont toutefois en situation de rareté chronique. A l'horizon de 2025, 1.8 milliards de personnes vivront dans des pays ou régions connaissant une pénurie absolue d'eau, et 2/3 de la population mondiale pourraient être dans des conditions de stress hydrique. La situation sera d'autant plus grave que les secteurs urbains en expansion rapide, exercent des pressions de plus en plus fortes sur les ressources en eau limitrophes[2].

Depuis 1990, Haïti fait partie des 9 pays qui devront faire face à la pénurie d'eau en 2025, selon les projections de croissance de la population[3]. Cependant, paradoxalement dans ce cas, la question de la pénurie se pose moins en termes du potentiel disponible, qu'en termes de la répartition géographique des ressources en eau et de leur mode d'exploitation, induisant une insuffisance de systèmes adéquats d'approvisionnement en eau potable, une faible couverture en périmètres irrigués et un assainissement de base déficient, particulièrement dans les grandes villes du pays.

En Haïti, la problématique de l'eau s'installe aujourd'hui, dans un contexte démographique assez particulier, caractérisé par une population à la fois dense, pauvre, mal nourrie et peu éduquée[4]. Dans une telle dynamique sociale, la pénurie d'eau doit être adressée non seulement sous les angles de la disponibilité per capita et/ou de la qualité en fonction des besoins différents, mais également et surtout sous celui de l'économie, c'est-à-dire, en tenant compte des capacités de la

1 Breuil F. La pénurie d'eau : donnée naturelle ou question sociale ?. Médiaterre Scientifiques, Rubrique: Publications, Thématique : Eau, 18/10/2006, http://www.mediaterre.org.

2 UN-Water Thematic Initiatives. Coping with water scarcity: A strategic issue and priority for system-wide action. August 2006, 12 p.

3 GADELLE, F. Le monde manquera-t-il bientôt d'eau? Sécheresse. 1995 : vol. 6, 1:11-15

4 EMMANUEL E. et LINDSKOG P. Regards sur la situation des ressources en eau de la République d'Haïti. In : Emmanuel E. et Vermande P. Gestion Intégrée de l'eau en Haïti_Actes du Colloque International. Port-au-Prince : Université Quisqueya, juin 2002, 312 p.

collectivité à aménager ou à développer de nouvelles ressources sur la base de méthodologies et de résultats technologiques adaptables à son contexte.
Par ailleurs, la dégradation généralisée des principaux bassins versants d'Haïti, la décharge des eaux usées urbaines dans l'écosystème marin sans aucun traitement préalable et l'absence d'une politique nationale de gestion des ressources en eau conduisent à orienter, la réflexion sur la pénurie vers un questionnement sur l'anthropologie sociale de l'eau en Haïti. Les différents problèmes hydriques du pays n'ont-ils pas une étroite corrélation avec le comportement de l'haïtien vis-à-vis des ressources naturelles ? Y a-t-il des études ou recherches réalisées sur les indices biotiques des rivières d'Haïti ? Existe-t-il une connaissance haïtienne sur les effets des polluants vis-à-vis des écosystèmes aquatiques ? En se référant sur l'importance de l'eau dans la culture humaine, dans les religions, et plus particulièrement dans le vaudou haïtien, n'est-il pas pertinent aujourd'hui, dans l'état de pollution des ressources en eau d'Haïti, de remettre en question la thèse qui soutient l'existence de divinités dans les eaux haïtiennes?
Dans le souci de trouver des éléments de réponse à ces différentes questions, le Laboratoire de Qualité de l'Eau et de l'Environnement (LAQUE) de l'Université Quisqueya décide, dans le cadre de la commémoration de la Journée mondiale de l'eau 2007, d'organiser un Colloque International sur le thème « Faire face à la pénurie de l'eau ». Ce Colloque, qui bénéficie déjà du support financier du Ministère de l'Environnement (MDE), du Fonds des Nations Unies pour l'Enfance (Unicef), de l'Agence Universitaire de la Francophonie (AUF), du Programme Hydrologique International de l'UNESCO (PHI), du Programme des Nations Unies pour l'Alimentation et l'Agriculture (FAO), de l'Institut PANOS Caraïbe et de la fondation Haïtienne de l'Environnement (FHE) sera tenu les 22 et 23 mars 2007 à l'Hôtel Montana à Pétion-Ville, Haïti.

Rapport général ou synthèse
Le colloque qui s'est tenu à Port-au-Prince, le 22 mars, journée internationale l'Eau a réuni en moyenne sur les deux jours, 150 participants venant de France, du Cameroun et d'Haïti.
La conférence inaugurale de ce colloque a été prononcée par SEM Jacques Edouard Alexis, Premier Ministre de la République d'Haïti. Elle a souligné les difficultés auxquelles font face les populations haïtiennes et surtout les plus pauvres pour accéder à l'eau potable pour leur consommation mais aussi pour les autres usages tels que l'agriculture. Il apparaît clairement que la question de l'eau aussi bien en milieu urbain qu'en milieu rural est bien prise en compte dans les préoccupations du gouvernement de la République d'Haïti
Autour de la préoccupation centrale à savoir « faire face à la pénurie de l'eau », il apparaît que les exposés aussi bien que les questions qui les ont suivi ont posé plusieurs questions majeures avant de tenter à travers des expériences diverses d'y apporter quelques réponses puis de dégager des perspectives.
Si cette question centrale renvoie en première analyse à celle de la gestion de la ressource en eau, le colloque a largement débordé cette problématique en s'interrogeant sur l'épineuse question de l'approvisionnement en eau potable, de la qualité du service à l'usager y compris de l'assainissement (notamment eaux pluviales et eaux usées) et des déchets, confirmant ainsi que l'on peut difficilement dissocier l'eau de l'assainissement même s'il convient de bien dissocier les financements consacrés à l'un et à l'autre service.

Les questions centrales apparues sont les suivantes :
- Haïti est-elle menacée par la pénurie d'eau, même si elle est abondamment arrosée par les pluies ?

- Les menaces qui pèsent sur la ressource en eau en Haïti sont-elles d'origine naturelle ou anthropique ?
- Les menaces et/ou la pénurie en eau sont-elles du même ordre en zone rurale qu'en zone urbaine ?
- Peut-on trouver dans les usages, les habitudes de vie et la culture haïtiennes, et l'organisation sociopolitique du pays des éléments qui expliquent le constat qui est dressé et mieux d'en tenir compte pour apporter des réponses réalistes ?
- Quel est le jeu des acteurs en présence dans le domaine de la gestion de la ressource en eau ;
- Peut-on à travers des expériences concrètes menées en Haïti ou ailleurs esquisser des solutions pour faire à la pénurie en eau et surtout initier des projets concrets aussi bien dans les équipes de recherche que sur le terrain où l'usager attend les acteurs de l'eau ?
- Au plan légal quels sont les mesures en gestation dans le pays ?
- Et finalement comment les partenaires du développement peuvent-ils contribuer aux efforts entrepris dans le pays pour faire face à la pénurie en eau, produire des connaissances nouvelles dans le secteur de l'eau, mettre en place une politique dans le secteur de l'eau et développer des projets en faveur des populations et surtout des populations les plus pauvres ?

Lorsque l'on a ainsi résumé les questions qui ont émergé au cours de ce colloque on peut être tenté de dire qu'il s'agit là simplement d'un colloque de plus dont la problématique n'a pas suffisamment été travaillée pour permettre d'en sortir avec des résultats qui seront utiles pour l'avenir, des pistes d'actions pour les uns et les autres et qui donc finalement n'aura simplement que permis aux uns et aux autres de se revoir. Je voudrais apporter un démenti formel à cette inquiétude en disant que 5 étudiants en thèse en France ont présenté leurs travaux (3 exposés et 2 posters) de même que 8 étudiants en fin de cycle de niveau master 2 :

- Et des résultats issus de projets de coopération scientifique interuniversitaires auront été soumis à la critique des participants ;
- Et que des professionnels appartenant à divers réseaux d'acteurs dans le domaine de l'eau auront présenté différentes expériences au cours de ce colloque.

Finalement que pouvons-nous en retenir de ce colloque ?

Le constat indique que Haïti est menacée par une pénurie d'eau voire par une pénurie absolue par endroits, menacée aussi par des pollutions chroniques (salinité ou métaux lourds) rendant leur utilisation dangereuse.

Les menaces qui pèsent sur la ressource en eau résultent aussi surtout de la défaillance des services d'assainissement (eaux usées des hôpitaux, absence de collecte de déchets solides et liquides) et par la destruction de l'environnement notamment du couvert végétal. De plus les réseaux d'assainissement pluvial sont inexistants. En milieu urbain, la typologie de l'habitat montre bien qu'il y a concentration de pollution d'origine fécale. Il y a également des menaces de salinité des acquières côtiers d'où la nécessité de gérer les pompages qui sont faite pour alimenter les ménages.

L'absence de règles opposables aux populations et de stratégie en matière d'eau et d'assainissement rend peu lisible et peu compréhensible le secteur de l'eau. Il y a lieu en particulier de préciser davantage le rôle des collectivités locales dans le secteur de l'eau.

RECHERCHE HAÏTIENNE : UNE EXPERTISE EN CONSTRUCTION ET A RENFORCER
Quelques pôles de compétences :

- adéquation entre ressources disponibles et demandes en eau en Haïti
- géopolitique de l'eau
- anthropologie
- planification urbaine raisonnée pour la sauvegarde de la ressource
- assainissement solide et préservation de la ressource
- optimisation des ouvrages eau potable
- hydrodynamique
- écotoxicologie (risques sanitaires et autres)

Des équipes de recherche à renforcer, à étoffer notamment en mettant un accent sur la relève étudiante qui a su démontrer dans le cadre du colloque sa capacité à poursuivre les apports de la recherche pour les secteurs eau et assainissement.

Il est apparu nécessaire de mettre en place au plan national un réseau fédératif de recherche sur ces questions, ceci pour tenir compte de la faiblesse des ressources humaines et des équipements de la recherche.

MOBILISATIONS ET EXPLOITATION DE LA RESSOURCE EN EAU : DIVERSITE ET RICHESSE D'EXPERIENCES EN HAÏTI
En ce qui concerne l'accès à l'eau potable, ou à l'eau pour l'agriculture, il y a lieu de valoriser les quelques expériences connues en Haïti et de prendre le recul nécessaire pour en tirer les enseignements nécessaires.

UNE EVOLUTION PROMETTEUSE DU SECTEUR DE L'EAU
Qu'il s'agisse du projet de loi cadre ou de la réforme en cours du secteur de l'eau, la nouvelle stratégie nationale se dessine autour des principes de gestion intégrée et rationnelle de la ressource. Seule approche à ce jour qui a su trouver l'adéquation idéale entre les différents usagers de la ressource.
A condition que la mise en œuvre de la réforme soit effective.
En revanche, nous n'avons pas d'indication précise sur les orientations nationales en matière d'assainissement ?

RECHERCHE ET POLITIQUES PUBLIQUES EN HAÏTI
L'expertise scientifique apportée par la recherche doit aller au-delà des diagnostics et de l'analyse des conséquences des défaillances des services publics. Ceci est particulièrement vrai pour les questions sanitaires qui ont dans la plupart des cas des solutions en amont.
Des cas indiquant comment des résultats de recherche ont ensuite été mis en application moyennant des stratégies municipales ont été présentés.
Le corpus de connaissances existant doit être valorisé sous forme d'argumentaires pour anticiper et orienter les politiques publiques en matière d'eau, d'assainissement et de santé.
POUR UNE RECHERCHE HAÏTIENNE MILITANTE
La mission du chercheur ne doit pas se limiter à un travail de laboratoire et de prospection analytique sur le terrain. La recherche fondamentale doit se décliner en recherche appliquée. Dans les domaines des services de base et de la santé publique, il s'agit de travailler avec les usagers des services pour leur proposer des solutions sur mesure. On pourrait par exemple préciser et contrôler les périmètres de protection des zones de captage et de pompage des eaux souterraines, préciser la problématique des réserves collinaires et développer cette technique qui permet d'accroire les quantités d'eau mobilisables.

Les recherches conduites ailleurs moyennant des approches écosystémiques à la santé humaine montrent que cela est possible. Il convient aussi de ne pas se limiter à la vision utilitariste de l'eau mais creuser également sa dimension symbolique.
Nécessaire articulation entre universités –Collectivités locales ; universités-décideurs de manière générale.
L'état des lieux des recherches montre aussi que dans le domaine de l'eau beaucoup de zones géographiques du pays n'ont pas encore fait l'objet de recherche notamment dans les domaines de l'hydrogéologie.
L'université est disposée à intervenir dans la formation continue dans le secteur de l'eau.

ET LA COOPERATION INTERNATIONALE POUR VENIR EN APPUI …

Sans être exhaustif ni en ce qui concerne le volume des actions ni en ce qui concerne la diversités des acteurs l'on peut signaler que :

- **la BID** intervient dans le secteur de l'eau (réforme du secteur par la BID, loi présentée au parlement) ; mise en place de programmes en province ; renforcer les moyens d'intervention des pouvoirs locaux dans les locaux ; intervention en milieu rural (dans l'Artibonite ouest localités de 5000 habitants) ; travaux en collaboration avec la CAMEP et le SNEPS : environ 54 millions de usd.
- **le pS-Eau** fait un travail d'appui auprès de la coopération décentralisée et les OINGs et les acteurs du secteur de l'eau (diffusion d'information avec une approche recherche finalisée) auprès des acteurs du Sud et du Nord. La législation française prévoit que les CLTD et syndicats des eaux peuvent prélever <1% pour financer des actions de développement dans les pays du Sud ; Des actions concrètes à envisager pour les collectivités locales en Haïti ;
- **La stratégie de l'UNICEF** dans le secteur consiste à rouvrir des secteurs Eau et A dans le pays y compris en Haïti. L'élaboration d'un programme d'activité est en cours (Ouest, Artibonite et PauP) et à partir de partir de 2008 un nouveau programme de coopération sur 5 ans avec le gouvernement sera élaboré (latrines, EP, appui à la réforme)]. Les stratégies et les approches restent à être définies.
- **L'Agence universitaire de la francophonie** : PCSI, mobilités académiques et scientifique, manifestation scientifique, appui à la conférence des recteurs, appui aux filières universitaires francophones ; mise en réseaux des chercheurs à travers le réseau de chercheurs 'environnement et développement durable ».

Les universités s'ouvrent dans ce contexte aux acteurs de l'eau et particulièrement aux collectivités publiques dans un partenariat gagnant - gagnant (formation – échange de données – déploiement des moyens financiers et humains – identification d'axes de recherche pertinents au plan social); c'est aux universitaires de produire les outils de base pour tenir compte des spécificités du contexte local.

Toutes les stratégies développées ici ne peuvent port**er de fruits que s'il elles s'inscrivent dans la durée, dans un cadre formel et que si elles rencontrent des efforts déployés par les bénéficiaires eux-mêmes**.

LES ENGAGEMENTS SUITE AU COLLOQUE 2007

- du pS-Eau : promotion de la coopération décentralisée française via une rencontre à Paris avant fin 2007 sur « eau, assainissement et solidarités en Haïti ».

- Faire le lien entre la recherche et le politique. Cette articulation pourrait se traduire par la mise en place d'un pôle assistance scientifique consultable et mobilisable dans le cadre de définitions de stratégies sectorielles.

OBJECTIF COLLOQUE EAU 2009
Quelques recommandations pour l'organisation d'une prochaine édition :

- Ouvrir l'arène des présentations et débats aux acteurs opérationnels du secteur (secteurs public et privé)
- Mobiliser les partenaires techniques et financiers (services publics, bailleurs de fonds)

Prévoir des ateliers de travail multidisciplinaires (2 demies journées par thème traité) afin de définir de nouveaux champs d'investigation pour la recherche, de nouvelles opportunités de partenariat entre acteurs, des articulations entre recherche et opérateurs de service (pour la mise en œuvre d'actions-recherche et d'actions-pilotes). Idéalement, chacun de ces ateliers devrait pouvoir se traduire par l'annonce d'engagements au terme du colloque afin de pouvoir construire des synergies pour construire des réponses pertinentes aux questions posées.

1.6.2. Participation à des réunions à l'étranger

1. Le Comité National d'Haïti a participé en août 2007 à Guatemala City à la VII réunion des Comités nationaux et points focaux du Programme Hydrologique International de l'UNESCO pour l'Amérique Latine et les Caraïbes. Au cours de cette réunion, les Comités nationaux et points focaux présents ont, entre autres, adopté la résolution No. PHI/LAC VII-O8, présenté par le Comité national d'Haïti, portant sur la création de la « ***Chaire UNESCO en Ecohydrologie*** » dans le cadre du Master Recherche « ***Ecotoxicologie, Environnement et Gestion des Eaux*** » de l'Université Quisqueya (Haïti).
2. Dans le cadre du programme ISARM des Amériques, 2 membres du Comité d'Haïti ont participé en septembre 2007 à l'Atelier sur les aquifères transfrontaliers tenu à Montréal.
3. Le Professeur Evens EMMANUEL, membre du groupe de travail sur l'éduaction et le renforcement des capacités du programme Ecohydrologie de l'UNESCO a participé en juin 2006 à Faro (Portugal) et en décembre 2007 à Maringa (Brésil) aux activités de ce programme.

Les membres du comité ont participé à plusieurs conférences internationales et ont présenté des communications orales, notamment :

1. Ruth Angerville, Evens Emmanuel, Yves Perrodin. Impact écotoxique potentiel sur les milieux recepteurs aquatiques des metaux en melange dans les eaux pluviales urbaines. NOVATECH 2007, Lyon, juin 2007. CDROM.
2. Ruth Angerville, Evens Emmanuel, Osnick Joseph, Yves Perrodin. Ecological risk assessment of heavy metals in paint manufacturing effluents of Port-au-Prince. SETAC Europe 15th Annual Meeting, 22-26 May 2005, Lille, France. CDROM.
3. Evens Emmanuel, Yves Perrodin, Kettly Théleys, Myrline Mompoint, Jean-Marie Blanchard. Environmental hazard assessment of untreated urban wastewater on the ecosystem of Port-au-Prince bay. Proceedings of the XXIX Congreso Interamericano de Ingenieria Sanitaria y Ambiental. San Juan, Puerto Rico, 22-28 de agosto, 2004. CDROM.
4. Ruth Angerville, Félix Junior Rony, Ketty Balthazard, Evens Emmanuel. Assessment of human exposures to lead in drinking water. Proceedings of the

XXIX Congreso Interamericano de Ingenieria Sanitaria y Ambiental. San Juan, Puerto Rico, 22-28 de agosto, 2004. CDROM.

1.7. Autres activités au niveau régional

1.7.1. Coopération ou relations institutionnelles

Le 21 janvier 2008, le Doyen de la Faculté des Sciences, de Génie et d'Architecture (FSGA) de l'Université Quisqueya, Monsieur le Professeur Evens EMMANUEL, Directeur scientifique du Comité national, et le Directeur de l'Ecole Nationale de Géologie Appliquée (ENGA), Monsieur le Professeur Emmanuel MOLIERE, Président du Comité National d'Haïti du PHI ont procédé à la signature d'un accord cadre de coopération scientifique interuniversitaire dans le domaine de l'environnement et des sciences de la terre. Cet accord est approuvé par le Recteur de l'Université Quisqueya, Monsieur le Professeur Jacky LUMARQUE, et le Ministre de l'Education Nationale et de la Formation Professionnelle, Monsieur le Professeur Gabriel BIEN-AIME.

Un groupe de travail composé de chercheurs du Laboratoire d'Analyse de Matériaux (LAM) de l'Université Quisqueya, sous la direction de Madame le Professeur Marie Gisèle P.A. PIERRE, et de l'Ecole Nationale de Géologie Appliquée (ENGA), sous la direction de Monsieur le Professeur Emmanuel MOLIERE, est en train d'observer le phonomène des débordements consécutifs du lac Azuei et de l'étang de Miragoâne.

1.7.2. Projets scientifiques achevés ou en cours

- « ***Hydrodynamique du transfert des polluants dans les nappes de la Plaine du Cul-de-sac***», regroupant 3 équipes : Laboratoire de Qualité de l'Eau et Environnement (LAQUE) de l'Université Quisqueya (Haïti), Laboratoire des Sciences de l'Environnement de l'École National des Travaux Publics de l'État (France), Institut National de la Recherche Scientifique – Eau, Terre, Environnement de l'Université du Québec (Québec – Canada)). Financement : Agence Universitaire de la Francophonie et UNESCO, 2006-2007, achevé.
- « ***Mise en place d'un observatoire sur la qualité microbiologique des ressources en eau douce dans 3 grandes villes de la Caraïbe (Port-au-Prince, Santo Domingo et la Havane)***». Programme regroupant : l'Université Quisqueya (Haïti), l'Institut Technologique de Santo Domingo (République Dominicaine), l'Université de la Havane (Cuba) et l'Université de Picardie Jules Verne, en cours.
- « ***Evaluation des risques microbiologiques et chimiques liés aux parasites (Cryptosporidium sp., Helminthes et Giardia) et aux polluants (organiques et minéraux) contenus dans l'eau de boisson consommée dans les écoles publiques de la Communauté Urbaine de Port-au-Prince*** ». Partenaires : l'Université Quisqueya (Haïti) et l'Université de Picardie Jules Verne. Financement : Ministère de l'Education Nationale et de la Formation Professionnelle, en cours.
- ***« Préparation et caractérisation de matériaux issus de la biomasse végétale méditerranéenne et caribéenne pour le traitement de l'eau*** ». Laboratoire de Qualité de l'Eau et Environnement (LAQUE) de l'Université Quisqueya (Haïti), en collaboration avec l'Université des Antilles et de la Guyane (Coordination du PCSI), l'École Supérieure d'Horticulture (ESH) de la

Tunisie et l'Université de Liège. Financement : Agence Universitaire de la Francophonie, en cours.

- « ***Production de charbons actifs à partir de déchets lignocellulosiques d'Haïti et étude de leurs potentialités pour le traitement des effluents liquides***». Laboratoire de Qualité de l'Eau et Environnement (LAQUE) de l'Université Quisqueya (Haïti), en collaboration avec l'Université des Antilles et de la Guyane (Coordination du projet), NBC de la Guyane et Agrissuply d'Haïti. Financement : Région Guadeloupe, en cours.
- « ***Analyse des facteurs de risque de contamination par les oocystes de cryptosporidies présents dans l'environnement aux Cayes, Haïti*** ». Programme regroupant : le Laboratoire de Parasitologie Mycologie Médicales, Centre Hospitalier Universitaire d'Amiens, Université de Picardie Jules Verne - France (Coordination du Projet), les Centres GESKHIO (Port-au-Prince, Haïti), le Laboratoire de Qualité de l'Eau et Environnement (LAQUE), Université Quisqueya (Haïti), le Laboratoire de Parasitologie Mycologie, Faculté de Médecine, Université Denis Diderot-Paris 7 (France), le Département de Santé Publique, Université Notre Dame d'Haïti (Haïti), Département de Parasitologie, Faculté d'Agronomie et de Médecine vétérinaire, Université d'Etat d'Haïti (UEH), et le Unité de Recherche 077 de l'IRD (Dakar, Sénégal). Financement : Ambassade de France en Haïti et les laboratoires partenaires, en cours.

2 ACTIVITES FUTURES

2.1 Activités planifiées avant décembre 2009

- Mettre en place programme d'éducation à l'eau et à l'environnement. La première démarche sera de procéder à la traduction française de l'ouvrage "Agua e educacion" de l'UNESCO. La deuxième étape du processus sera l'expérimentation du matériel dans les écoles de la petite enfance (4-6 ans) et les classes terminales des écoles associées.
- Signature d'un accord de coopération scientifique avec l'Association Haïtienne « Femmes, science et technologie », pour l'expérimentation dans les cycles de l'enseignement fondamental et du nouveau secondaire, d'un cours sur les cycles hydrologiques et l'éducation à l'environnement dans les écoles associées.
- Elaboration et présentation du projet portant sur la création de la « ***Chaire UNESCO en Ecohydrologie*** » dans le cadre du Master Recherche « ***Ecotoxicologie, Environnement et Gestion des Eaux*** » de l'Université Quisqueya (Haïti).
- Ouverture de la « ***Chaire UNESCO en Ecohydrologie*** ».
- Mettre en place un programme pour encourager les chercheurs en sciences de l'eau du pays à publier les résultats de leurs travaux dans la revue AQUAC-LAC de l'UNESCO.
- Préparer la participation d'Haïti au forum mondiale de l'eau en 2009.
- Elaborer les documents de projet portant sur la mise en place d'un observatoire sur la salinité des ressources en eau souterraine du pays: (i) Aquifère du Nord'Est (dans le cadre du programme ISARM) ; (ii) Aquifère de la Plaine du Cul-de-Sac.
- Observer et suivre le phonomène des débordements consécutifs du lac Azuei et de l'étang de Miragoâne.
- Créer de nouveaux groupes de travail sur les thèmes du PHI-VII.
- Organiser des cours et séminaires de recherche pour les membres du Comité national.

2.2 Activités prévues pour la période 2010-2011

- Développer le programme d'éducation à l'eau
- Développer la « ***Chaire UNESCO en Ecohydrologie*** ».
- Observer et suivre le phonomène des débordements consécutifs du lac Azuei et de l'étang de Miragoâne.
- Mettre en place l'observatoire de terrain sur la salinité des ressources en eau souterraine du pays: (i) Aquifère du Nord'Est (dans le cadre du programme ISARM) ; (ii) Aquifère de la Plaine du Cul-de-Sac.
- Organiser la IX réunion des Comités nationaux et points focaux du Programme Hydrologique International de l'UNESCO pour l'Amérique Latine et les Caraïbes.
- Renforcer les groupes de travail sur les thèmes du PHI-VII.
- Organiser des cours et séminaires de recherche pour les membres du Comité national.

2.3 Activités envisagées à long terme

- Monter un master en hydraulique, hydrologie et hydrogéologie à l'Ecole Nationale de Géologie Appliquée.
- Consolider l'observatoire de terrain sur la salinité des ressources en eau souterraine du pays: (i) Aquifère du Nord'Est ; (ii) Aquifère de la Plaine du Cul-de-Sac.
- Mettre en place un observatoire de terrain en hydrologie urbaine à Port-au-Prince.
- Consolider la « ***Chaire UNESCO en Ecohydrologie*** ».
- Renforcer les groupes de travail sur les thèmes du PHI-VII.
- Créer des réseaux fédératifs de recherche sur les thèmes du PHI-VII.
- Organiser des cours et séminaires de recherche pour les membres du Comité national.

INFORME NACIONAL SOBRE ACTIVIDADES RELACIONADAS AL PHI

1. Actividades realizadas en el periodo julio 2006 – mayo 2008

1.1 Reuniones del Comité Nacional del PHI

1.1.1 Decisiones concernientes a la composición del Comité Nacional del PHI

En Honduras hasta la fecha no existe una conformación oficial del Comité Nacional del PHI, no obstante, a nivel de país existen varias organizaciones cuyos principios y funciones están enfocados al cumplimiento de los lineamientos establecidos por el Comité Nacional del PHI.

A continuación se describen las organizaciones que en Honduras han sido formadas bajo principios de la Gestión Integrada de Recursos Hídricos:

- Plataforma del Agua de Honduras (PAH): Surge en el año 2003 con el propósito de fundamental de promover un espacio de dialogo, evaluación y propuesta a nivel nacional para el fortalecimiento de capacidades e incidencia en la Gestión Integrada de los Recursos Hídricos.

- Grupo Técnico Interinstitucional (GTI): Formado en el marco de la implementación del Plan de Acción Nacional de Lucha contra la Desertificación y Sequía, para dar cumplimiento a los principios de la Convención de las Nacionales Unidas de Lucha contra la Desertificación y Sequía (UNCCD) por sus siglas en ingles, la cual entro en vigencia en Honduras en el año de 1998.

- Red de Agua y Saneamiento de Honduras (RAS-HON): Es una instancia de dialogo, consulta e intercambio de información del Sector Agua Potable y Saneamiento, de carácter consultivo, con independencia funcional y técnica de sus miembros.

- Asociación Nacional del Agua (GWP Honduras): Creada para fomentar la Gestión Integrada de los Recursos Hídricos (GIRH), proceso que promueve la gestión y desarrollo coordinado del agua, la tierra y los recursos relacionados, con el fin de maximizar el bienestar social y económico resultante de manera equitativa, sin comprometer la sostenibilidad de los ecosistemas.

- Asociación Hondureña de Juntas Administradora de Sistemas de Agua (AHJASA): La Visión de la AHJASA es obtener servicios de agua eficiente, sostenibles y de buena calidad mediante la educación de los usuarios, el desarrollo de una conciencia colectiva, la constitución de organizaciones comunales democráticas legalmente establecidas, el desarrollo del liderazgo y la administración efectiva de los recursos existentes.

- Red Nacional de Cuencas Hidrográficas de Honduras (RENACH): Fue creada mediante Decreto Legislativo 218-96, con el fin de coordinar la administración de los Recursos Hídricos los que están ligados con la calidad de vida de las personas, influyendo en sus niveles de productividad y generar espacios para intercambio de experiencia entre manejadores de áreas productoras de agua.

1.1.2 Estado de las actividades del PHI – VI

A nivel de país y conforme a los lineamientos planteados en la fase VI del Programa Hidrológico Internacional se han desarrollado una serie de acciones que se describen a continuación:

Tema 1: Los cambios mundiales y los recursos hídricos

En relación al tema del abastecimiento y calidad del uso del agua, en Honduras existe una diferencia entra la disponibilidad conforme a las áreas geográficas. La vertiente que desemboca en el océano Atlántico se caracteriza por ser un área que cuenta con disponibilidad del recursos agua tanto en época de lluvia como en época seca, no así sucede en la vertiente del pacifico, la cual presenta deficiencias en la disponibilidad y distribución del agua superficial y subterránea, incrementada esta situación por un proceso de canícula prolongada, lo que ha llevado a la realización de programas y proyectos encaminados a minimizar dicha problemática, como es el caso del Plan de Acción Nacional de Lucha contra la Desertificación y Sequía.

El Plan de Acción Nacional de Lucha Contra la Desertificación y Sequía (PAN-LCD) es una iniciativa que se enmarca en las políticas de Estado en materia de desarrollo principalmente en los sectores agropecuario, forestal, ambiental, ordenamiento territorial, descentralización y educación para el desarrollo sostenible, que responde a los postulados de la Convención de las Naciones Unidas de Lucha contra la Desertificación (UNCCD) que entró en vigencia en 1996 a la cual Honduras hizo su incorporación en 1997.

El país ha avanzado no solo en la implementación de proyectos, sino también a nivel organizativo, es así que se cuenta con **juntas de agua** en más de cinco mil comunidades, se encuentra formada la Plataforma del Agua de Honduras (PAH), la Red de Agua y Saneamiento de Honduras (RAS-HON) y la Asociación Hondureña de Juntas Administradoras de Sistemas de Agua (AHJASA), tres elementos fuertes en la organización y administración de recurso hídrico en el país.

En lo referente a los procesos jurídicos y legales, en Honduras se ha avanzado considerablemente mediante la elaboración de dos mecanismos normativos, en primer lugar el desarrollo de una **Política Hídrica Nacional**, la cual surgió como una iniciativa de la Plataforma del Agua de Honduras (PAH) en conjunto con la Secretaría de Recursos Naturales de Honduras (SERNA), específicamente a través de la Dirección General de Recursos Hídricos (DGRH), la sociedad civil, ONG`s, instituciones internacionales, organizaciones locales y demás actores del sector para diseñar una propuesta que promueva una gestión integrada del recurso hídrico, con una visión a mediano y largo plazo.

La Política Hídrica Nacional fue diseñada en el año 2007 mediante una colaboración de varias instituciones interesadas en la temática como ser La SERNA, la Secretaría de Agricultura y Ganadería (SAG), la Agenda Forestal, el CATIE, la Escuela Agrícola Panamericana El Zamorano, la Cooperación Hondureña de Desarrollo Forestal y el Servicio Autónomo Nacional de Acueductos y Alcantarillados (SANAA), bajo el apoyo financiero de la Agencia Canadiense de Cooperación Internacional (ACDI).

Los principios de la Política Hídrica Nacional son:

a) El acceso al agua para consumo humano como derecho fundamental.
b) El Agua es un recurso finito, escaso y vulnerable.
c) La Gestión del agua con participación social y equidad de género.
d) El agua como bien estratégico para el desarrollo del país.
e) El agua es un bien con valor ambiental, social y económico.
f) El deterioro de la calidad del agua tiene un costo ambiental, social y económico.
g) El agua es un bien con valor ambiental, social y económico.
h) El deterioro de la calidad del agua tiene un costo ambiental, social y económico.

Actualmente y después de haber realizado un proceso de socialización en varios sectores del país, en el mes de junio se hará entrega de la Política Hídrica al Presidente de la República para ser analizada y revisada por su Consejo de Ministro y con ello buscar su aplicación a nivel nacional con la participación de todos los sectores involucrados.

La segunda iniciativa es la elaboración de una nueva **Ley General de Aguas**, cuyo objetivo de establecer los principios y regulaciones aplicables a la gestión para la conservación, protección, valorización y aprovechamiento del recurso hídrico nacional, sus ecosistemas y recursos vinculados.

El proceso de formulación de la Ley inició desde el año 2003 con el fin de solventar los problemas ambientales relacionados con el manejo de los recursos hídricos, y con ello mejorar la ley de aguas existente en el país desde 1927, misma que no se adapta a las condiciones y problemática actual. Sin embargo, es hasta en el 2006 que en El Congreso Nacional de la República se crea una Comisión de Recursos Hídricos y con ello la formulación de esta nueva ley, a través de una comisión liderada por la PAH y compuesta por varias instituciones y personas expertas en la temática hídrica, quienes, con la participación de un equipo voluntario y multidisciplinario elaboraron un documento de proyecto de Ley.

Como resultado se elaboró una nueva propuesta de Ley General del Agua, revisada y avalada en conjunto con la Comisión presidencial de Modernización del Estado y demás entes gubernamentales, la cual actualmente se encuentra en el seno de la Cámara Legislativa para ser discutida y aprobada por el Congreso Nacional de la República.

Otra de las acciones de mucha relevancia realizada en el presente año es la **Cumbre de Presidentes sobre Cambio Climático y Medio Ambiente** como una iniciativa de Honduras para converger lineamientos y ejes estratégicos para control de emisiones y cumplimiento del Protocolo de Kioto.

Tema 2: La dinámica integrada de las cuencas y los acuíferos.

A nivel de país existen varios programas cuyos lineamientos se basan en el **Manejo Integrado Cuencas** entre los que figuran:

- Proyecto “Fortalecimiento de la Gestión Local de los Recursos Naturales en las Cuencas de los Ríos Patuca, Choluteca y Negro” (FORCUENCAS)

- Programa Multifase de Manejo de Recursos Naturales en Cuencas Prioritarias (MARENA)

- Proyecto Manejo Integrado de los Recursos Naturales (USAID-MIRA)

- El Programa Regional de los Recursos Naturales de la Cooperación Técnica Alemana (PRORENA)

En el área académica la Universidad Nacional Autónoma de Honduras ha iniciado a nivel de postgrado, un estudio de **manejo integrado de cuencas hidrográficas** en la zona de occidente y se están haciendo negociaciones para que profesionales e investigadores hondureños puedan obtener maestrías en cuencas transfronterizas.

Entre los avances realizados en este tema se encuentra la elaboración del **Mapa Nacional de Aguas Subterráneas**, identificando su rango potencial a 150 metros de profundidad, el cual fue desarrollado por UNESCO, SANAA y el Instituto Geográfico Nacional (IGN) y continua vigente.

Así mismo mediante el apoyo de la Cooperación Suiza (COSUDE) y la asesoría estratégica del SANAA, la SERNA a través de la DGRH, desarrolló el primer **mapa zonal de la región central**, mediante el proyecto "Fortalecimiento Institucional en el tema de las Aguas Subterráneas en Honduras" con el que se identificó las unidades geológicas de la zona.

En relación al **manejo de cuencas compartidas,** es importante mencionar que en Centro América no existe legislación concerniente a este aspecto, sin embargo se está iniciando la capacitación y coordinación a través de los siguientes proyectos:

a) Plan Trifinio, con el manejo de la cuenca del rio Lempa entre los países de Honduras, Guatemala y El Salvador.

b) Proyecto Binacional, Plan de Protección y Desarrollo de la Cuenca del Río Goascoran por parte de Honduras y El Salvador.

c) Manejo Integrado de la Cuenca del río Negro, el cual esta siendo ejecutado entre Ministerio de Ambiente y Recursos Naturales (MARN) de Nicaragua y la Comisión de Recursos Hídricos del Ministerio de Relaciones Exteriores de Honduras.

d) Plan Manejo Integrado del Golfo de Fonseca como un seguimiento al Acuerdo de Paz que involucra a Honduras, El Salvador y Nicaragua.

En cuanto a los **fenómenos extremos** la Organización Panamericana de la Salud (OPS) ha apoyado a instituciones competentes con capacitaciones que han trascendido a nivel regional, por lo cual en todo el país ya se tiene como obligatoriedad, la implementación de planes de emergencia a nivel municipal y conforme a las condiciones de cada zona.

Adicionalmente existe en el país, una Red de Estaciones Hidrometeorológicas manejadas por la Dirección General de Recursos Hídricos (DGRH), en conjunto con otras organizaciones como el Comisión Permanente de Contingencias (COPECO) y el SANNA forman el **Sistema de Alerta Temprana (SAT),** que permite prevenir el comportamiento de los ríos en función del caudal, utilizando tanto los datos de archivo histórico, como los provenientes en tiempo real del sistema de supervisión. Este sistema a su vez es una herramienta para la planificación a largo plazo de la construcción de infraestructuras de protección.

A través del **Proyecto Mitigación de Desastres Naturales (PMDN)** y con el financiamiento del Banco Mundial se ha logrado el fortalecimiento de las estaciones hidrometeorológicas nacionales.

Actualmente y bajo la coordinación de la Secretaría de Recursos Naturales y Ambiente, siendo la DGRH la institución ejecutora en Honduras, se esta desarrollando **El Programa Regional de Reducción de la Vulnerabilidad y Degradación Ambiental (PREVDA),** que tiene como objetivo principal el Impulsar procesos dirigidos a lograr un desarrollo rural sostenible, a través del fortalecimiento de la gestión de los recursos naturales, tanto a nivel central como a nivel local y tiene una duración de 3 años.

Tema 3: La Hidrología de los hábitats terrestres

Recientemente se ha formado la Asociación Nacional del Agua como un capítulo de país del Global Water Partnership (GWP), cuyo objetivo básico es el desarrollo en la gestión de recursos hídricos con un enfoque en el manejo de cuencas hidrográficas.

En cuanto a los humedales, Honduras forma parte de la **Convención Ramsar** y como parte de los compromisos adquiridos en esta convención, se esta trabajando con la elaboración del **Inventario Nacional de Humedales**, con el objetivo de contar con un documento que sea una pauta para el manejo y uso de estos ecosistemas y que al mismo tiempo sea utilizado como herramienta base para la elaboración de políticas y estrategias de uso sostenible.

En los últimos años Honduras ha sufrido un proceso de degradación de los recursos naturales, entre los mayores problemas que se enfrentan están la deforestación y los incendios forestales, por lo que se han generado mecanismos de reducción de esta problemática, como ser la creación del **Proyecto de Reforestación Nacional** coordinado por la SERNA y la Secretaría de Defensa, quienes ejecutan acciones para a nivel nacional involucrando la participación de la sociedad civil y el sistema educativo.

Así mismo mediante la declaratoria como áreas protegidas a todas las montañas con una altura igual o mayor a 1,800 metros sobre el nivel del mar, se ha logrado establecer un control en cuanto a ordenamiento e implementación de medidas de conservación forestal, con el fin de mejorar su condición de zonas productoras de agua.

En lo referente a las **islas y zonas costeras**, existen limitaciones en cuanto a la disponibilidad del recurso, ya sea en cantidad como calidad, actualmente el abastecimiento se realiza en su mayoría por aprovechamiento de aguas subterráneas, pero debido al crecimiento poblacional y a un desarrollo turístico acelerado se ha sobre explotado este recurso, también en las zonas mas desarrolladas se hace uso de plantas desalinizadoras.

Tema 4: El agua y la sociedad

Como todos sabemos la disponibilidad del agua es un pilar fundamental para el desarrollo de una sociedad, sin embargo, en general no existe una conciencia de que el agua es un bien común, provocada básicamente por un desconocimiento de la población sobre el ciclo hidrológico y la incidencia de las acciones antropogénicas en cada fase de este.

Si hablamos de **valorización del agua**, se han realizado estudios enfocados a la implementación de Pagos por Servicios Ambientales, a través de varias instituciones y proyectos como ser USAID –MIRA, FORCUENCAS, entre otros.

La modificación del uso del suelo hace que existan cambios en la capacidad de infiltración del agua, debido a que no existen drenajes adecuados para canalizar los flujos, lo que provoca inundaciones, añadidos a la falta de planificación y a la aplicación del ordenamiento territorial acorde a las condiciones del suelo.

En Honduras los mayores problemas en cuanto disponibilidad y contaminación del agua, ocurren en las ciudades principales, Tegucigalpa (Capital del país) y San Pedro Sula caracterizada por un desarrollo industrial, ya que es donde se requiere mayor abastecimiento de agua y mejores mecanismos para saneamiento ambiental, es así que se han ido desarrollando diferentes mecanismos para mitigar dicha situación.

A nivel central, la Cámara de Comercio esta desarrollando un plan a mediano plazo que contempla el uso de agua en la capital, tanto el abastecimiento como el saneamiento. También se han dado iniciativas para el desarrollo de un anillo verde.

En San Pedro Sula, a través de la Comisión Ejecutiva del Valle de Sula ha desarrollado Planes Estratégicos que incorporan acciones de protección de acuíferos y normativa para el control de emisiones, como ser el Reglamento para la Regulación de las Descargas de Residuos líquidos.

Otro aspecto importante ha considerar es la administración de recursos, para lo que se esta trabajando en la descentralización a las municipalidades mediante la implementación de la Ley Marco de Agua y Saneamiento.

Tema 5: La educación y la formación en recursos hídricos

La educación en temas relacionados a los recursos hídricos ha sido manejada por varias instituciones entre las que figuran la Secretaría de Recursos Naturales y Ambiente, el Servicio Autónomo Nacional de Acueductos y Alcantarillado (SANAA), la Plataforma del Agua de Honduras entre otras.

Las actividades desarrolladas han sido enfocadas al desarrollo de una conciencia de ahorro y conservación del recurso, para lo cual se han ejecutado actividades como:

- **Ferias Nacionales de Agua**, el objetivo de este evento es concienciar a la población en general sobre la importancia de proteger, preservar, desarrollar y utilizar el recurso hídrico como factor fundamental para el desarrollo integral en beneficio del país. Esta actividad se ha realizado desde el 2006, bajo el tema Gestión Integral de Recursos Hídricos y en el 2007 promoviendo la política de Adoptemos un Río.

- **Campañas de educación ambiental** a nivel de las municipalidades, desarrolladas por la Secretaría de Recursos Naturales a través de la Dirección de Gestión Ambiental.

- **SANAA** a través de la elaboración y divulgación de boletines informativos sobre el ciclo hidrológico, uso del agua y conservación de los recursos naturales.

A nivel de educación formal se ha incorporado dentro de los planes de estudio el componente ambiental, dentro de los que se destaca el manejo de los recursos hídricos, también se esta trabajando con la creación de carreras a nivel secundario y superior con enfoque en los temas mencionados. También se ha mejorado el Manual de Educación Ambiental para el nivel básico.

A nivel universitario actualmente se están estableciendo convenios entre la Universidad Autónoma de Honduras y universidades en Canadá para brinda asesoría científica y académica en la implementación de la Maestría en Recursos Hídricos con énfasis en hidrogeología, también la Universidad Agrícola del Zamorano desarrolla una serie de Diplomados relacionados con el tema de recursos hídricos.

Uno de los avances más significativos en cuanto a la educación ambiental es la elaboración de la **Ley de Educación y Concienciación Ambiental**, la cual luego de un proceso de formulación, consulta y socialización ha sido revisada y aprobada por el Congreso Nacional de la República.

1.1.3 Decisiones concernientes a la contribución/participación en el PHI - VI

1.2 Actividades dentro del marco del PHI

1.2.1 Certámenes científicos y técnicos nacionales/locales

A nivel de país no se realizan este tipo de eventos, generalmente se organizan actividades donde se premia la labor de las instituciones, como ser el Premio Nacional del Medio Ambiente, sin embargo existen una gran cantidad de competencia qe involucran el sistema educativo, principalmente el nivel básico, como ser concursos de dibujo con niños y otros eventos artísticos.

1.2.2 Participación en Comités de dirección/grupos de trabajo del PHI

Debido a que el comité Nacional del PHI en el país no funciona directamente como tal, las actividades relacionados a comités o redes, han sido desarrolladas por organizaciones o grupos de trabajo concernientes al tema, los cuales han sido mencionados en el inciso 1.1.1 de este documento.

1.2.3 Proyectos de investigación o de aplicación apoyados o patrocinados.

En relación al aspecto de investigación, en Honduras se han desarrollado un sinnúmero proyectos a pequeña y mediana escala, ejecutados por varias organizaciones a nivel gubernamental, no gubernamental, académico y grupos comunales, pero debido a la dispersión de la información existe dificultad para enumerarlos, sin embargo se puede mencionar los siguientes:

- **Proyecto de Cosechas de aguas lluvias:** Basado en la experiencia del Estado de Brasil con el “Programa de Formación y Movilización Social para la Convivencia en Zonas Semi-Áridas (P1MC)” y siguiendo la metodología y tecnología del proyecto “Un Millón de Cisternas” de ASA-Brasil, se realizó este proyecto piloto, en el cual se conto con la supervisión técnica del Fondo Hondureño de Inversión Social (FHIS) y el apoyo financiero de la Cooperación Técnica Alemana.

Este proyecto respondió a la iniciativa del Plan de Acción de Lucha contra la Desertificación y Sequía (PAN-LCD), siendo evaluado y verificada la validez de su implementación, de esa manera, ser replicado a nivel nacional, primordialmente en los municipios clasificados como alta vulnerabilidad a la seguía y con ello, colaborar a disminuir la degradación de los recursos naturales y efectos de la sequía en el país.

- **Mapeo Hidrológico en la zona central de Honduras**: El objetivo principal del proyecto fue la elaboración de un mapa geológico, hidrogeológico en escala 1:100,000 de la Zona Central 3 cubriendo 2,500 km^2 y elaboración de mapas temáticos complementarios a los mismos. Este trabajo se realizó mediante transectas a través de las rutas principales, carreteras y caminos vecinales. Este trabajo fue logrado por medio del consultor en geología y el equipo técnico que realizaba mediciones de espesores, texturas, estructuras e identificación de las rocas y su posición cronoestratigráfica

- **Inventario Nacional de Humedales**: La realización se este implica un estudio sobre la relación hidrológica que puedan tener las lagunas costeras del Caribe de Honduras.

1.2.4 Colaboración con otras organizaciones o programas nacionales e internacionales

En este aspecto se destaca la participación de Honduras en las siguientes convenciones de las Naciones Unidas:

- Convención de las Naciones Unidas para la Lucha contra la desertificación y Sequía.
- Convención de las Naciones Unidas para el Cambio Climático.
- Convención Ramsar.

En el marco de dichas convención se han desarrollado una serie de programa a nivel regional para homologar los esfuerzos en miras de generar un impacto significativo a nivel político y operativo.

1.2.5 Otras iniciativas

1.3 Cursos académicos de adiestramiento

1.3.1 Contribución a cursos del PHI

1.3.2 Organización de cursos específicos

1.3.3 Participación en cursos del PHI

1.4 Cooperación con el Instituto UNESCO – IHE para la Educación Relativa al Agua, y otros centros internacionales /regionales relacionados con los recursos hídricos, bajo los auspicios de la UNESCO.

1.5 Publicaciones

Las publicaciones de mayor relevancia que se han generado en el país son:

- Informe del Estado del Ambiente, Honduras Geo 2006.
- Publicación del Balance Hídrico Nacional.
- Reflexiones sobre agua, Kenneth Rivera
- Adoptemos un río, Kenneth Rivera

Es importante destacar que a través de las diferentes instituciones que trabajan en la temática se han realizado una serie de estudios enfocados en diferentes temáticas, como contaminación, saneamiento, abastecimiento, hidrología, etc.

Estos estudios han sido elaborados para la ejecución de actividades relacionadas a las funciones de cada institución, sin embargo estos en su mayoría no han sido publicados oficialmente.

1.6 Participación en certámenes científicos internacionales

1.6.1 Certámenes realizados en el país.

1.6.2 Participación en certámenes en el extranjero

A nivel regional se han realizado una serie de foros y talleres que directores y tomadores de decisiones de los gobiernos, con el fin de orientar las acciones hacia una Gestión Integrada del Recurso Hídrico.

A continuación se enumeran algunas de las actividades a nivel regional:

- Conferencia de legisladores centroamericanos del Recurso Hídrico, en Tegucigalpa 2006.
- Foro de agua y saneamiento: ¿Son viables las metas del milenio?
- Formación de instructores en el manejo y preservación del agua.
- Reunión centroamericana de Planes de gestión Integrada del Recurso Hídrico.

1.7 Otras actividades a nivel regional

1.7.1 Relaciones/cooperación institucionales

1.7.2 Proyectos científicos y en marcha

2. Actividades futuras

2.1 Actividades planificadas hasta diciembre 2009

A nivel general no existe una planificación sistematizada de las actividades a realizarse como país en el marco del PHI, son obstante existen iniciativas de las redes e instituciones que trabajan en el manejo de los recursos hídricos, entre las que sobresalen:

- Realización de la Tercera Feria Nacional del Agua, cuyo objetivo es la educación y concienciación ambiental, con la participación de las escuelas y colegios e incorporando el componente de reforestación, este año se realizará bajo el tema La Lucha contra la Desertificación y Sequía.

- Iniciar con el proceso de implementación de la política hídrica, luego que esta sea aprobada oficialmente por la Presidencia de la República.

- Seguimiento a la discusión, aprobación y aplicación de la Ley General de Aguas.

- Ejecución de proyectos cuyos resultados contribuyan con un manejo adecuado, disponibilidad y calidad del recurso agua, basados en el enfoque de cuenca hidrográfica.

- Seguimiento a las estrategias definidas en las convenciones.

- Desarrollo de estudios de investigación, entre los que se destaca los planificados por el Consejo Hondureño de Ciencia y Tecnología (COHCIT), a través del financiamiento de la cooperación externa.

2.2 Actividades previstas para 2010 – 2011

2.3 Actividades vislumbradas a largo plazo

IHP National Committee of India

NATIONAL REPORT OF THE IHP NATIONAL COMMITTEE OF REPUBLIC OF INDIA FOR THE EIGHTEENTH SESSION OF INTER GOVERNMENTAL COUNCIL (April 2006- March 2008)

PREAMBLE

Water is vital for life and fundamental for environmental health and management. The importance of water varies with space and time. The hydrology of Indian sub-continent, comprising an area of 329 million hectares, varies from season to season and region to region due to unpredictable changes in climatic conditions. Variability of rainfall every year is a major constraint in different regions for utilizing all the available water in the rivers. The quantum of water available per capita in India is quite low as compared to many developed countries. Thus, increasing demand of water for domestic, agricultural, industrial and other purposes along with natural changes is a major point of concern for the hydrologists and water planners of the country.

Ministry of Water Resources (MoWR), Government of India is responsible for the development and regulation of country's water resources. Besides, every State also has a separate Ministry to develop and regulate the water resources. The central organizations under MoWR responsible for different activities are Central Water Commission (CWC), Central Ground Water Board (CGWB), National Institute of Hydrology (NIH), Central Soil and Material Research Station (CSMRS) and Central Water and Power research Station (CWPRS).

HP National Committee of India known as Indian National Committee on Hydrology (INCOH) is an apex body with its Secretariat at National Institute of Hydrology Roorkee with the responsibility of coordinating various activities concerning hydrology in the country. In order to carry out specific activities in various fields of hydrology and water resources, INCOH consists of a main body and three sub-committees. The INCOH has its members drawn from central and state government agencies as well as experts from academic and research organizations. The Ministry of Water Resources (MoWR) provides funds to INCOH to carry out the following activities as per the gazette notification:

- To give advice to central and state governments and their agencies on matters related to hydrology.
- To appoint special task force/expert panels to consider special problems to advise the Committee.

- To prepare and periodically update the state-of- art in the country in different branches of hydrology by collecting relevant information from national and international organizations and disseminating the same.
- To undertake studies on historical appreciation of development of hydrology and introduce perspective planning for research in the field.
- To disseminate information related to hydrology by way of publishing journals, research news/digests.
- To recommend recognition of centers of excellence in different branches of hydrology and recommend central funding thereof.
- To recommend funding for the infrastructure development of hydrological research institutions.
- To maintain effective co-ordination to avoid overlaps in the research programs of different institutions.
- To promote programs for human resources development leading to specialization of research staff and recommend encouragement for the outstanding research personnel.
- To identify areas in the field of hydrology which need immediate attention or in which new methods are to be introduced for bringing the level of research activities in the country to international standards.
- To prepare, co-ordinate and recommend funding of research programs to be taken up by the institutions in the country on basic and applied research, action research, and other areas related to research in hydrology.
- To encourage the national institutions to take research studies and development activities in the fields, which have been identified by the Committee, as thrust/priority areas; where necessary, the Committee may itself nominate the institution for undertaking research/development in a specified subject.
- To encourage voluntary professional bodies, non-commercial Non- Governmental Organizations (NGOs) to take up R & D activities.
- Dissemination of knowledge, participation in mass awareness program, etc. in hydrology.
- To maintain effective cooperation with other National Committees/Boards, related GOI/state ministries, CSIR laboratories, IIT's, Engineering colleges and Polytechnics, universities and other academic institutions.
- To encourage indigenous industry to take up technological developments in hydrology through loans.
- To monitor the progress made by executing institutions on research schemes in the field of hydrology.
- To promote and coordinate effective participation of India in the international programs related to hydrology and to act as national committee for such international bodies, where required.
- To promote education, training and manpower development programs in the field of hydrology.

- To arrange and conduct seminars/conferences/workshops, to support mass awareness programs, and to arrange R & D review sessions on hydrology.

PRIORITY AREAS OF RESEARCH

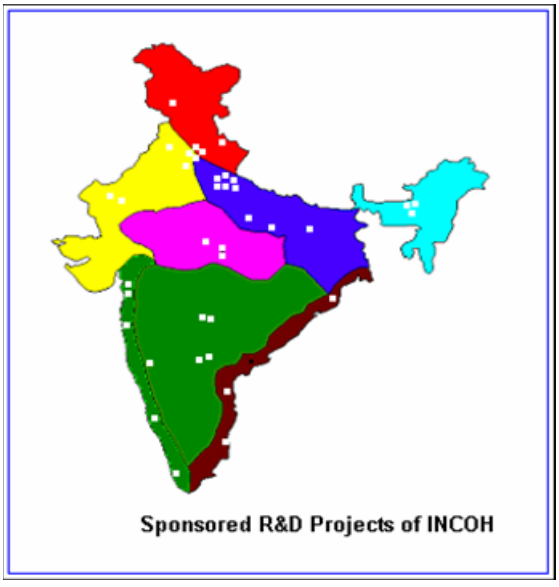
The areas where need for research is felt are quite large in number. Therefore, the areas requiring immediate attention are identified and prioritized by the Ministry of Water Resources, Government of India and are as follows:

1. Study of climate change with regard to its impact on water resources.
2. Inflow forecasting.
3. A holistic assessment of availability of water, its time distribution and long term changes in its characteristic.
4. Assessment of groundwater and its inter-linkage with surface water.
5. Groundwater recharge by ponds, recharge wells and through unlined Kharif irrigation channels.
6. Assessment of the potential of traditional systems of water harvesting and storages.
7. Rainwater harvesting and watershed development.
8. Assessment of return flows.

ACTIVITIES OF INCOH

R&D Programs – Funding by Ministry of Water Resources (MoWR)

Every year, Ministry of Water Resources, Government of India spends about 3-4 Crore INR (75000-1 Million USD) for funding R&D programs under the aegis of INCOH. In the past INCOH has supported sixty five research projects under "Research Schemes Applied to River Valley Projects", which have been received from different parts of the country (**Appendix 1**). Out of these research projects, thirty-five research projects have been completed successfully. To review the progress of on-going projects and to have scientific interaction to reduce the gap between research and its application, R&D session of INCOH are organized every year at different place of the country. Two R&D sessions of INCOH were organized during 2006-2008 to critically review the progress of all thirty on-going research projects. Experts in related field were invited to evaluate these projects. Dr. Bhanu Neupane, Regional Programmer Specialist (Water Science), UNESCO, New Delhi Office was also invited as one of the experts for evaluations of these research projects.



Sponsored R&D Projects of INCOH

Financial Support to Seminars/Symposia/training Courses

As a part of its objectives, INCOH provides financial support / sponsorship to various organizations in the country for organizing national and international events in hydrology and water resources. Till date, INCOH has provided financial support to more that 400 activities and about 8,500,000 INR (100,000 USD) has been spent for funding by the INCOH. The list of agencies to which financial support provided during 2006-2008 are given in **Appendix 2**.

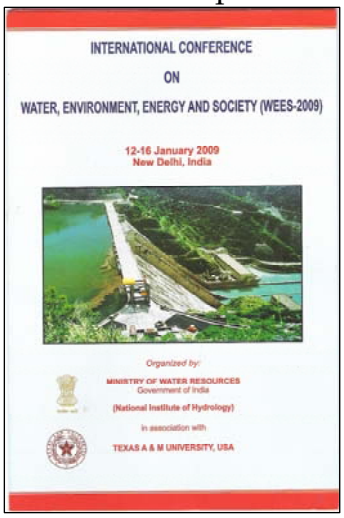
India's Participation in IHP Program of UNESCO

INCOH is effectively participating in the activities of International Hydrological Program (IHP) of the UNESCO by organizing funding R&D projects and sponsoring regional courses/seminar/symposia/workshops. The Committee is actively contributing to the VII phase (2008-2013) of IHP of UNESCO as per the approved program of Ministry of Water Resources, Government of India through its National Committee. The activities to be taken up by India under IHP-VII program of UNESCO, which is duly approved by the Ministry of Water Resources, Government of India, are given below.

Activities to be taken up by India under IHP-VII (2008-2013) Program of UNESCO

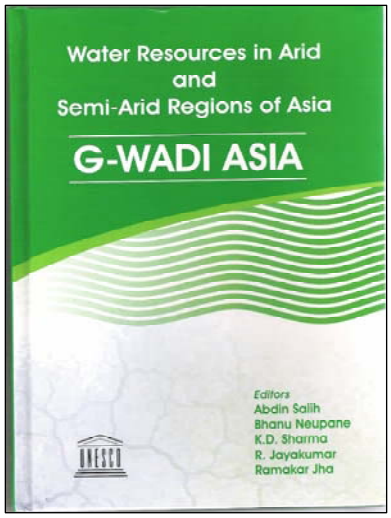
Theme	Primary Focal Areas	Activities to be taken up
Theme 1. Adapting to The Impacts of Global Changes on River Basins and Aquifer Systems.	1.1 Global changes and feedback mechanisms of hydrological processes in stressed systems.	Assessment of water resources under climate change.
	1.3 Hydro-hazards, hydrological extremes and water-related disasters.	Water resources management under drought situation.
	1.4: Managing groundwater systems' response to global changes.	Artificial recharge of water and groundwater assessment.
Theme 3: Eco-hydrology for Sustainability.	3.3 Risk based environmental management and accounting.	1. Real time flood forecasting. 2. Flood inundation zoning for different return periods.
Theme IV: Water and Life Support Systems.	4.1 Protecting water quality for sustainable livelihoods and poverty alleviation.	International conference on water, environment, energy and society (WEES-2009).

Under the auspices of INCOH, the International Conference on Water, Environment,



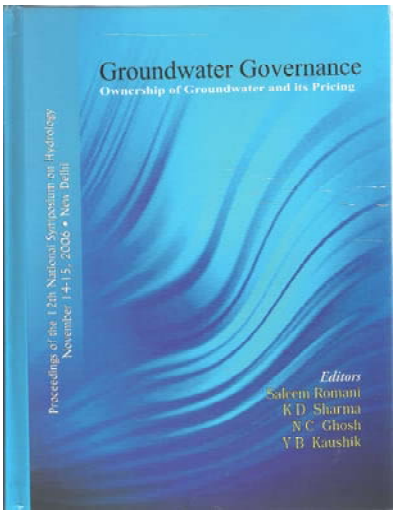
Energy and Society (WEES-2009) is scheduled to be held during 12-16 January 2009 at New Delhi. It is expected that more than 500 delegates, experts and participants would be attend the International Conferences.

In recent past, INCOH organized the first Global Water and Development Information (G-WADI) workshop at Roorkee, India, where world

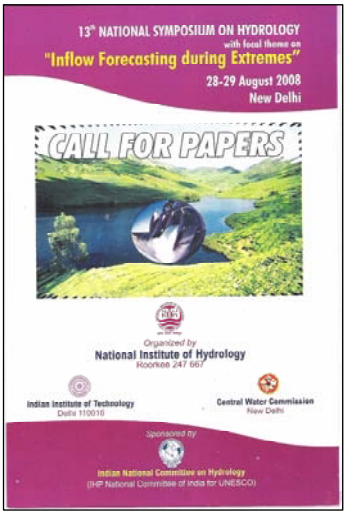


experts/leaders in arid-zone hydrology came to provide training on hydrological modeling methods and software, focused on the special needs and problems of arid and semi-arid areas. Participants came from Australia, Africa (North and South),South America, the Middle East, USA ,UK, India , Pakistan, China and Central Asian region. An edited book was published on "Water Resources in Arid and Semi-Arid Regions of Asia: GWADI-ASIA" during the year 2007 as the outcome of the G-WADI modeling workshop.

Organization of National Symposium on Hydrology

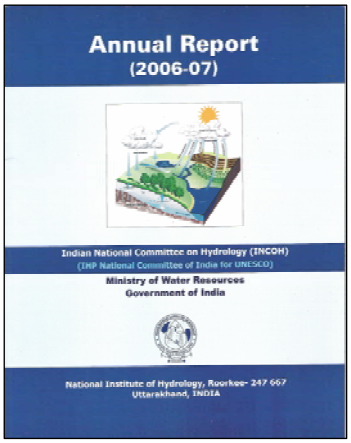


INCOH organizes national seminar/symposium at every alternate year to bring together hydrologists and water resources engineers from various parts of India. During the 32nd and 33rd INCOH meetings, it was decided to organize National Symposium on Hydrology of INCOH in the year 2008. The 12th National Symposium on Hydrology was organized on the Theme "Groundwater Governance: Ownership of Groundwater and its Pricing" during 12-14 November 2006 at New Delhi. It is proposed to organize the 13th National Symposium on Hydrology of INCOH on the Theme "Inflow Forecasting during Extremes" during 28-29 August 2008 at New Delhi.



INCOH PUBLICATIONS

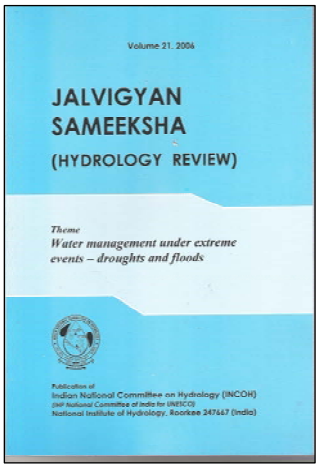
(a) Annual Report

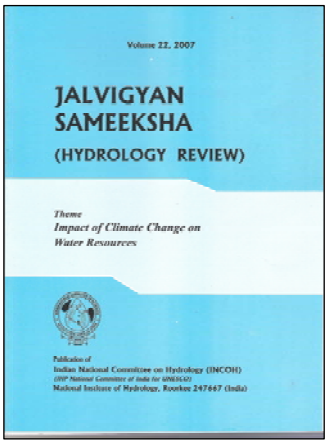


Every year Annual Reports are being published by INCOH, in which the following information are included: List of INCOH members and its sub-committee members, about important meetings held during the year, R&D sessions and Brain storming sessions organized, India's participation in IHP activities, support to R&D projects provided, support to seminar/symposia/training-courses/workshops, decisions made in the meetings, future plans, special publications brought out and budget components.

(b) Publications of Hydrology Review Journal- Jal Vigyan Sameeksha

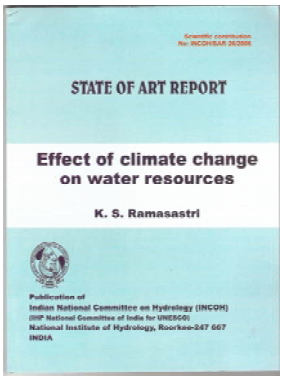
To disseminate information and promote hydrological research in the country, INCOH publishes a Journal entitled Hydrological Review Journal- "Jal Vigyan Sameeksha (JVS)". The papers published in the Journal are by invitation only. The Journal is widely circulated amongst major international/national organizations and agencies dealing in water resources. Thirty volumes of JVS have been brought out so far on different focal themes (**Appendix 3)**. <u>These publications are available free of cost on request basis.</u> During the year 2006-08, two Issues of the journal on the topics "Water management under extreme events- drought and floods" and "Impact of climate change in water resources" were published.

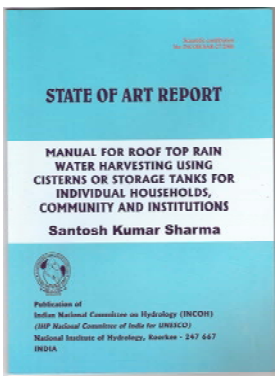


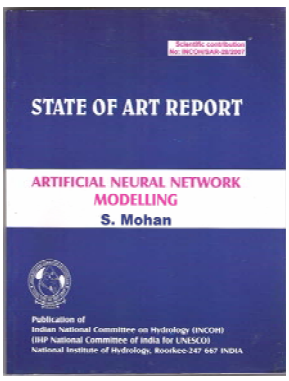


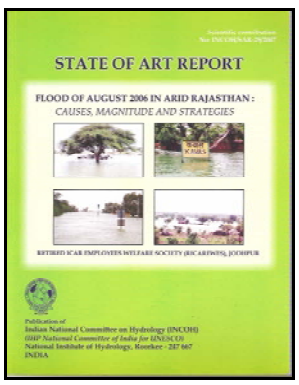
(c) State-of-Art Reports

In pursuance of its objectives to periodically update the research trends in different branches of hydrology, State-of-Art reports, authored by experts identified by INCOH from various institutes and organizations in India, are published regularly. INCOH has brought out twenty nine state-of-art reports so far (**Appendix 4)**. <u>These publications are available free of cost on request basis.</u> During 2006-08, four Issues of the State-of-art report on the topics "Effect of climate change on water resources", "Manual for Roof top rain water harvesting using Cisterns or Storage Tanks for individual households, community and institutions", "Artificial neural network modeling" and "Flood of August 2006 in Arid Rajasthan: Causes, Magnitude and Strategies" were published.









IMPORTANT MEETINGS AND EVENTS HELD DURING 2006-2008

A number of meetings of INCOH Committee members, sub-committee members, Steering Committee members and Research Committee (Surface water and ground water) members were held during the period 2006-08 for the following purposes:

1. To review on-going research projects funded by INCOH.
2. To evaluate new research schemes for funding by INCOH.
3. To invite research proposals in the priority areas of Ministry of Water Resources, Government of India and IHP related activities.
4. To support "short-term" and "long-term" program in the area of priority such as "Impact of Climate Change in Water Resources", etc.
5. To organize International Conference and National Symposium on Hydrology.
6. To decide Themes for INCOH publications such as Hydrology Review Journal and State-of-Art Reports.
7. To provide financial support to different agencies for organizing seminar / symposia/ short-term courses, etc.
8. To enhance IHP related activities in India under the aegis of INCOH.
9. To assist/advise different agencies on technical activities in the area of hydrology.

Various events such as Brain Storming Session to decide IHP VII (2008-2013) programs of India, R&D Sessions to critically review on-going research projects, G-WADI meetings, UNESCO Conference, etc. were organized during the period 2006-08.

APPENDIX-1

LIST OF COMPLETED PROJECTS

S. No	Project name	P.I. name & address	Sanctioned period
1.	Waste Water Renovation for Unrestricted Irrigation and Ground Water Recharge Using Soil Aquifer Treatment (SAT) Technique in the Sabarmati River Bed at Ahmedabad	Sri P. Neema, NEERI, Ahmedabad	5 Years 1992-1997
2.	Compilation of Abstract of Hydrological Research in during last 25 years	Dr. N. V. Pundarikanthan, Anna University, Chennai	2 Years 1993-1995
3.	Short term flow prediction for sustainability of tanks in Tropics influenced by Shadow Rains	Dr. N. V. Pundarikanthan, Anna University, Chennai	3 Years 1993-1996
4.	Dam Break Analysis for Vaigai Dam	Sri R. Srinivasan, IHH, Poondi	4 Years 1993-1997
5.	Estimation of Snow and Glacier Melt Contribution in Ganga and Chenab Basins	Dr. Pratap Singh, NIH, Roorkee	1 Year 1993-1994
6.	Study of Supply and Demand Pattern in the Irrigation, Industry and Drinking Water Sectors	Dr. N. V. Pundarikanthan, Anna University, Chennai	3 Years 1994-1997
7.	Quantification and Alleviation of Crop losses due to flood and Impact of Floods on Ground Water Recharge	Dr.H.S.Uppal PAU, Ludhiana	3 Years 1995-1998
8.	Study of Himalayan Glacier Characteristics, Com.	Dr. M.S. Dhanju	3 Years 1995-1998
9.	Studies of excess water stress crop yield relationship for drainage index	Dr. S.K. Gupta, CSSRI, Karnal	5 Years 1995-2000
10.	Integration of Digital Terrain Model and Remote Sensing Data in GIS for the develop-ment of a Runoff Model	Dr. P.K. Garg, Civil Engg. Deptt., IIT, Roorkee	3 Years 1995-1998
11.	Studies of Water Resources	Prof. B.N.Ghosh,	3 Years

S. No	Project name	P.I. name & address	Sanctioned period
	Utilisation & Flood Damage Assessment of Mahanada basin by Remote Sensing	6, Chalta Bagan Lane, Kolkata	1995-1998
12.	Hydrological & Ecological Studies on the Oustery Lake ecosystem. (Pondicherry Univ., Pondicherry)	Prof. S. A. Abbasi, Sr. Prof. Center & Energy Tech., Pondicherry Univ., Kalapet, Pondicherry	3 Years 1995-1998
13.	Integrated Hydrological Studies in Kondaveeti Vagu Watershed. (Nagarjuna Univ., Nagarjuna)	Dr. P. Sankara Pitchaiah, Dept. of Geology, Acharya Nagarjuna Univ., Nagarjuna Nagar	3 Years 1995-1998
14.	Developing Guidelines for EIA of a completed water resources project in Tamil Nadu.	Prof. S. A. Abbasi, Sr. Prof. & CPCET, Pondichery University	3 Years 1995-1998
15.	Study of soil and water degradation using GIS	Dr. N. V. Pundarikanthan, Anna University, Chennai	3 Years 1996-1999
16.	Teaching Programme and Hydrology Component in Under-graduate Course in Engineering Colleges	Dr. T. Prasad Centre for Water Res. Studies, Patna, Bihar	4 Years 1996-2000
17.	Design & Development of Instruments for Measuring Snow/Glaciers parameters for assessing and forecasting Snow Bound Runoff Water	Dr. M.A. Shamshi, CSIO, Chandigarh	4 Years 1996-2000
18.	Modelling for optimal reservoir operation for multi crop irrigation	S. Vedula IISc, Bangalore	3 Years 1997-2000
19.	Development of dynamic Flood frequency model	Dr. N.K. Goel, IIT Roorkee Roorkee, Uttrakhand	3 Years 1997-2000
20.	Investigation of drought through remote sensing and land based information system	Dr. T. K. Gosh (Late) IIT, Mumbai	4 Years 1997-2001
21.	System Simulation and	Sri K.D. Numbudripad,	3 Years

S. No	Project name	P.I. name & address	Sanctioned period
	Reservoir Operation for Kuttiyadi Schemes in Kerala	CWRDM, Kozhikode	1997-2000
22.	Hydroeconomic Interaction between Tank & Well Water and possibilities for conversion of Tank into Percolation Tank	Prof. K. Palmiswami Water Technical Centre, Tamil Nadu Agricultural Univ., (TN)	2 years 1998- 2000
23.	Ground Water Management Studies in Upper Gondwanas West Godavari District A.P.	Prof. G. Krishna Rao, Deptt. of Geology, Andhra Univ., Vishakha-patnam, A.P.	2 Years 1998-2000
24.	The Effect of Water Logging and Intensive Agriculture on Ground Water Regime in Deltaic Region.	Prof. M. Gangadhar Rao, Dept. of Geophysics Andhra Univ., Vishakhapatnam	3 Years 1998-2001
25.	Feld Performance of Tube Well in U.P. & suggestions for construction of tube well as per site conditions	Sh. K.K. Agrawwal Ex.Engineer U.P., IRI, Roorkee	3 Years 1999-2002
26.	Impact of Urbanisation on Ground Water - A study from Jaipur city and its Hinterland.	Prof. A. K. Sinha Dept. of Geology Univ. of Rajasthan, Jaipur	2 Years 1999 – 2001
27.	Study of Effect on Agriculture, Livestock Population , Food Chain, etc. due to Arsenical Water	Sh J. N. Chakraborty State Water Investigation Deptt., Kolkata	2 years 1999-2001
28.	Prediction of sediment yield and its deposition in Reservoirs	Dr. P.K. Swamee, Dept. of Civil Engg. ,IIT Roorkee	1 Year 2000-2001
29.	Environmental studies of surface and ground water downstream of Pennar river	Dr. M. Anji Reddy JNTU, Hyderabad	2 Years 2000-2002
30.	Water quality assessment and characteristation in Pondicherry Region	Dr.R.Ramesh IOM, Anna Univ., Chennai, Tamil Nadu	2 Years 2000-2002
31.	Ground Water Studies Using Satelite data. Helium and	Dr. S. K. Gupta Sc.'SG', PRL,	2 years 2001-2003

S. No	Project name	P.I. name & address	Sanctioned period
	Geophysical techniques-A pilot study project	Ahmedabad	
32.	Feasibility of artificial recharge study through mathematical modeling in Kongal river basin, a hard rock region in Nalgonda Dist., A.P.	Dr. V. S. Singh NGRI, Uppal Road Post Bag No.724 Hyderabad	2 years 2003-2005
33.	Ascertaining arsenic mobilization in soil water-plant system and exploring the possible remedial measures, West Bengal	Dr. S. K. Sanyal Dept. of Agriculture Chemistry & Soil Science, Faculty of Agriculture BCKV, Mohanpur , WB	2 years 2003-2005
34.	Study of hydrological Behaviour of Micro watershed and development of integrated watershed management Model	Dr. A.P Mukherjee, Indira Gandhi Agriculture University Raipur, Chattisgarh	3 Years
35.	Study of Trace Metal in Surface & Sub-surface water in and around Tirupati	Prof. K.L. Narasimha Rao Sri Venkateswara University, Tirupati, A P	2 Years

LIST OF ONGOING RESEARCH PROJECTS

S. No.	Project name	P.I. Name & Address	Sanctioned Period
1.	Behaviour of monsoon rainfall in Rajasthan	Director DSO & Hydrology, IID&R Irrigation Unit, J L N Marg, Jaipur	3 Years
2.	Reservoir performance analysis using stochastic stream flow models	Dr.K.Srinivasan, IIT Madras, Chennai, Tamil Nadu	3 Years
3.	Impact of Urban, Industrial & Agricultural Pollution in Surface and Ground Water in and around Hyderabad & Secunderabad - A.P.	Prof. M. N. Reddy, Osmania University, Hyderabad , A P	3 Years
4.	Hydrofluorosis in Halia River, Environs; Nalgonda district, A.P. - A case study of Intensity and Source.	Dr. M. Muralidhar Osmania University, Hyderabad, A P	3 Years
5.	Study of fluvial geomorphology and tectonics of Khari-Mashi drainage basin, Rajasthan for data preparation and groundwater recharge capability assessment	Dr. S. Sinha Roy, Birla Inst. of Scientific Research, Jaipur, Rajasthan	3 Years
6.	Geohydrological studies for augmentation of spring discharge in Western Himalaya	Dr.G.C.S.Negi GBPIHED, Almora, Uttrakhand	3 Years
7.	Groundwater behaviour in connate water areas and hard rocks terrains of Orissa with respect to different schedules of pumping and varied draw down conditions	Er. J. Patnaik, C.Er. & Dir., DGWS&I, Bhubaneswar, Orissa	3 Years
8.	To assess the Impact of presence of septic tanks on ground water and spread of water borne diseases, and to	Dr. Gauhar Mahmood Jamia Millia Islamia, New Delhi	2 Years

S. No.	Project name	P.I. Name & Address	Sanctioned Period
	identify means to solve the problems created by the waste water in Balrampur dist. in U.P.		
9.	To assess the Impact of presence of Water Harvesting and Water Conservation in Imphal, Manipur	Dr. L. Dinachandra Singh, MSTC, Imphal, Manipur	2 Years
10.	Studies on salt water intrusion in coastal D.K. District, Karnataka	Dr. A. Mahesha, NIT, Suratkal, Karnataka	3 Years
11.	R&D cum action and awareness project on rainwater harvesting, groundwater recharge and waste water reuse	Dr.S.A.Abbassi Pondicherry Univ., Pondicherry	3 Years
12.	Ground Water Research Studies in Thar Terrain of Rajasthan through surplus water	Addl. CE, SWRPD, Jaipur, Rajasthan	18 Months
13.	Development of defluoridation Media for contaminated ground water and its Lab to Field Application	Dr. Uday Chand Ghosh, Presidency College, Kolkata , W B	2 Years
14.	Ground water flow modeling and aquifer vulnerability assessment studies in Yamuna-Krishni sub-basin, Muzaffarnagar District	Dr. Rashid Umar AMU, Aligarh, U P	3 Years
15.	Study on Ground Water Contamination through Municipal Land Fills in the NCT of Delhi	Dr. A. L. Ramanathan JNU, New Delhi	3 Years
16.	Identification of sites for artificial ground water recharge in upper ganga plain, using remote sensing – GIS	Dr. R. P. Gupta IIT, Roorkee Roorkee, Uttrakhand	3 Years
17.	Institutional Framework for Regulating use of ground	Prof. Kamta Prasad IRMED	2 Years

S. No.	Project name	P.I. Name & Address	Sanctioned Period
	water in India	Karkardooma, Delhi	
18.	Artificial Neural networks for Water resources planning: An innovative approach	Dr. K. Srinivasa Raju, Birla Institute of Technology & Science, Pilani	2 Years
19.	Fuzzy – Stochastic Modeling for Stream Water Quality Management	Prof.P.P. Mujumdar I.I.Sc. Bangalore Karnataka	2 Years
20.	Hydrological investigation of lake Picholla Udaipur (Rajasthan) for its rejuvenation	Dr. C.S.P. Ojha IIT Roorkee, Roorkee	2 Years
21.	Development of drought vulnerable indices of preparedness and mitigation	Dr. R Nagarajan IIT, Mumbai & Sri R.P. Pandey NIH, Roorkee	2 Years
22.	Integration of Fuzy Logic and GIS for Delineating Groundwater Source Areas in Bazada land of Solani River Basin	Shri O.P Dubey IRI, Roorkee	2 Years
23.	Flood Estimation in Mixed/Urban/Rural catchments of South India	Dr. S. Raju Anna University, Chennai	3 Years
24.	Assessment of water resources under climate change	Prof. P.P.Majumdar, IISc, Banglore	3 Years
25.	Study on hydrology of small watersheds of highland Kerala	Smt. Celine George, CWRDM, Kerala	3 Years
26.	Development of a runoff and Sediment Yield Estimating SDSS for Ungauged Watersheds	Dr. (Mrs.) Ravinder Kaur, Senior Scientist, Division of Environmental Sciences, IARI New Delhi-110012	3 Years

S. No.	Project name	P.I. Name & Address	Sanctioned Period
27.	Development of Models for the Cleanup Cr (VI) Contaminated Aquifers Using Bio-Remediation.	Dr. Ligy Philip Associate Professor Department of Civil Engg. IIT Madras, Chennai-600 036	3 Years
28.	Identification of Vulnerable Areas in Himalayan Watersheds.	Dr. Surendra Kumar Mishra, Assistant Professor, Department of Management, IIT Roorkee -247667	3 years
29.	To Develop a Sedimentation Rate Estimation Model for Reservoirs in Kandi area of Punjab.	Er. Jagdish Singh, Chief Enginer, Irrigation & Power Reserarch Institute (IPRI), Panjab, Amritsar-143001	4 Years
30.	Identification & Mapping of Palaeo-channels in the eastern fringe of the Thar desert for water resources augmentation plan	Dr. M. P. Punia B.M.Birla Science & Technology Centre 27, Jaipur	1 year

APPENDIX-2

INTERNATIONAL, NATIONAL AND STATE LEVEL ACTIVITIES SPONSORED BY INCOH DURING THE YEARS 2006-2008

S. No	Name of Activity and organization	Date & Venue	Organizer
1.	International Conference on "Hydrology & Watershed Manegment" with a Focal Theme on Improving Water Productivity in the Agriculture ICHWAM – 2006	5th -8th Dec 2006 Venue UGC Academic Staff College J. N. T. U. Campus, Kukatpally, Hyderabad- 500072 (A.P.)	Dr. B. Venkateswara Rao, Convener ICHWAM-2006 & Head CWR, I.S.T, J.N.T.U., Kukatpally, Hyderabad- 500072 (A.P.)
2.	Workshop on "Harvest Rainwater & Recycle Water for Future "	16th -17th Jun 2006 Venue- Hotel Pride, Pune	Mr. Janaki Raman Vision India Events & Conf. Pvt. Ltd, No.-5 Amol Enclave, Bhau Patil Road, Kotkar Lane Pune-411020
3.	Conference on "Water Management "on the occasion of Water Resources Day 2006,	31st May 2006 Venue The Institute of Engineers(India) Assam State Center,Panbazar, Guwahati-781001	Sri. G. N. Khound, FIE Honorary Secretary Inst. of Engg. Assam state center, Panbazar, Overbridge, East Lant, Guwahati,-781001
4.	National Symposium on "Water Resources Management For Sustainable Development (WRMSD-2006)"	26th -28th July 2006 Venue – Hotel- The New Marrion, Bhubaneswar	Prof. Dr. P. K. Jena. Chairman, Institute of Advance Technology & Environmental Studies (IATES), Lewis Road, Bhubaneswar-751002
5.	Conference on "Natural Resources Management for Sustainable Development in Western India "	11th -13th Oct 2006 Venue- , Yeshwantrao Chavan Academy of Development Administation, Raj Bhavan Complex, Baner Road, Pune	Dr. V. N. Sharada Director., Central Soil and Water Conservation Research and Training Institute (CSWCRTI),218, Kaulagarh Road, Dehradun-248195, Uttrakhand

S. No	Name of Activity and organization	Date & Venue	Organizer
6.	XXV AHI National Seminar on Hydrology With Special Colloquium on "Impact of Heavy rain on Rural, Urban and Industrial Establishment and Civil Facilities"	24th -25th Aug 2006 Venue- Dept. of Applied Geology University of Madras, Chennai	Prof. C. Subba Rao Joint Secretary-AHI Dept. of Geophysics Andhra Uni. Visakhapatnam-530003
7.	National Seminar on "Bringing in Green Revolution –Dryland Development Through Organic Farming & Water Conservation "	10th Sep 2006 Venue- P. R. Government (Aut.) College, Kakinada, East Godawari Distt. (A. P.)	Dr. T. Rajyalakshmi, President (SPICAM), Kakinada-533003 (A. P.)
8.	Third International Groundwater Conference (IGC-2007) on "Water, Environment and Agriculture – Present Problems and Future Challenges"	7 - 10th Feb. 2007 Venue: TNAU, Coimbatore	Dr. K. Palanisami Organising Secretary Director CARDS, Tamil Nadu Agricultural University Coimbatore – 641 003
9.	Seminar on "Flood of August 2006 in Arid Rajasthan: Causes, Magnitude and Strategies"	15th December 2006 Venue: Central Arid Zone Research Institute, Jodhpur	Dr. D. C. Joshi Member Secretary Organising Committee 7-A-66, "SRIJAN" Nandan Van Chopasni Road, Jodhpur – 342 008
10.	A National Conference on "Water and Waste Management"	23-24 April 2007 Venue: JNTU, Kakinada	Dept. of Civil Engg., JNTU, Kakinada – 533 003
11.	"22nd Water Resources Day 2007"	30th May 2007 Venue- Hotel Pride, Pune	Institution of Engineers (India), Assam State Centre, Panbazar, Guwahati
12.	Seminar "Revisiting Indira Gandhi Canal Project"	15-16th December 2007 Venue	Retired ICAR Employees Welfare Society (RICAREWES), Jodhpur

S. No	Name of Activity and organization	Date & Venue	Organizer
13.	"Environmental and Livelihood Security through Resource Management in Northern India (ELSTRM-2007)"	29-31st October 2007 Venue – Chandigarh	Indian Association of Soil and Water Conservationists (IASWC), 218, Kaulagarh Road, Dehradun
14.	XXVI AHI National Seminar on "Hydrology" with a special colloquium on 'Rainfall Versus Water Resources in North-East India'	26-28th October Venue- North-Eastern Hill University, Shillong	Association of Hydrologists of India, Dept. of Geophysics, Andhra University, Visakhapatnam – 530 003
15.	"Water Resource management for Alleviating Poverty in Eastern U.P.",	24th December 2007 Venue- Institute of Agril. Sciences, BHU, Varanasi	Department of Farm Engg., Instt. Of Agril. Sciences, Banaras Hindu University, BHU, Varanasi – 5
16.	International Ground Water Conference on "Ground Water Dynamics and Global Change"	19th-22nd March 2008 Venue-	Dept. of Geology, University of Rajasthan, Jaipur
17.	"Water and Mineral Resource Information and Environmental Impacts analysis Using High Resolution Satellite Imageries in the 21st Century"	27th-28th March 2008 Venue: Faculty of Language (A/C Auditorium)	Department of Industries and Earth Sciences, Tamil University, Thanjavur
18.	National Symposium on Environment & Water NSEW-2008)	18th April 2008 Venue: Jadavpur University, Kolkata	Indian Association of Hydrologists, West Bengal Regional Centre, 9B /Deshpriya Park West, Kolkata – 700 026

APPENDIX-3

Hydrology Review Journal- Jal Vigyan Sameeksha (JVS) Publications

S. No.	Volume	Year	Area
1.	VOLUME I NO.1	1986	Drought
2.	VOLUME I NO.2	1986	Hydrological Forecasting
3.	VOLUME II NO.1	1987	Ground Water Management
4.	VOLUME II NO.2	1987	Hydrological Network Design
5.	VOLUME III NO.1	1988	Water Quality
6.	VOLUME III NO.2	1988	Drainage
7.	VOLUME IV NO.1	1989	Remote Sensing
8.	VOLUME IV NO.2	1989	PC Applications in Hydrology
9.	VOLUME V NO.1&2	1990	Soil Moisture
10.	VOLUME VI NO.1&2	1991	Soil Erosion & Sedimentation
11.	VOLUME VII NO.1	1992	Flood Hydrology
12.	VOLUME VII NO.2	1992	Water Conservation
13.	VOLUME VIII NO.1	1993	Reservoir Operation
14.	VOLUME VIII NO.2	1993	Education and Training
15.	VOLUME IX NO.1&2	1994	Conjunctive use of surface and ground water
16.	VOLUME X NO.1&2	1995	Watershed Management
17.	VOLUME XI NO.1	1996	National Activities
18.	VOLUME XI NO.2	1996	National Activities
19.	VOLUME XII NO.1	1997	Data Storage and Retrieval System
20.	VOLUME XII NO.2	1997	Hydrological Aspects of Agricultural Areas
21.	VOLUME XIII NO.1 & 2	1998	Advances in Remote Sensing and GIS
22.	VOLUME XIV NO.1 & 2	1999	Water related Disasters
23.	VOLUME XV NO.1 & 2	2000	Urban Hydrology
24.	VOLUME XVI NO.1 & 2	2001	Emerging Techniques in Water Resources
25.	VOLUME XVII NO.1 & 2	2002	Water and Environment
26.	VOLUME XVIII NO.1 &2	2003	Snow Hydrology
27.	VOLUME XIX NO.1 & 2	2004	Hydrological Aspects of Large Scale Water Transfer
28.	VOLUME XX	2005	Fresh and Sea Water Interaction in Coastal Regions
29.	VOLUME XXI	2006	Water management under extreme events-Droughts and Floods
30.	VOLUME XXI	2007	Impact of climate change in water resources

APPENDIX-4

STATE-OF-ART REPORTS PUBLICATIONS

S.No.	Title of Report	Prepared By	Status/Year
1.	Long Term Baseflow Studies	Sh.T.S.Raju, Dr.G.C.Mishra and Dr.A.G.Chachadi	1995
2.	How To Conduct River Surveys	Dr.V.P.Thergaonkar&Sh. A.M.Deshkar	1995
3.	Current Status and Prospects of Rain Water Harvesting	Dr. H.N.Verma and Dr. K.N.Tiwari	1995
4.	Surface Drainage Aspects of Agricultural Areas	Sh.G.P.Malhotra	1995
5.	Research in Soil and Water Conservation in India with Special Emphasis on Watershed Management	Dr. V.V. Dhruva Narayana	1995
6.	Reservoir Sedimentation	Prof. R.J.Garde	1995
7.	Natural Ground Water Recharge Estimation Methodologies in India	Sh. B.P.C.Sinha and Sh. S.K. Sharma	1995
8.	Water Supply for Industrial and Domestic Use	Sh.Paritosh C.Tyagi	1995
9.	Real Time Reservoir Operation	Dr. D.K. Srivastava	1995
10.	Wastewater Treatment with Aquatic Plants	Prof. S. A. Abbasi	1995
11.	Prevention and Control of Soil Erosion	Sh. V.N. Sharda	1996
12.	Ground Water Pollution Studies in India	Sh. B.P.C. Sinha, Santosh Kumar Sharma,O.P. Pal	1996
13.	Infiltration and its Simulation	Sh. V.N. Sharda & Sh. Sita Ram Singh	1997
14.	Surface Water Quality Modelling	Dr. Vijay Joshi	1997
15.	Integrated Planning of River Basin System and Management	Prof. Hari Krishna	1997
16.	Impact of Siltation on the useful life of large reservoirs	Dr. R.S. Varshney	1997

17.	Existing Methods of collection of Sediment Data in Indian Streams/Rivers.	Sh. M.L. Baweja,Dr. Roop Narayan	1999
18.	Frontier Areas of Research in Hydrometeorology	Prof.A.R.Subramaniam	1999
19.	Water Quality in Irrigation Agriculture	Dr. N.V. Pundarikenthan, Dr. S. Ravi Chandra,Dr. N.K. Ambujam	1999
20.	Water Management Practices in Command Areas	Dr. B.M. Sahni	2000
21.	Finite Element Methods in Water Resources	Dr. B.V. Rao	2000
22.	Application of Expert System in Water Resources	Dr. H. Raman	2000
23.	Conjunctive Use of Surface and Ground Water	Shri R.S. Saksena	2000
24.	Regionalisation of Hydrological Parameters	Dr. Subash Chander & Dr. N.K. Goel	2002
25.	Water Quality Indices	Dr.S.A. Abbasi	2002
26.	Climate Change and its Impacts	Dr. K. S. Ramasastri	2006
27.	Manual for Roof Top Rainwater Harvesting using Cisterns or Storage Tanks for Individual Households, Community and Institutions	Sri S. K. Sharma	2006
28.	ANN Modelling	Prof. S. Mohan	2007
29.	Flood of August 2006 in Arid Rajasthan : Causes, Magnitude and Strategies	A. S. Faroda D C Joshi	2007

NATIONAL REPORT ON IHP RELATED ACTIVITIES FROM INDONESIA FOR 18TH SESSION OF IHP INTERGOVERNMENTAL COUNCIL UNESCO

1. ACTIVITIES UNDERTAKEN IN THE PERIOD JULY 2006 – MAY 2008

1.1 Meetings of the IHP National Committee

The organizational structure of the Indonesian National Committee for IHP consist of a Chairman, a Vice Chairman, two Secretaries, and 14 members from vrious research institutes, universities and sectoral-departments. These institutes consist of the Indonesian Institute of Sciences (LIPI), University of Indonesia, Bogor Institute of Agriculture, Bureau of Meteorology, Departments of Public Works, Agriculture, and Forestry.

The Indonesian National Committee for IHP is on the threshold of restructuring its activities based on considerations: (i) retuning the program within the new path of IHP Programme phase VII; (ii) obtaining better participation from key stakeholders.

The present composition of the National Committee is:

Chairman : Hery Harjono
Vice Chairman : Arie Setiadi
Secretary I : Gadis Sri Haryani
Secretary II : Nenny Sintawardani
Members:

1. P.E. Hehanussa	LIPI
2. M. Rahman Djuwansyah	LIPI
3. Hadikusumah	LIPI
4. Sudaryati Cahyaningsih	LIPI
5. Bogie Soedjatmiko	LIPI
6. Indreswari Guritno	University of Indonesia (UI)
7. Hidayat Pawitan	Bogor Agriculture Institute (IPB)
8. Istiqlal Amien	Department of Agriculture
9. Sulad Sriharto	Department of Public Works
10. Agung Bagiawan	Department of Public Works
11.Willem Putuhena	Department of Public Works
12. I Wayan Susi Dharmawan	Department of Forestry
13. Hery Harjanto	Bureau of Meteorology and Geophysics
14. Jusman Sihombing	Department of National Education

The committee hold bimonthly coordination meetings and in additional several technical meetings as needed for the planning and implementation of seminars and workshops organized under coordination of the committee. The committee routine meetings is attended by the Chairman of the Indonesian Committee for UNESCO and by Program Specialist of the UNESCO Jakarta Office. Members of the national committee through regular meetings distribute informations gathered during the meeting as well as report to the meeting hydrological and related activities in their organizations.

The mailing address is as follows :

Dr. Gadis Sri Haryani
Indonesian National Committee for IHP
Research Centre for Limnology LIPI

Indonesian Institute of Sciences
Cibinong, 16911, INDONESIA
E-mail: gadissh@indo.net.id or limno@indo.net.id

And/cc to

Bureau of Science and Technology Cooperation and Promotion, the Indonesian Institute of Sciences (LIPI)
Jln. Gatot Subroto No. 10, Jakarta, 12710, INDONESIA
Telp.: 62-21-52257111/5207226,
e-mail: bkpi@lipi.go.id

1.1.1 Status of IHP-VI activities

Selected activities related to the IHP-VI programme are implemented by and in various departments, universities, and research institutions, members of the IHP National Committee. During the bi-monthly committee meeting, reports of activities from each group were delivered for the knowledge and use by other members and for relted IHP-VI activities.

A series of workshops on Preparation and Formulation of Indonesia's IWRM & WE (Integrated Water Resources Management and Water Efficiency) was held starting February 2005: This is a contribution for IHP VI Theme 2: *Integrated Watershed and Aquifer Dynamics*.

A contribution to IHP VI Theme 5: *Water Education and Training*: under the flag of the Indonesia Water Partnership, consisting of stakeholders related to water have took place in the annual World Water Day since year 2000. Its main objective is to conduct campaign through training, educating and dialogue, and seminar programs to augment public participation. Annual themes were changed according to the prevailing national needs. Three strategic target groups have been prioritized, namely school children and their teachers, decision makers cum academics, and farmers.

1.1.2 Decisions regarding contribution to/participation in IHP-VII

1.2 Activities at national level in the framework of the IHP

1.2.1 National/local scientific and technical meetings

The Asia Pacific Center for Ecohydrology (APCE) in Cibinong has held various activities since 2001 attended by regional participants in the region. The speed of physical developments in the country did put more attention to local single structures while less to its surroundings as well as to upstream and downstream related problems. This was the result of (an only) sector or departmental approach where coordination with other disciplines and sectors was forgotten. This mistake was lately recognized and better coordination through understanding of the very close relation between hydrological dynamics and ecological function has been understood. The formalization of APCE as a 2nd category UNESCO institute is being prepared under the LIPI organization.

The Research Institute of Water Resources organized national hydrological training program every year. The RIWR is planning to

strengthen it through national activities. In conjunction with WMO who endorsed and supported the Indonesian proposal it will conduct a Regional Hydrology Training Center for Asia Pacific. It will be held in Indonesia in conjunction with the national training program.

1.2.2 Participation in IHP Steering Committees/Working Groups

Annual meetings of the Regional Steering Committee for IHP in the Asia Pacific region are held in rotational base locations. Indonesia has always participated in these yearly meetings.

1.2.3 Research/applied projects supported or sponsored

- SARCS Carbon and Water Cycle Research Project: *Carbon, Nutrient and Water Fluxes of River Basins of the Java Island*, implemented by Bogor Agricultural University (IPB Bogor) and the Agency for the Assessment and Application of Technology (BPPT Jakarta) between May 2006 to October 2007.
- In order to meet the WMO Standard in hydrological measurement, it is proposed to develop calibration laboratory for hydrology equipment (current meter rainfall recorder, climatology, water level recorder) in Medan for west region, Jogja for central region and Makassar for east region of Indonesia.
- Erosion protection study is conducting at the Eretan waters, Indramayu in 2006 – 2007 by Research Center for Oceanography - LIPI. The objective of this study is to understand the dynamics change process of coastline area caused by the existence of the interaction among air, sea and land which causes the coastal erosion. The developing of numerical model will be done in 2007 based on Horikawa (1988) and groin design based on US Army Corps Enginering (1975) which is able to be used for the prediction of erosion protection of coastline changes.
- Operational Hidrometeorological observed:
    - Meteorological and Geophysical Agency (BMG) operated rain gauges for observing rainfall. Totally amount of rain gauges active are 2678 (Source : BMG, 2006). Another instruments also operated by BMG i.e Monotoring Automatic Weather Station (MAWS) at 29 location station. BMG and Jamstec (Japan Minister of Science and Technology) collaborated to monitor convective cloud activities at Jambi and Padang with Automatic Weather Station (AWS).
    - Development of Radar Station on 2006 at 4 location i.e. Makassar, Menado, Surabaya, Padang.
    - Development of Radar Station on 2007 at 3 location i.e Pontianak, Lampung, and Biak. Existing Radar Station till 2006 are 22 location.
    - Mapping to flood forecast potentials at 8 district in Central Java, East Java, and South Sumatera (activity on 2006).
    - Mapping to flood forecast potentials at 11 district (activity on 2007)

1.2.4 Collaboration with other national and international organizations and/or programmes

- JSPS-DGHE Joint Research Project FY 2007-2009 on *Watershed Management for Sustainable Water Resources Development in a Humid Tropical Regions*, implemented in Indonesia side by Bogor Agricultural University, Research Centre for Geotechnology- LIPI, and Research and Development Agency - Department of Agriculture, started April 2007 to March 2010.
- Establishment of National Guidelines of Quality Assurance for Hydrological Management that is done in collaboration among hydrology operator in Indonesia (c.q. Directorate General of Water Resources, Research Center of Water Resources, Agency for Meteorology and Geophysics, Department of Energy and Mineral Resources, Department of Agriculture, Department of Forestry, Indonesian Institute of Science, Agency for Research and Technology Dissemination, etc)

1.2.5 Other initiatives

- Participation in a Workshop on Water Management in Islamic Countries, 23 – 27 February 2007, in Tehran, Iran
- International Joint Workshop on Water and Climate, Department of Pubic Works, 23 – 24 May, 2007.
- National Workshop of Forestry and Climate Change in Indonesia, Department of Forestry, 27 – 28 August, 2007.
- International Workshop on Impacts of Reforestation of Degraded Land on Landscape Hydrology in the Asian Region, National Institute of Hydrology, Roorke 247 667 INDIA, 6-10 March, 2006
- National Seminar Series on Water Resources conditions to Support Improved Rice Prodution, in Cooperation between Indonesian Society of Hydrology with Department of Public Works, Department of Agricutures and the Agency of Meteorology and Geophysics, February 2007, August 2007 and November 2007.
- Department of Public Work is studying global climate change to adopt the effect on the public infrastructures
- Indonesia hosted world meeting on global climate change in December 2007.

1.3 Educational and training courses

1.3.1 Contribution to IHP courses

1.3.2 Organization of specific courses

- The Research Institute for Water Resources RIWR held Hydrological Training Course every year two times. This year is held in Bandung, from July 29 – 3 August 2007 with the Topic of Hydrological Operational and in November 2007 with the Topic of Applied Hydrology.
- Directorate of Water Resources Management, Directorate General of Water Resources has conducted meeting in order to establish concept of National Guidelines of Quality Assurance for Hydrological Management in 3 phases on November 2007.
- Directorate of Water Resources Management, Directorate General of Water Resources in cooperation with Research Center of Water

Resources has conducted hydrology training for central hydrology operation staff on 4 – 6 December 2006.

1.3.3 Participation in IHP courses

1.4 Cooperation with the UNESCO-IHE Institute for Water Education and/or international/regional water centres under the auspices of UNESCO

1.5 Publications

1.6 Participation in international scientific meetings

1.6.1 Meetings hosted by the country

- Department of Public Work organized an event on International Joint Workshop on Water and Climate on 23 – 24 May 2007 that is held in Jakarta

- Government of Indonesia hosted the UNFCC, United Nation Forum on Climate Change in Bali, December 2007

1.6.2 Participation in meetings abroad

- Prof. Jan Sopaheluwakan, and Dr. Gadis Sri Haryani represented Indonesia in the RSC Meeting 16 – 20 October 2006, in Bangkok, Thailand
- Mr. Eddy A. Djadjadiredja, Agung B. Ibrahim, Rahmat S.L, Samuel Johnson participated UNESCO IHP 14th RSC Meeting for Southeast Asia & The Pacific, Bangkok, Thailand, 15 – 20 October 2006 in conjunction with the 3rd Asia Pacific Association of Hydrology and Water Resources Conference.
- Prof.Peter Hehanussa attend a workshop on Water Management in Islamic Countries, 23 – 26 February 2007, in Tehran, Iran.
- Prof.Hehanussa attended the meeting of Directors of UNESCO's Water Related Centers, in IHE Delft The Netherlands, 11 – 16 June 2007
- Prof.Hehanussa attended a meeting of the Directors of UNESCO's Water Related Center, 22 – 26 September 2007, Bangkok Thailand.
- Dr. Hery Harjono, Mr. Eddy A. Djadjadiredja, Agung B. Ibrahim, Rahmat S.L, Prof. Hidayat Pawitan participated UNESCO IHP 15th RSC Meeting for Southeast Asia & The Pacific (SEAP), Manila, Philippines, 19 – 23 November 2007 in conjunction with a "International Conference on Hydrology and Water Resources Management for Hazard Reduction and Sustainable Development (HRSD 2007)".

1.7 Other activities at regional level

1.7.1 Institutional relations/cooperation

1.7.2 Completed and ongoing scientific projects

- The Asia Pacific Center for Ecohydrology (APCE) have ongoing activities in the Saguling Reservoir in the Upper Citarum River, West Jawa. This is an activity to understand and regulate the eutrophication process that has taken place in the region.
- APCE is also starting to take part in the SWATCH Asia Programme under coordination and coordination with Europe SWATCH Programme. This is a programme under the coordination of IHE-Delft, an activity that is trying to understand, plan and foresee the cities of the future related to water scarcity to be faced in the next decades.

2. FUTURE ACTIVITIES

2.1 Activities planned until December 2009

- Preparing Report on IFD Analyses by using Indonesian methods. The report has been sent to Prof. G. Tabios.
- Preparing River catalogue Vol VI and sent it to UNESCO Jakarta. The name of the river K. Ciujung-Kragilan dan K. Ciliman-Leuwikopo.
- Legislation for Indonesia National Standard for National Guidelines of Quality Assurance for Hydrological Management
- Preparing Guidelines of Quality Inspection for Hydrology Management
- Preparing Guidelines of hydrology data validation
- Preparing Guidelines of Water Balance Condition.
- Participation in IHP-RSC Meeting, Asian Pacific FRIEND and Catalogue of Rivers
- Participation in Training course in 2008 and 2009 at Nagoya University
- Participation in program at the International Center for Water-related hazards and risk management (ICHARM)

2.2 Activities foreseen for 2010-2011

- Participation in IHP-RSC meeting Asian Pacific FRIEND and Catalogue of Rivers
- Participation in IHP-Training course at Nagoya University

2.3 Activities envisaged in the long term

- Indonesian National committee for IHP will promote activities to public coordinate participations at national level to augment people's awareness through, educations and trainings on hazards caused by global warming, as well as hazards caused by geological and volcanological events, in which Indonesia is one of the most prone areas. These include sea level rise, flood and drought hazard, volcanic debris control, earthquakes, tsunamis, water and food security, and access to save water. Area of priorities is mega cities, and coastal areas. Considering that Indonesia is an archipelago (more than 17.508 islands), inhabited by more than 220 million people, this is a large task. The objective is to promote people's preparedness, by the communities as well as governments institutions, in facing the oncoming hazards.

- Asia Pacific Center for ecohydrology (APCE) has been set up in Cibinong Science Center in close cooperation with Research Center for Limnology, Indonesian Institute of Sciences. It has prepared a demo-site which is located at the upper Citarum Basin. The reservoirs collect water that drains the

Bandung Basin where urban and industrial wastes are still a major problem. Eutrophication of the reservoir is being studied to promote alternatives to reduce the pollutants. Water cycle related to erosion and sedimentation is also being studied in a small Cililin Basin. Results of studies will be shared as study cases with other Asia – Pacific scientists interested in ecohydrology implementation.

- Participation in IHP-RSC activities and IHP Intergovernmental Council meetings.

IRANIAN NATIONAL REPORT ON IHP RELATED ACTIVITIES

1. ACTIVITIES UNDERTAKEN IN THE PERIOD JULY 2006 – MAY 2008

1.1 Meetings of the IHP National Committee

1.1.1 Decisions regarding the composition of the IHP National Committee

Iranian National Committee of IHP composed of 17 members representing various organizations such as Ministry of Energy, Water Resource Management Co, Department of Environment, Meteorological Organization, two category II Centers, regional center on urban water management, International Center on Qanats and Historic Hydraulic Structures, Amirkabir University, Sharif University, Khaje Nasir University, University of Tehran, Ministry of Agriculture, Geological Survey.

The committee convened approximately once a month discussing various issues of our contribution to the international programmes.
The secretariat of IHP National Committee sends IHP News Water Portal News to all members and also informs them about awards and bursaries and also national and international workshops, seminars and conferences. Members also represent their report in the Committee Meetings.

1.1.2 Status of IHP-VI activities

1.1.3 Decisions regarding contribution to/participation in IHP-VII

After going through the details of the various themes and keeping in view the interest of the country, The National Committee decided to participate in the following themes/focal areas.
Theme 1: Focal Area 1.2, Focal Area 1.5
Theme 2: Focal Area 2.2, Focal Area 2.3, Focal Area 2.4
Theme 3: Focal Area 3.2
Theme 4: Focal Area 4.1, Focal Area 4.3, Focal Area 4.4
Theme 5: Focal Area 5.4

1.2 Activities at national level in the framework of the IHP

1.2.1 National/local scientific and technical meetings

Iranian National Committee on Hydrology has been active in disseminating and promoting hydrological knowledge in the country by providing sponsorship to various organizations in the country for organizing national/regional and international events in the hydrology.

1.2.2 Participation in IHP Steering Committees/Working Groups

Iranian National Committee of IHP is not the member of the Intergovernmental Council and participates in the sessions as observer.

1.2.3 Research/applied projects supported or sponsored

1- Inventory of the countries utilizing the qanat technology: this project is aimed to prepare an international document which determines the dimensions of this technology usage in each country. Number of qanats, volume of supplied water, and ratio of supplied water to total water demand and the present situation of the qanats in the country will be analyzed.
2- Preparation of the Atlas of Qanats in the Central Plateau of Iran as a pilot project: in case this project would be successfully finished, we can make use of its methodology in extending the work to a larger area in order to prepare the world atlas of qanats.
3- A survey on the negative impacts of the developmental projects on qanats and the ways to prevent the further destructions. This project can be done with the support of the Iranian ministry of energy (WRMO).
4- Introduction of modern technology to operation and maintenance of qanats: this project examines how to apply the modern technologies in the construction and maintenance of the qanats.
5- Groundwater Management in the Arid Regions; Some Lessons from Indigenous Knowledge. This project has been put forward to UNESCO. It is hoped that the proposal would meet with UNESCO's approval. This project is to examine the situation of groundwater management in the arid regions of Iran as well as the ways through which we can incorporate some traditional methods into our modern groundwater management.
6- Survey on The law of Trans boundary aquifers

1.2.4 Collaboration with other national and international organizations and/or programmes

- The International Water Academy
- The International Water Association
- UNESCO-IHE
- UN-Water Decade Program on Capacity Development (UNW-DPC)

1.2.5 Other initiatives

1.3 Educational and training courses

1.3.1 Contribution to IHP courses

- Expert Group Meeting on "Municipal Wastewater Use for Irrigation", Sana'a, Yemen, 4th – 7th Nov. 2006.
- Participating in the 4th International Water Exhibition, Tehran, Iran, 22nd – 25th Nov. 2006.
- International Conference on "Water Resources Management in the Islamic Countries", Tehran, Iran, 19th – 20th Feb. 2007.
- International Symposium on "New Directions in Urban Water Management", Paris, France, 12th – 14th Sep. 2007.
- Co organizing 70 short courses in the field of wastewater with cooperation of faculty of water Shahid Abbaspour University and UNESCO-IHE institute in 2008 and 2009.

1.3.2 Organisation of specific courses

- Training of Trainers Workshop on "Application of Models and New Technologies in Groundwater Management in Arid and Semi-arid Regions", Karaj, Iran, 29th July – 1st Aug. 2006.
- International Workshop on "Flash Floods in Urban Areas and Risk Management", Muscat, Oman, 4th – 6th Sep. 2006.
- International Workshop on "Groundwater for Emergency Situations", Tehran, Iran, 29th – 31st Oct. 2006.
- Training of Trainers Workshop on "Integrated Urban Water Management (IUWM)", Lahore, Pakistan, 2nd – 5th May 2007.
- International Workshop on "Water Demand Management in Urban Areas in Light of Tourism", Muscat, Oman, 27th – 28th Aug. 2007.
- International Workshop on "Capacity Development for Water Journalists", Tehran, Iran, 26th – 28th Nov. 2007.
- Organizing the International Training Course on Qanats "A Multidisciplinary Approach to Integrating Traditional Knowledge with Modern Development"1 ~ 4 July 2007, Yazd – Iran

1.3.3 Participation in IHP courses

- Training workshop on Reservoir sedimentation management (China,10-16 October 2007),
- International workshop on Groundwater Modeling for Arid and Semi arid areas (China, 11 -17 June 2007)
- Workshop on Water resource management practices and strategies in arid and semi arid zones of Asia (Turkmenistan, 10-14 March 2008)

1.4 Cooperation with the UNESCO-IHE Institute for Water Education and/or international/regional water centers under the auspices of UNESCO

- Co organizing 70 short courses in the field of wastewater with cooperation of faculty of water Shahid Abbaspour University and UNESCO-IHE institute in 2008 and 2009.
- UNESCO – IHE

And also cooperation with following centers:

- Regional Centre for Training and Water Studies (RCTWS-Cairo)
- UNESCO Tehran Cluster Office
- UNESCO New Delhi Office
- UNESCO Cairo Office
- UNESCO Beijing Office
- Iranian National Commission for UNESCO
- Turkmenistan National Commission for UNESCO
- Pakistan National Commission for UNESCO

1.5 Publications

- Newsletters (January and June 2007, January 2008)
- Proceedings of the International Workshop on "Groundwater for Emergency Situations", IHP-VI, Series on Groundwater, No.16

CDs:

- Third International Workshop on "Innovations in Water and Wastewater Technology", Dec. 2005, Berlin.
- International Workshop on "Ground Water for Emergency Situations", Oct. 2006, Tehran.
- International Workshop on "Flash Floods in Urban Areas and Risk Management", Sep. 2006, Muscat.
- Expert Group Meeting on "Municipal Waste Water Use for Irrigation", Nov. 2006, Sana'a.
- International Conference on "Water Resources Management in the Islamic Countries", Feb. 2007, Tehran
- Preparing the country report of qanats of Afghanistan, Iran and Pakistan

1.6 Participation in international scientific meetings

1.6.1 Meetings hosted by the country

- Technical Workshop on "Wastewater Reclamation and Water Reuse", Tehran, Iran, 5th May 2008.
- Technical Workshop on "Decentralized and Small Wastewater Treatment Systems", Tehran, Iran, 6th May 2008.
- 2nd Asia Pacific Ministerial Conference on Housing and Urban Development, Tehran, Iran, 12th – 15th May 2008.

1.6.2 Participation in meetings abroad

- 17th session of IHP Intergovernmental Council, UNESCO HQ, Paris, July 2006
- Meeting of the Directors of UNESCO's Water Related Institute and Centers, UNESCO-IHE, Delft, June 2007
- Implementation Planning Workshop on "IHP-VII Urban Water Management Program activities", Paris, Jan. 2008

1.7 Other activities at regional level

1.7.1 Institutional relations/cooperation

1.7.2 Completed and ongoing scientific projects

- Reconstruction of Hydro-meteorological Network of Afghanistan
- Establishment of Water Research Center in Kabul, Afghanistan

2. FUTURE ACTIVITIES

2.1 Activities planned until December 2009

- Impacts of Climate Change on Water Resources in MENA Region (emphasizing on supplying drinking water)
- Carrying out a research project during 2008 - 2009
- Holding a training workshop in Syria, RCTWS – Cairo, Late 2008
- Holding an Int. Seminar in Oman, Late 2008

- Arsenic Removal Technology
- Carrying out a research project in 2008 – 09
- Empowerment of Women's Role in Water Issues
- Preparatory phase will be launched in 2008
- Executive phase will start in 2009
- Training of Trainers on Urban Water Management Issues
- Holding a workshop in 2009
- Revising the manual in 2009
- International Conference on Water Resources Management (Middle East, CIS and MENA Countries)
- Coordinating for the 2nd Conference to be held in 2010 (venue to be determined)
- Health and Safety in Municipal Water Reuse for Irrigation
- Organizing an international workshop in 2008 / 2009
- Organizing a technical training course on qanat for Iraqi experts

2.2 Activities foreseen for 2010-2011

- Impacts of Climate Change on Water Resources in MENA Region (emphasizing on supplying drinking water)
  - The work plan will be prepared after investigating the outcomes of 2008-9 activities
- Arsenic Removal Technology
  - Practical implementation based on the research studies
- Empowerment of Women's Role in Water Issues
  - Continuation of executive phase during 2010 – 11
  - Assessing the outcomes in 2012
- Training of Trainers on Urban Water Management Issues
  - Continuation of holding the event in different countries
  - Assessing the measures carried out, every other 2 years
  - Revising the Manual
- International Conference on Water Resources Management (Middle East, CIS and MENA Countries)
  - Organizing the 3rd Conference to be held in 2013

2.3 Activities envisaged in the long term

A Memorandum of Understanding (MoU) has been signed and exchanged with International Centre for Water Hazard and Risk Management (ICHARM) and short-term, mid-term and long-term activities have been included to be carried out in the framework of UNESCO-IHP phase VII.

NATIONAL REPORT ON IHP RELATED ACTIVITIES

Japan

Various activities of UNESCO have been implemented under the support of the Japanese National Commission for UNESCO with financial contribution in the form of Fund-in-Trust (JFIT) for the Promotion of Science for the Sustainable Development. The following summary includes the activities of Japanese National Committee for the International Hydrological Programme (IHP) of UNESCO undertaken during July 2006 to May 2008.

1. ACTIVITIES UNDERTAKEN IN THE PERIOD JULY 2006 – MAY 2008

1.1 Meetings of the IHP National Committee

1.1.1 Decisions regarding the composition of the IHP National Committee

The new composition of the Japanese IHP National Committee has been decided as follows:

Members of the IHP National Committee as of May 2008.

	Name	Position	E-mail
Chair *	TAKEUCHI Kuniyoshi	Director, ICHARM	kuni.t@pwri.go.jp
*	NAKANISHI Hisae	Prof., Nagoya Univ.	nakanishi@gsid.nagoya-u.ac.jp
*	YAMAGATA Toshio	Prof., Univ. of Tokyo	yamagata@eps.s.u-tokyo.ac.jp
	UYEDA Hiroshi	Prof., HyARC, Nagoya Univ.	uyeda@rain.hyarc.nagoya-u.ac.jp
	OKI Taikan	Prof., IIS, Univ. of Tokyo	taikan@iis.u-tokyo.ac.jp
	KURAJI Koichiro	Lecturer, Univ. of Tokyo	kuraji_koichiro@uf.a.u-tokyo.ac.jp
	KOIKE Toshio	Prof., Univ. of Tokyo	tkoike@hydra.t.u-tokyo.ac.jp
	SHIMIZU Yoshihisa	Prof., Kyoto Univ.	shimizu@biwa.eqc.kyoto-u.ac.jp
	JINNO Kenji	Prof., Kyushu Univ.	jinno@civil.kyushu-u.ac.jp
	TAKARA Kaoru	Prof., DPRI, Kyoto Univ.	takara@flood.dpri.kyoto-u.ac.jp
	TANAKA Tadashi	Prof., Univ. of Tsukuba	tadashi@geoenv.tsukuba.ac.jp
	TERAKAWA Akira	Deputy Director, ICHARM	terakawa@pwri.go.jp
	NAKAYAMA Mikiyasu	Prof., Univ. of Tokyo	nakayama@k.u-tokyo.ac.jp
	WATANABE Tsugihiro	Prof., RIHN	nabe@chikyu.ac.jp

Notes:
* Member of the Japanese National Commission for UNESCO;
ICHARM: The International Centre for Water Hazard and Risk Management (UNESCO Category II Centre);
RIHN: Research Institute for Humanity and Nature;
HyARC: Hydrospheric Atmospheric Research Center, Nagoya University;
IIS: Institute for Industrial Sciences, University of Tokyo; and
DPRI: Disaster Prevention Research Institute, Kyoto University.

Secretariat of the Japanese National Committee for IHP, UNESCO:
c/o Mr. AKIYAMA Kazuo
Japanese National Commission for UNESCO
Ministry of Education, Culture, Sports, Science and Technology (MEXT)
3-2-2 Kasumigaseki, Chiyoda-ku, Tokyo 100-8959, Japan
E-mail: akiyamak@mext.go.jp
TEL: +81-(0)3-6734-2595 / FAX: +81-(0)3-6734-3679
http://flood.dpri.kyoto-u.ac.jp/ihp_japan/index.htm

1.1.2 Status of IHP-VI activities

Various activities relating to IHP-VI Themes have been implemented during 2002-2007 as follows.

Theme 1: Global changes and water resources
- Climate change research especially using “Earth Simulator”: MEXT Kyosei-Project (RR2002, 2002-2006) and Kakushin Project (2007-2011).
- Global Earth Observation System of Systems (GEOSS) and Asian Water Cycle Initiative (AWCI)
- GWSP-Asia
- Research on “virtual water”
- Collaboration with IHP-LAC for Rio de La Plata Basin Workshops

Theme 2: Integrated watershed and aquifer dynamics
- Groundwater research such as GRAPHIC

- GWES (Groundwater in Emergency Situations)
- Collaboration with Mongolian UNESCO Chair on

Theme 3: Land-habitat hydrology

- Ecohydrology symposia and sessions at AOGS meetings

Theme 4: Water and society

- Seventeen CREST (Core Research for Evolutional Science and Technology) research projects supported by the JST (Japanese Science and Technology Agency)
- Water hazards and disaster reduction research by universities, institutions and ICHARM

Theme 5: Water education and training

- Nagoya University Training Courses and a Doctor degree course in Graduate School of Science
- ICHARM Training Programmes and a one-year Master Degree Program on water-related risk management with the National Graduate Institute for Policy Studies (GRIPS) supported by JICA.

Other regional and cross-cutting themes activities includes:

(1) Catalogue of Rivers: The format of the Catalogue of Rivers for Southeast Asia and the Pacific, Vol. 6 was discussed by Dr. Chikamori with the former editors Prof. Takara and Dr. Tachikawa. It was presented at the 15th Session of IHP Regional Steering Committee (RSC) for Southeast Asia and the Pacific (SEAP) in Manila, the Philippines, on 22-23 November 2007. The information of previous five volumes locates at: http://flood.dpri.kyoto-u.ac.jp/ihp_rsc/riverCatalogue/index.html

(2) Asian Pacific FRIEND: Prof. Takeuchi, Prof. Takara and Dr. Chikamori attended the Asian Pacific FRIEND Technical Sub-Committee (TSC) on 21 November 2007 at the occasion of the 15th Session of RSC in Manila, the Philippines. Prof. Takara has submitted a report of the current status of rainfall IDF (intensity-duration-frequency) analysis and practice in Japan and in the region in March 2008, based on an action item decided at the TSC.

(3) Hydrology for Environment, Life and Policy (HELP): Dr. Koichiro Kuraji (Univ. of Tokyo), Dr. Junpei Kubota (RIHN) and Ms. Hirakawa (Hiroshima Univ.) participated in the Workshop on Integrated Catchment Management (ICM) in the Motueaka River basin held in Nelson, New Zealand on 7-11 November 2005. This workshop is a Pacific regional meeting of UNESCO-IHP-HELP. The follow-up activities are continued.

(4) Prediction in Ungauged Basins (PUB) by IAHS: Prof. Takeuchi (ICHARM, formerly the Univ. of Yamanashi), Dr. Tachikawa (Kyoto Univ.) and others are conducting PUB research and formed PUB-Japan to organize a number of PUB sessions.

(5) International Flood Initiative (IFI) and International Programme on Landslides (IPL): ICHARM is playing a role of the Secretariat of IFI. IFI was launched at a Session organized by UN agencies, ICSU, WFEO and the International Consortium on Landslides (ICL) at the World Conference on Disaster Reduction (WCDR) in Kobe, Japan in January 2005. Since then both IFI and IPL are promoted continuously and actively. IPL could also have a linkage with the International Sedimentation Initiative (ISI).

1.1.3 Decisions regarding contribution to/participation in IHP-VII

The Japanese National Committee for IHP has sent comments on IHP-VII Draft Plan to the UNESCO-IHP Secretariat. Japan has indicated their intention to contribute to the following Themes and Focal Areas (FA) in the Updated Draft Strategic Plan for the 7th Phase of the IHP (2008-2013), IHP/Bur-XL/11, Paris, 2 May 2007. After that the IHP National Committee also had a working group meeting on 15 December 2007 in Tokyo to further discuss actions for IHP-VII. Additionally proposed FAs are indicated by asterisks (*):

THEME 1: Adapting to the Impacts of Global Changes on River Basins and Aquifer Systems
- FA 1.1 – Global changes and feedback mechanisms in hydrological processes in stressed systems
- FA 1.2 – Climate change impacts on the hydrological cycle and consequent impact on water resources*
- FA 1.3 – Hydro-hazards, hydrological extremes and water-related disasters
- FA 1.4 – Managing groundwater systems' response to global changes
- FA 1.5 – Global change and climate variability in arid and semi-arid regions*

THEME 2: Strengthening Water Governance for Sustainability
- FA 2.1 – Cultural, Societal, and scientific responses to the crises in water governance*
- FA 2.2 – Capacity development for improved governance; enhanced legislation for wise stewardship of water resources*

THEME 3: Ecohydrology for Sustainability
- FA 3.1 – Ecological measures to protect and remediate catchments process
- FA 3.4 – Groundwater-dependent ecosystems identification, inventory and assessment*

THEME 4: Water and Life Support Systems
FA 4.3 – Achieving sustainable urban water management
FA 4.4 – Achieving sustainable rural water management*

THEME 5: Water Education for Sustainable Development
FA 5.1 – Tertiary water education and professional development
FA 5.2 – Vocational education and training of water technicians
FA 5.3 – Water education in schools
FA 5.4 – Water education for communities, stakeholders and mass-media professionals

The following contributions are expected to each Theme and FA.

FA 1.1:
- Global water cycle assessment: IHP contribution to GEOSS [Univ. of Tokyo]
- Interaction between hydrological cycle and physical/biochemical oceanography by cooperation between IHP and IOC [Nihon Univ., JAMSTEC, Univ. of Tokyo, Kyoto Univ.]

FA 1.2:
- Second Phase of PUB project in cooperation with IAHS [Kyoto Univ.]
- Climate change impacts on water-related disaster risk [MEXT Kakushin Program, Kyoto Univ.]

FA 1.3:
- Improving the predictability of hydrological extremes in ungaged or poorly gaged basins using new measurement technology and promoting the local use of satellite information for improved river basin management in partnership with GEOSS
- Case studies on human security and water-related disasters
- Best practices on water risk management
- Provide ICHARM coordination as focal point for possible networking activities
- Hydro-hazards and their impact on society
- Flood management [MEXT Kakushin Program, ICHARM, PWRI, IFNet, Kyoto Univ.]

FA 1.4:
- Groundwater resources assessment under the pressure of humanity and climate change (GRAPHIC) [Research Institute for Humanity and Nature (RIHN)]

FA 1.5:
- Hydrological and ecological impact assessment of long-term global warming on river basins in the world [Kyoto Univ.]

FA 2.1:
- Community-based integrated river basin management as a HELP follow-up [Univ. of Tokyo, Kyoto Univ.]

FA 2.2:
- Relative impact evaluation in water resources dynamics and social system with large development in river basins [Kyoto Univ.]

FA 3.1:
- Participation in ecohydrology research development
- Effect of forest devastation on water resources and environmental issues [Univ. of Tsukuba, Kyoto Univ., Kyushu Univ., Univ. of Tokyo, Tokyo Univ. of Agriculture and Technology]

FA 3.4:
- Frontier of sustainable groundwater management systems based on groundwater flow process in arid/semi-arid region in cooperation with China and Mongolia [Univ. of Tsukuba, Hiroshima Univ., Kumamoto Univ.]

FA 4.3:
- Hydrogeological and sociological survey on development processes of East-Asian cities co-existing with floods [Kyoto Univ.]
- Vulnerability assessment of urban groundwater resources in Asia and Oceania [Geological Survay of Japan]

FA 4.4:
- Development of a new flood management method utilizing paddies into river management against global warming [National Institute for Rural Engineering (NIRE), Univ. of Tsukuba, Univ. of Tokyo]

Theme 5:
- Nagoya University Ph.D. program
- Nagoya University IHP Training Course in cooperation with a number of Japanese universities

-
- ICHARM 1-year Master degree program on disaster prevention policy in cooperation with the National Graduate Research Institute for Policy Studies (GRIPS) supported by JICA
- ICHARM training course on flood hazard mapping
- Capacity building and education for observers for continuous monitoring of terrestrial environments in Asia [Univ. of Tsukuba]

1.2 Activities at national level in the framework of the IHP

1.2.1 National/local scientific and technical meetings

(1) ICHARM Inauguration Symposium: "Alliance for Localism" was held at the United Nations University (UNU), Tokyo, Japan on 14 September 2006. Mr. Kazuo Kitagawa, the Minister of Land, Infrastructure and Transport of Japanese Government gave a message. Several representatives gave keynote speeches such as from US Army Corp of Engineers, UN-ISDR, WMO, UNESCO, Brazil, and DPRI of Kyoto University.
(2) IHP Training Course Working Group Meeting was held in Tokyo on 26 March 2007. The course for FY 2006 was reported; the plan of the 2007 course was explained and discussed.
(3) The JFIT Annual Review Meeting on Science Sector Activities of UNESCO Office Jakarta was held in the conference room of the UNESCO Jakarta Office from 23 to 24 May 2007. Prof. Takeuchi, Prof. Iwatsuki (MAB), Mr. Akiyama attended. The status and progress of the UNESCO science programmes in the region were reported and evaluated. A new JFIT for solving global issues and its future perspective is also discussed.
(4) Signing Ceremony of the Memory of Understanding between the University of Tsukuba, the Institute of Geo-ecology, Mongolian Academy of Sciences (Mongolia) and the UNESCO for the establishment of UNESCO Chair on Sustainable Groundwater Management in Mongolia (614): on 22 June 2007 at the University of Tsukuba. The purpose of the Chair shall be to promote an integrated system of research, training, information and documentation in the field of groundwater management. Prof. Tadashi Tanaka, Director of Terrestrial Environment Research Center, Graduate School of Life and Environmental Sciences, University of Tsukuba will be the Co-Chairholder. The UNESCO Chair will serve as a means of facilitating collaboration between high-level, internationally recognized researchers and teaching staff of the University and other institutions in Mongolia and Japan and neighboring East Asian countries such as China and the Republic of Korea.
(5) The 26th IHP National Committee meeting was held at MEXT to discuss various issues relating to the 18th Session of IHP Intergovernmental Council (June 2008) and IHP-VII (2008-2013) on 30 May 2008.

1.2.2 Participation in IHP Steering Committees/Working Groups

Regional Steering Committee (RSC) for IHP in Southeast Asia and the Pacific (SEAP):

(1) The 14th RSC was held on 19-20 October 2006 in Bangkok, Thailand in conjunction with the International Symposium on Managing Water Supply for Growing Demand on 16-20 October and with APHW2006 conference on 16-18 October at the same place. From this meeting Mongolia became an official member of RSC. The cost for some participants from Asia and the Pacific was financially supported by JFIT. The maintenance of the current governance system of RSC were decided in the RSC. The RSC adopted a resolution for encouraging Lao PDR and Myanmar to officially participate in the RSC in the near future. Prof. Takara was re-elected as the Secretary of RSC-SEAP.
(2) The 15th RSC was held on 22-23 November 2007 in Manila, the Philippines in conjunction with the International Conference on Hydrology and Water Resources Management for Hazard Reduction and Sustainable Development (HRSD 2007) on 19-23 November 2007. The RSC adopted two resolutions for promoting flood research, Asian Pacific FRIEND and Catalogue of Rivers. It is decided that RSC meetings would be held in Mongolia in 2008 and in China in 2009. New RSC Chairman was elected: Prof. Leonardo Liongson, Professor, the University of Philippines. See http://hrsd-2007.pnc-unesco-ihp.upd.edu.ph/

1.2.3 Research/applied projects supported or sponsored

(1) The MEXT bestowed Prof. Takara, Kyoto University on a Grant-in-Aid for Scientific Research for FY 2004-2006 in order to promote a climate- and disaster-related international cooperative research in East Asia. This fund was used in part for meetings related to UNESCO-IHP such as RSC meetings.
(2) A MEXT Grant-in-Aid for Scientific Research was awarded to "Downscaling of Global Earth Observation Products to Locally Useful Information" led by Prof. Kuniyoshi Takeuchi, University of Yamanashi for FY2004-2006 to promote the research on PUB, Predictions in Ungauged Basins, an IHAS-initiated science program supported by IHP IGC Resolution XV-7.
(3) A MEXT Special Coordination Fund for Promoting Science and Technology (Leadership for international scientific cooperation) was awarded to "Leadership on the Hydrological Science for Mitigating World Water Issues" led by Prof. Taikan Oki, University of Tokyo for FY2004-2006. The fund was used to promote international activities including PUB and other IHP-related initiatives.

1.2.4 Collaboration with other national and international organizations and/or programmes

The Japanese IHP National Committee has been closely collaborating with:
(1) Some committees in the Science Council of Japan (SCJ),
(2) The national government and its branches relating to hydrology and water resources administration,
(3) Nagoya University for IHP Training Courses and graduate school. Other universities and research institutes,
(4) The Japan Water Forum (JWF),
(5) World Meteorological Organization (WMO), and
(6) International NGOs/NPOs such as the International Association of Hydrological Sciences (IAHS), the International Water Resources Association (IWRA) and the International Consortium on Landslides (ICL).

1.2.5 Other initiatives

1) The 3rd Asian Water Cycle Symposium (2-4 Dec. 2007) was held at Oita Kokusai Koryu Kaikan (Oita International House), Beppu, Oita Prefecture, Japan [Prof. Koike].
2) The 1st Asia-Pacific Water Summit was held in Beppu, Oita Prefecture, Japan on 3-4 December 2007, with the participation of top-level decision makers from the Asia-Pacific region. ICHARM has organized a session as a leading agency for water-related disaster management and compiled a proposition document [ICHARM, Prof. Takeuchi].
3) The 3rd Asian Water Cycle Symposium (2-4 Dec. 2007) was held at Oita Kokusai Koryu Kaikan (Oita International House), Beppu, Oita Prefecture, Japan [Prof. Koike].
4) Japan PUB meeting was held in Kyoto on 3-4 March 2008 [Prof. Takeuchi, Dr. Tachikawa].

1.3 Educational and training courses

1.3.1 Contribution to IHP courses

Seventeen UNESCO IHP Nagoya Training Courses have been held since 1991. Topics of the course were relevant to Water Resources for Sustainable Development, Hydrology and Water Resources under Vulnerable Environment, and Water Interactions (Systems at Risk and Social Challenges). About ten participants from East and Southeast Asian countries took lectures and practices every year in the training course. A few students of IHP special program for foreign students in Nagoya University (see (1) below) participated in the course every year. In late years, some of trainees are participating in the course at their own expenses. The training course is expected to be continued with strong requests of East and Southeast Asian countries. Activities of the UNESCO IHP Nagoya Training Course are introduced on the website, http://www.ihpnagoyaforum.org/. Based on these experiences, the training course will be further renewed to fit to the themes of IHP Phase VII (2008-2013).

(1) Doctor of Science degree on atmospheric and hydrospheric science:

The Graduate School of Science and the Graduate School of Environmental Studies of Nagoya University accepts students from Asia and the Pacific region, with the financial support from the Ministry of Education, Culture, Sports, Science and Technology of Japan (MEXT).

(2) IHP Training Courses:

The Hydroshperic Atmospheric Research Center (HyARC) of Nagoya University offers IHP Training Courses for both foreign students of Graduate School of Science, Nagoya University and trainees chosen by UNESCO Regional Science Bureau for Asia and the Pacific in Jakarta. The training courses are financed by the Japanese Fund-in-Trust (JFIT) for IHP.

a) The 16th Training Course was held with a theme *Oceanography Basics*, from 26 November to 9 December 2006, at the Hydrospheric Atmospheric Research Center (HyARC), Nagoya University, Nagoya, Japan. The course comprised a series of lectures and practice sessions in English. It also included an overnight field observation cruise in Ise Bay on a training vessel Sei-Sui Maru of Mie University, and a technical tour to the Center for Marine Environmental Studies, Ehime University. Nine participants were 7 from the Philippines, Vietnam, Indonesia, Myanmar, Sri Lanka, Papua New Guinea recommended by the UNESCO Jakarta Office and 2 from the Special Graduate School at Nagoya University.

b) The 17th IHP Training Course with the theme "Numerical Prediction of High-Impact Weather Systems" was held in Nagoya, Tokyo and Yokohama, Japan, on 2-15 December 2007. Expected participants are eight from Indonesia (2), Laos, Malaysia, Nepal, Vietnam, the Philippines, and Thailand supported by UNECO Jakarta Office; two from Malaysia and Laos with self-support; and three from China, Bangladesh and Nepal attending the Special Graduate School Course at Nagoya University.

1.3.2 Organization of specific courses

ICHARM has been providing a training course on flood hazard mapping (5 weeks every year) since 2004. In November 2007, 16 trainees participated from 8 countries in Asia Pacific region. New one-year Master Degree Program (Disaster Prevention Policy Programme, water-related risk management course) was initiated in October 2007 in cooperation with the National Graduate Research Institute for Policy Studies (GRIPS), supported by JICA. 10 practical engineers from 5 countries are attending the course for the first year.

1.3.3 Participation in IHP courses

N/A

1.4 Cooperation with the UNESCO-IHE Institute for Water Education and/or international/regional water centres under the auspices of UNESCO

(1) ICHARM: **I**nternational **C**entre for Water **Ha**zard and **R**isk **M**anagement under the auspices of UNESCO was established in Tsukuba, Japan in March 2006, after getting accreditation by the member states of UNESCO at the 33rd General Conference of UNESCO. Dr. Kuniyoshi Takeuchi, the chairman of the Japanese National Committee for UNESCO-IHP, was assigned as the founding Director of ICHARM. ICHARM was established as the core of research, training, and information networking activities on water-related disasters at global levels. The activities are expected to contribute in the prevention and reduction of water-related disasters, focusing on flood related disasters at the initial stage. It is important to cooperate with existing UNESCO water Centers such as IHE in the Netherlands, IRTCES in China, HTC in Malaysia and RCUWM in Iran, etc. The outline of ICHARM is as follows.

1) Objectives: The objective of the Centre is to function as the world centre of excellence to provide and assist implementation of best practicable strategies to localities, nations, regions and the globe to manage the risk of water related disasters including flood, drought, landslide, debris flow, storm surge, tsunami and water contamination. The Centre conducts research, capacity building and information networking activities in an integrated manner for preventing and mitigating the impacts of water related disasters and thus to achieve sustainable and integrated river basin management.

2) Functions:

(i) to promote scientific research and to undertake effective capacity-building activities at the institutional and professional levels;

(ii) to create and reinforce networks for the exchange of scientific, technical and policy information among institutions and individuals;
(iii) to develop and coordinate cooperative research activities, taking advantage particularly of the installed scientific and professional capacity of the IHP networks, WWAP, the IFI/P and relevant programmes of non-governmental organizations, international institutions and networks;
(iv) to conduct international training courses for practitioners and researchers on the global level; and
(v) to organize knowledge and information transfer activities including international symposia or workshops, and to engage in appropriate awareness-raising activities;

3) Structure: The center is established as a part of the Public Works Research Institute (PWRI) and be operated under the responsibility of its Chief Executive, with the advice from the Advisory Board.

(2) ICHARM Inauguration Symposia:

- "Towards Global Water Disaster Reduction - Cooperating through ICHARM (International Centre for Water Hazard and Risk Management) -" was held at the United Nations University (UNU), Tokyo, Japan on 10 May 2006.
- "Alliance for Localism" was held at the United Nations University (UNU), Tokyo, Japan on 14 September 2006. Mr. Kazuo Kitagawa, the Minister of Land, Infrastructure and Transport of Japanese Government gave a message. Several representatives gave keynote speeches such as from US Army Corp of Engineers, UN-ISDR, WMO, UNESCO, Brazil, and DPRI of Kyoto University.

(3) The 5th Workshop on Rio de La Plata Basin was held at Itaipu Binacional, Brazil on 11-14 March 2008, organized by UNESCO-IHP LAC, UN Water Decade, UNEP GEMS/Water, ICHARM and Japan Water Forum. Scientific outcomes of the meeting will be published as UNESCO-IHP publication series by UNESCO Montevideo Office with Japanese cooperation [Dr. Yamashiki (Nihon Univ.)].

1.5 Publications

1. «Hydrology 2020: An Integrating Science to Meet World Water Challenges», T. Oki, C. Valeo and K. Heal (Eds.), IAHS Publication No. 300, 190 +xxxii pp., 2006.
2. «Oceanography Basics» -The Textbook for Sixteenth IHP Training Course in 2006-, (Ed.)Akihiko Morimoto, Hydorospheric Atmospheric Research Center, Nagoya University and United Nations Educational Scientific and Cultural Organization, 2007, 155 pp.
3. «Numerical Prediction of high-Impact Weather Systems» -The Textbook for 17th IHP Training Course in 2007-, Tsuboki, K. and Sakakibara, A. (Eds.), Hydrospheric Atmospheric Research Center, Nagoya University and United Nations Educational Scientific, November 2007, 273 pp.
4. «IHP», Newsletter on IHP activities of Japan, No.19, May 2008 (in Japanese).

1.6 Participation in international scientific meetings

1.6.1 Meetings hosted by the country

(1) ICHARM meetings stated above and ICHARM First Advisory Board meeting in Tsukuba on 15 September 2006.
(2) Japan is managing PUB (Prediction in Ungaged Basins) activities of IAHS. Asian PUB is developing quite well under Dr. Yasuto Tachikawa's initiative. Domestic PUB meetings were held in Mie Prefecture on 8-10 November 2006 and in Kyoto on 3-4 March 2008.
(3) The 2nd Asian Water Cycle Symposium took place at the University of Tokyo on 9-10 January 2007 with 165 participants. 18 Asian countries (Bangladesh, Bhutan, Cambodia, China, India, Indonesia, Japan, Korea, Laos, Mongolia, Myanmar, Nepal, Pakistan, the Philippines, Sri Lanka, Thailand, Uzbekistan, and Vietnam) adopted the basic plans, sharing the same goals to solve water-related issues, such as water damages (flood, landslide, drought), water shortage, water quality, river and water management, and effects on the climate changes. The meeting designated demonstration river basin per each country and a basic outline for standardization of a target river basin, data policy, and data collection schedule.
(4) A Post-GAME project, MAHASRI led by Dr. Jun Matsumoto (Univ. of Tokyo) is now activated with many participants from Asian countries. They are collaborating with IHP FRIEND as well as with PUB.

(5) GWES (Groundwater in Emergency Situation) Working Group meeting, chaired by Dr. Vrba, was held at the International Conference Center in Tsukuba on 18-19 July 2007, hosted by ICHARM. The discussion was on the contents of the guideline under preparation, and it was decided to include Japanese case study, which is to be prepared by Prof. Tanaka, Tsukuba Univ. [ICHARM, Prof. Tadashi Tanaka (Univ. Tsukuba)].
(6) ICHARM and NARBO (Network of Asian River Basin Organizations) secretariat participated in the Regional Consultation Meeting for Candidate Water Knowledge Hubs held at the Singapore Public Utility Board on 29-30 October 2007. 26 representatives from 14 organizations discussed for establishing a novel network, called "water knowledge hubs", to share knowledge and experience on water management among Asia-Pacific countries. The meeting was a part of the preparation process for the Asia-Pacific Water Summit (December 2007). Dr. Wouter Lincklaen Arriens, Lead Water Resources Specialist of ADB (Asian Development Bank) and Dr. Jan Luijendijk, Professor of UNESCO-IHE, led the meeting. The two-day meeting concluded that ICHARM would be a candidate water knowledge hub on water related disaster management in the region.
(7) The 3rd Asian Water Cycle Symposium took place in Beppu, Oita, Japan on 2-4 December 2007 with 84 participants. An implementation plan is adopted and now on going with participation of 17 countries each of which is providing a demonstration research basin in the country. See further at http://monsoon.t.u-tokyo.ac.jp/AWCI/.
(8) GWSP-Asia (Global Water System Project) Working Group activities includes discussion on data collection and future research direction [http://www.chikyu.ac.jp/USE/GWSP/GWSPasia.htm; Dr. Makoto Taniguchi (RIHN)].
(9) The 4th International Symposium on Flood Defence was held in Toronto, Canada on 6-8 May 2008. ICHARM organized a session on flood disaster risk reduction strategy as the Secretariat of IFI, which is jointly promoted by international organizations such as UNESCO, WMO, ISDR, UNU, IAHS, and IAHR.

1.6.2 Participation in meetings abroad

Japan has played important roles in the IHP Intergovernmental Council (IGC) as a member. In particular, Prof. Kuniyoshi Takeuchi had been the Chairperson of the Council and Bureau of IHP from 1998 to 2000. Japan participated in the establishment of the Regional Steering Committee (RSC) for Southeast Asia and the Pacific in 1993. The first RSC chairperson was Prof. Yutaka Takahasi (Univ. of Tokyo), who used to be the Vice Chairperson of the IGC (1990-1991) elected from the Group IV, Asia and the pacific. Since the establishment of RSC, at least a couple of Japanese National IHP Committee members have attended and participated actively in all of the annual meetings of the RSC. Prof. Takeuchi had served as the RSC Secretary (1993-1999) and the Chairman of the Technical Sub-Committee (TSC) for Asian Pacific FRIEND (APF) Phase I (1997-2001) in the framework of the RSC, while Prof. Takara is playing a role of the RSC Secretary (1999-) and a member of TSC-APF Phases I (1997-2001) and II (2002-).

(1) ICHARM participated in the 1st UNESCO Water-Related Centres meeting held in Delft, the Netherlands on 11-13 June 2007. Outline of each centre was introduced and some discussion was done on common image, networking and review process as assessment. Centres agreed with the roles and duties expected to them, as well as how to be evaluated [Prof. Takeuchi (ICHARM)]
(2) A PUB session was organized on 16 October 2006 in cooperation with APHW2006 meeting as well as IHP RSC meetings in Bangkok, Thailand. Prof. Takeuchi, Dr. Tachikawa and others who visited Myanmar to investigate the Irrawaddy River basin and water resources management in Myanmar on 9-15 October 2006.
(3) International Symposium on Managing Water Supply for Growing Demand was organized as an IHP-related activity on 16-20 October 2006 in cooperation with APHW2006 conference on 16-18 October 2006 at the same place.
(4) UK-Japan Workshop on Flood and Coastal Defence: Risk Management under Climate and Social Change was held at the University of Newcastle upon Tyne, UK, on 21-24 February 2007 with a support of UK Foreign and Commonwealth Office Global Opportunity Fund. Attended are Prof. Enda O'Connell, Dr. J. Bathurst, Prof. I. Cluckie (Bristol), Prof. R. Falconer (Cardiff), Prof. K. Shiono (Loughborough) and others from UK, and Prof. Takara, Dr. Tachikawa, Dr. Sayama and others from Japan.
(5) PUB Sessions at IUGG, Perugia, Italy on 9-14 July 2007. A PUB database management system for the Mae Chaem basin in Thailand which was established by the RID Thailand and ICHARM was introduced. Its web site is http://www.icharm.pwri.go.jp/html/network/index.html
(6) A PUB Session was convened by Dr. Tachikawa at the 4th Meeting of AOGS in Bangkok,

Thailand on 31 July 2007.

(7) The 5th meeting of GRAPHIC (Groundwater Resources Assessment under the Pressure of Humanity and Climate Change) was held in Colorado, USA, on 17-19 September 2007. [Dr. Makoto Taniguchi (RIHN); http://www.chikyu.ac.jp/USE/GRAPHIC/GRAPHIC.htm].

(8) The International Conference on Hydrology and Water Resources Management for Hazard Reduction and Sustainable Development (HRSD 2007) was held in Manila, the Philippines, on 19-23 November 2007 as an IHP-related event. http://hrsd-2007.pnc-unesco-ihp.upd.edu.ph/

(9) The 5th Workshop on Rio de La Plata Basin at Itaipu Binacional, Brazil on 11-14 March 2008, organized by UNESCO-IHP LAC, UN Water Decade, UNEP GEMS/Water, ICHARM and Japan Water Forum [Dr. Yamashiki (Nihon Univ.)].

1.7 Other activities at regional level

1.7.1 Institutional relations/cooperation

N/A

1.7.2 Completed and ongoing scientific projects

N/A

2. FUTURE ACTIVITIES

2.1 Activities planned until December 2009

(1) Participation in the 9th IHP/IAHS George Kovacs Colloquium, Paris, 6-7 June 2008 [Prof. Takara].

(2) Participation in the GRAPHIC meeting on groundwater and climate change in Uganda in June 2008 [Dr. Taniguchi].

(3) Asian Pacific FRIEND Workshop in Hanoi, Vietnam in 2008 (to be confirmed) [Prof. Takara]..

(4) The 16th Session of the IHP Regional Steering Committee (RSC) for Southeast Asia and the Pacific will be held in Ulan Bator, Mongolia on 29 September to 3 October 2008.

(5) ICHARM 2nd Advisory Board meeting in Tsukuba in October 2008.

(6) HydroChange 2008 in Kyoto, October 2008.

(7) IAH (International Association of Hydrogeologists) meeting in Toyama, Japan in October 2008 including GRAPHIC discussion [Dr. Taniguchi].

(8) The 4th International Conference of Association of Asia Pacific Hydrology and Water Resources (APHW2008) will be in Beijing on 3-5 November 2008. A PUB Session will also be convened.

(9) The 1st World Landslide Forum will be held at UNU, Tokyo on 18-21 November 2008. ICHARM and other UNESCO-related organizations will attend it as well as a pre-event on 17 November.

(10) The 18th IHP Training Course with the theme “Satellite Remote Sensing of Atmospheric Constituents” will be held in 2008. See details at http://www.ihpnagoyaforum.org/.

(11) The 17th Session of the IHP Regional Steering Committee (RSC) for Southeast Asia and the Pacific will be held in China in 2009.

(12) The 19th IHP Training Courses will be hosted by Kyoto University in 2009.

2.2 Activities foreseen for 2010-2011

(1) Participation in RSC-SEAP activities including Asian Pacific FRIEND and the Catalogue of Rivers.

(2) The 20th anniversary of UNESCO IHP Training Course: Special lectures and meetings on “Adaptation to the impacts of global changes on river basins and aquifer systems” (to be confirmed).

(3) The 21st IHP Training Course: Ecohydrology for sustainability” (to be confirmed).

(4) Implementation of projects related to IHP-VII.

(5) The 2nd Asia Pacific Water Summit, Dates and place T.B.D.

(6) Research on HELP basins.

(7) Collaboration with UNESCO-MAB and UNESCO-IOC activities.

(8) The 5th International Conference of Association of Asia Pacific Hydrology and Water Resources (APHW2010). Dates and place T.B.D.

2.3 Activities envisaged in the long term

(1) Participation in IHP-VII projects and RSC activities.
(2) Nagoya University IHP Training Courses.
(3) Information dissemination through a web page of the National Committee.
(4) University of Tsukuba UNESCO Chair in Mongolia.

NATIONAL REPORT ON IHP RELATED ACTIVITIES, JORDAN

Correspondences:

Mohammad_Almomani@mwi.gov.jo
OR
Muawia_Samarah@mwi.gov.jo
OR
Mohammad_Atrash@mwi.gov.jo

Fax: 00962 6 5652287

Address:

Ministry of Water and Irrigation (MWI)
Schmeisani
Amman, Jordan
P.O.Box: 2412-5012

1. ACTIVITIES UNDERTAKEN IN THE PERIOD 2006 – 2008

1.1 Meetings of the IHP National Committee

Generally, there are seven meetings existed each year as one meeting each two months. Starting from the third quarter of 2007, the meetings of the Committee are on a monthly basis.

1.1.1 Decisions regarding the composition of the IHP National Committee

* The committee is headed by H.E the Minister of Water and Irrigation, Jordan , the existing Vice Chair Person is the Secretary General of Ministry of Water and Irrigation Eng. Khaldoun Khashman.

The IHP National Committee composed with the following Institutions and Universities:

- Ministry of Water and Irrigation (MWI) and both Water Authorities
* Water Authority of Jordan (WAJ)
* Jordan Valley Authority (JVA)
- Ministry of Education-National Commission for Education, Science and Culture
- University of Jordan, Amman – UNESCO Chair in Wadi Hydrology
- University of Science and Technology, Irbid
- Yarmouk University, Irbid
- Muta University, Karak
- Hashemite University, Zarqa
- Al Albayt University, Mafraq
- Balqa Applied University, Salt
- Metorological Departement
- Natural Resources Authority (NRA)
- The Higher Council for Science and Technology (HCST)

In regard of re-composition of the National IHP Committee, there are several changes existed, especially in 2007 and the beginning of 2008 as follows:

- The vise chair person of the committee has been changed two times, one of the reasons that the previous vice chair person of the Jordan National IHP Committee, Prof Mohammad Shatanawi became as a Minister of Water and Irrigation in the second half of 2007.
- In addition of that, the Secretary and Reporter of the committee have been changed two times. Within 2007 and 2008.
- Changes of the representative of Al Albayt University, Mafraq in 2006 and the representative of the Higher Council for Science and Technology (HCST) at the end of 2007.

The IHP Committee Main Functions are:

* Capacity building.
* Promoting research in water sciences.
* Providing technical support and advice.
* Fostering partnership with other IHP national committees in the regions.
* Awareness and Advocacy.
* Water education.

Summary of Recent Jordan IHP National Committee activities:

- Capacity building workshops for Ministry of Water and Irrigation in the field of water sciences focusing on integrated water resources management and ground water protection.
- Specialized seminars and panel discussions in water sciences, land use, water resources preservation.
- Awareness for the UN World Water Assessment Programme (WWAP).
- Dissemination of the UN World Water Development Report (WWDR) to relevant institutions.
- Celebration of the World Water Day in March every year.
- Participation in the Global International Hydrological Programme activities.
- Facilitation and promotion of study visits between IHP national committees in the region.
- Implementation of research projects in water sciences in collaboration with related Jordanian institutions and universities.

1.1.2 Status of IHP-VI activities

The Jordan National IHP Committee Contributed on the IHP-VI. Activities and concentrated on sustainable water resources and related issues such as water harvesting ,water resources management and artificial recharge, water resources protection, human resources development, …etc.

1.1.3 Decisions regarding contribution to/participation in IHP-VII

The Jordan National IHP Committee contributed on the preparation and commenting of the draft plan for participation in IHP-VII.The activities are concentrated on the national priorities as follows:

* Surface Water and Groundwater Resources Protection.
* Climate Change and their Impacts on Water Resources Availability.
* Public Awareness and Stakeholders Participation.
* Watershed and Aquifers / Climate Change Impacts.
* Hydrology / Echohydrology for Sustainability.
* Cultural, Social and Scientific Responses to the Crisis in Water Governance.
* Others

1.2 Activities at national level in the framework of the IHP

1.2.1 National/local scientific and technical meetings

* Two workshops have been conducted in the years 2006 and 2007 respectively. The activities of the year 2006 were entitled "WATER and CULTURE " where the title of the year 2007 activities was "Water Resources Management", part of mentioned workshops were run at the Ministry of Water and Irrigation, Jordan followed the celebration on the international water days of 2006 and 2007, where the other workshops conducted at Jordan University and Balqa Applied University. The main topics of the mentioned seminars were as follows;

* The Water in the Arabian Culture.
* Effects of Droughts on the Social, Cultural and Economic Activities.
* Water Crisis Management and Resolution of Conflict.
* The Conventional and Traditional Methods in Water Resources Management in Jordan.
* The Role of Municipal Activities on Characteristics and Watershed Management.
* Panel Discussion and Recommendations.

In addition to activities conducted at the Amman UNESCO office in 2006 include:

1- Echo hydrology and Phytotechnology for Water Resources Management.
2- GIS applications in Hydrology Modeling.

Further more, the following training courses were conducted in the year 2007 at the Ministry of Water and Irrigation and Balqa Applied University:

1- Echo hydrology and Phytotechnology for Water Resources Management.
2- GIS applications in Hydrology Modeling.
3- GIS applications in Groundwater Vulnerability Assessment

* A workshop has been conducted in march 2008 by the Jordan National IHP Committee. followed the celebration in the World Water Day at the Ministry of Water and Irrigation, in a topic, "SANITATION". The main three themes of the seminar were:

- Sanitation in Jordan.
-Water standards and drinking water quality in Jordan.
-Water policies in Jordan.

1.2.2 Participation in IHP Steering Committees/Working Groups

The members of the Jordan National IHP Committee are distributed to work in the seven Working Groups as follows;
-Web Site.
-News Letter (Bulletin).
-Water Harvesting.
-Training.
-Finances Fund.
-Regional and International Cooperation.
-Public Awareness.

1.2.3 Research/applied projects supported or sponsored

* Implementation of a research project to study possibilities of artificial recharge of the flash floods at southern Jordan valley-south of the Dead Sea. The research was conducted by the end of the year 2007 and beginning of 2008 by five researchers of the IHP National Members. The research was funded by the Ministry of Water and Irrigation and related Authorities , in addition to very limited financial support (15000 US$) by the UNESCO.The final report of this study is in the final steps and will be submitted to both the Ministry of Water and Irrigation and the Jordan National Committee for Education, Science and Culture and UNESCO office in Amman in June 2008.

1.2.4 Collaboration with other national and international organizations and/or programmes

* A member of the Jordan National IHP Committee participated in the International Ecohydrology working group.

* A member of the Jordan National IHP Committee participated in the Advisory Board of the International Centre of Water Hazard and Risk Management (ICHARM).

* UNESCO Chair in Wadi Hydrology at the Univercity of Jordan, Amman.

*UNESCO Regional Office in Cairo.

* UNESCO Chair in Desertification Protection at the Yarmouk University, Irbid

* Higher Committee of Climate Change at the Ministry of Environment.

* Higher Committee of Desertification Protection at the Ministry of Planning and Ministry of Environment.

* UNESCO, Amman Office and UNESCO Cairo Office.

* ALECSO, ROSTAS and ACSAD.

* Non governmental organizations and associations in Jordan as "Water Protection Association".

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1.2.5 Other initiatives

*Celebration of the Global Water Day in March 2007, and 2008 at the Ministry of Water and Irrigation. students, representatives of institutions, universities, the technical cooperation projects and the non-governmental organizations attended the events. A prizes have been distributed during the celebrations.

1.3 Educational and training courses

1.3.1 Contribution to IHP courses

Contribution to the annual wadi hydrology training course in Amman, Jordan. This Course is conducted by UNESCO Cairo Office, UNESCO Chair in Wadi Hydrology at the University of Jordan and Balqa Applied University, Jordan.

1.3.2 Organization of specific courses

1.3.3 Participation in IHP courses

* Participation in the annual Wadi Hydrology Course, Amman.

1.4 Cooperation with the UNESCO-IHE Institute for Water Education And/or international/regional water centers under the auspices of UNESCO.

1.5 Publications

* Publication of the scientific papers of the workshop held at Balqa Applied University in may 2007 through a CD.

* The papers presented in the seminar "Water and Culture" held at the University of Jordan in 30, of May 2006 through a CD.

1.6 Participation in international scientific meetings

1.6.1 Meetings hosted by the country

1.6.2 Participation in meetings abroad

* Participation in the 12,th Arab National IHP Committees Meeting in Dubai, Emirates in November, 2007. The National Country report about the water sector has been submitted to the meeting. Actually this meeting is conducted each two years through UNESCO Cairo Office, ALECSO and other Organizations.

* Participation in the 4th International Conference in Wadi Hydrology in Sanaa, Yemen in December, 2007. Two Scientific papers have been submitted to the Conference.

* Participation in two Scientific meetings abroad.

1.7 Other activities at regional level

1.7.1 Institutional relations/cooperation

* Cooperation with several governmental and Non-Governmental Organizations and Associations at the regional level.

* Cooperation with Wadi Hydrology Network, UNESCO Regional Office in Cairo, UNESCO Amman Office, UNESCO Chair in Wadi Hydrology.

* Cooperation with Groundwater Protection Network, UNESCO Cairo Office, ACSAD

* Cooperation with the Yemeni National IHP Committee

1.7.2 Completed and ongoing scientific projects

Implemented project entitled, "Storage of a Flash Floods in Wadi Araba and Dead Sea for an Artificial Recharge of the Shallow Groundwater Wells"

2. FUTURE ACTIVITIES

2.1 Activities planned until December 2009

There are three foreseen activities panned as follows:

* A scientific workshop on the topic " International Water Day in Sanitation", at Science and Technology University, Jordan, within the third quarter of 2008.

* Celebration in the Global Water Day in march 2009 at the Ministry of Water and Irrigation (MWI) headquarter, Amman in cooperation with the Non governmental organizations, UNESCO Chair in Wadi Hydrology and UNESCO Amman office.

* A scientific workshop in March 2009 about "Water Resources and Land Use".

* A scientific Seminar followed by a panel discussion within the second quarter 2009 in one of the Jordan Universities out side the capital city of Amman. The topic will be selected to coincide with one of the themes mentioned in the IHP seventh mid term phase of IHP- VII from (2008-2013).

2.2 Activities foreseen for 2010-2011

* Celebration in the Global Water Day in march 2010.

* A scientific workshop at the first quarter 2010.

* A Scientific seminar probably in the second quarter 2010.

* A training coarse in one of the themes mentioned in IHP- VII. within the third quarter 2010.

* Celebration in the Global Water Day in march 2011.

* A scientific workshop at the first quarter 2011.

* A scientific seminar Probably in the second quarter 2011.

* A training coarse in one of the themes mentioned in IHP- VII within the third quarter 2011.

2.3 Activities envisaged in the long term

United Nations Educational
Scientific and Cultural Organization

Actividades realizadas por el Comité nacional mexicano para el PHI en el periódo julio 2006 - mayo 2008

Mayo de 2008

Actividades realizadas por el Comité Nacional Mexicano para el PHI en el periódo julio 2006 - mayo 2008

Actividades a nivel nacional dentro del marco del PHI

- 1er Simposio Internacional de Manejo de Aguas Transfronterizas. Instituciones colaboradoras: IMTA, CNA, SEMARNAT. Nº de participantes: 200.
- Semiario sobre el Agua. Instituciones colaboradoras: UNESCO, CNA, SEMARNAT, OMS. Nº de participantes: 30.
- Reuniones sobre el Año Internacional del Agua Dulce.
- Conferencias sobre el Día Mundial del Agua. Potenciales instituciones colaboradoras: CNA, SEMARNAT.
- 2º Simposio Internacional de Manejo de Aguas Transfronterizas. Potenciales instituciones colaboradoras: IMTA, U. de Arizona, CONACYT.
- IV Foro Mundial del Agua.
- VI Taller del Grupo de Trabajo de Hielos y Nieves del PHI- LAC UNESCO y Segundo Curso de Capacitación en Observación de Glaciares.

Cursos académicos o de adiestramiento

- Curso Taller de modelación de avenidas y gestión de inundaciones.
- Reunión de evaluación de la Agenda Azul de las mujeres.
- Talleres de sensibilización en género y medio ambiente.

Publicaciones

- Manual de Balance Hídrico versión español.
- Recuperación Ambiental de cuencas.
- *Proceedings* del 2º Simposio Internacional de Manejo de Aguas Transfronterizas. Editores: IMTA, Universidad de Arizona.
- Informe tecnico sobre sedimentos en México.
- Taller “Tecnologías para la desalación en zonas costeras e islas”. Colaboradora: IMTA.
- Cátedra Agua y el Conocimiento. Colaboradora: IMTA.
- Taller sobre “Sensibilización en Género y Medio Ambiente”. Colaboradora: IMTA.
- Taller sobre “Producción de Lahars en el volcán Popocatéptl, México”. Colaboradora: UNAM.
- Taller “Groundwater Resources Assessment”

Otras actividades

A continuación se presenta un informe de actividades de 2007 de cada uno de los programas globales, regionales y grupos de trabajo que conforman el Conamexphi.

FRIEND

El 4 de octubre de 2007 se realizó una reunión de trabajo en el IMTA con objeto de documentar el estado de avance de la instalación, configuración y operación del Servidor y de la Base de Datos para la implementación de la página web del FRIEND/AMIGO-LAC (México), en dicha reunión se identificaron los requerimientos para definir el Programa de Trabajo FRIEND/AMIGO-LAC (México) para el periodo 2008-2009.

El 31 de octubre de 2007 se participó en la reunión del CoNaMexPHI con objeto de presentar el Programa de Trabajo FRIEND/AMIGO-LAC (México) para el bienio 2007 - 2009, en la cual se presentaron los avances y requerimientos para la implementación de la página web del FRIEND/AMIGO-LAC y se presentó el Programa Trabajo FRIEND/AMIGO-LAC (México) 2008-2009.

Del 12 al 17 de noviembre de 2007 se brindó apoyo a la iniciativa del Proyecto IFI del PHI-LAC, con objeto de aportar y contribuir en la realización del Curso-Taller Regional para LAC sobre: *vulnerabilidad y gestión de riesgos por inundaciones*, se realizaron las gestiones para contar con la participación como conferencista del Ing. Gabriel Arduino (personal staff de la Organización Meteorológica Mundial - OMM) quien durante el desarrollo del curso-taller, expuso en dos intervenciones el concepto de Gestión Integrada de Crecientes desarrollado y adoptado por la OMM.

IFI

Dentro de las actividades del programa IFI se llevo a cabo el “Curso taller vulnerabilidad y gestión de riesgos por inundaciones” en laciudad de Tuxtla Gutiérrez, Chiapas, México, en las instalaciones de la Universidad Autónoma de Chiapas, UNACH del 12 al 17 de noviembre de 2007. Fue un evento dirigido a profesionalesinteresados en la gestión de avenidas, así como a funcionarios de instituciones públicas y privadas, investigadores, profesores y alumnos. Tuvo como objetivo promover y reconocer la investigación científica, así como establecer una red de intercambio de información de carácter técnico, científico, educativo y normativo entre los profesionales del estudio de las inundaciones, la vulnerabilidad y la gestión de riesgos, con énfasis en la región de Latinoamérica y El Caribe. Las sesiones se llevaron a cabo mediante la modalidad interactiva de presentación de clases-conferencias y de análisis y estudio de diversos casos.

El Comité organizador de este Curso-Taller estuvo integrado por las siguientes personas e instituciones: El Dr. M. Alfonso Gutiérrez López Coordinador Regional IFI-PHI-LAC, del Instituto Mexicano de Tecnología del Agua, la Dra. Delva Guichard Romero de la Facultad de Ingeniería, UNACH, el Ing. Mario López Pérez de la Comisión Nacional del Agua, el M.C. José L. Arellano Monterrosas por parte del Posgrado IMTA, CONAGUA, el Dr. Rafael Val Segura de la Facultad

de Ingeniería, UNAM y por el Dr. Aldo Iván Ramírez Orozco Coordinador de la IFI-México del Instituto Mexicano de Tecnología del Agua.

ISI

Del 19 al 23 de marzo de 2007 se llevo a cabo en las instalaciones del IMTA el Curso-Taller Regional para Latinoamérica y El CaribeMonitoreo y Gestión de los Sedimentos. El objetivo del Curso Taller fue de llevar a cabo una actualización profesional en materia de monitoreo, evaluación y Gestión de los Sedimentos e impulsar una visión del futuro de la misma, con énfasis en la región de Latinoamérica y El Caribe, mediante una modalidad dinámica e interactiva, a través de la presentación de clases-conferencias, estudios de caso y una visita de campo. Los ponentes del curso fueron los señores M. Sc. Marcelo Gaviño (Argentina-U. Nacional de La Plata), Ing. Daniel Brea (Argentina-INA), Dr. Fabián Rivera Trejo (México-UJAT), M. I. Horacio Rubio, (México-Conagua), Dr. Carlos Escalante (México-DEPFI, UNAM), Dr. Jesús Gracia (México-I. I., UNAM), Dr. Manfred Spreafico (Suiza-Servicio Hidrológico), M. I. Alfredo Jiménez (México-CFE), Dr. Roberto Pizarro (Chile-U. de Talca), Dr. Henrique Chaves (Brasil-U. de Brasilia), M. I. Gilberto Salgado (México-IMTA), Dr. Oscar Link (Chile-U. de Concepción), Dr. José Vargas (Chile-U. de Concepción), Dr. Juan A. García (México-CIRA), M. C. Raúl Medina (México-IMTA), Dr. Christoph Lehmann (Suiza-Consultor), Dr. P. Schmocker (Suiza-U. de Berna). Se contó con la presencia de 50 especialistas en el area de sedimentos.

ISARM

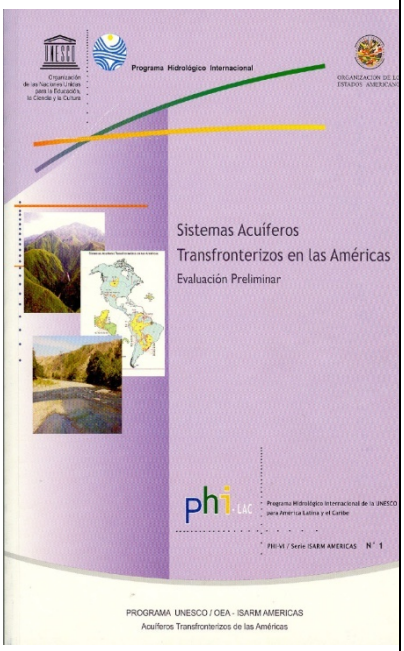
El programa UNESCO/OEA ISARM Américas es una iniciativa hemisférica que fue presentada por el Programa Hidrológico Internacional de la Organización de las Naciones Unidas para la Educación, la Ciencia y la Cultura (UNESCO-PHI), conjuntamente con la Secretaría General de la Organización de Estados Americanos/Departamento de Desarrollo Sostenible (OEA/DDS), durante el Taller sobre Acuíferos Transfronterizos que tuvo lugar durante el XXXII Congreso de la Asociación Internacional de Hidrogeólogos/Asociación Latinoamericana de Hidrología Subterránea para el Desarrollo (AIH/ALHSUD) "Aguas Subterráneas y Desarrollo Humano", realizado en octubre de 2002 en la ciudad de Mar del Plata, Argentina. ISARM (acrónimo por sus siglas en inglés: "Internacional Shared Aquifer Resource Management") fue lanzado anteriormente durante la 14ª Sesión del Consejo Intergubernamental del PHI de UNESCO en junio del 2000, en cooperación con varias organizaciones internacionales, como la Organización para Agricultura y Alimentación (FAO), la Comisión Económica de las Naciones Unidas para Europa (UNECE), la Comisión Social y Económica de la Naciones Unidas para Asia Occidental (UNESCWA)

El programa UNESCO/OEA ISARM Américas (Acuíferos Transfronterizos de la Américas) está organizado por un Comité de Coordinación y por Coordinadores Nacionales de los Estados Miembros escogidos por los Comités Nacionales del PHI y los Puntos Focales de la Red Interamericana de Recursos Hídricos (RIRH).

Del 17 al 21 de septiembre de 2007, se realizó el V Taller de Coordinación en la ciudad de Montreal, Canadá. Se participó mediante el intercambio de experiencias con los Coordinadores Nacionales y demás participantes del taller, en relación con el marco legal e institucional de las instituciones encargadas de la administración y gestión de los recursos hídricos en cada unos de los países de América, así como con el régimen de propiedad de las aguas. Se realizó una

presentación de las condiciones socioeconómicas y ambientales generales de prevalecen en los acuíferos transfronterizos de nuestro país, destacando el gran contraste que existe entre los acuíferos de la frontera norte con respecto a los localizados en la frontera sur de México.

Se aportó información textual y gráfica que sirvió para responder al tercer cuestionario relacionado con los aspectos socioeconómicos y ambientales de los acuíferos transfronterizos de México. Adicionalmente a la presentación de los aspectos socioeconómicos y ambientales de los acuíferos transfronterizos, a petición del comité organizador del Taller de Coordinación, se solicitó al Coordinador Nacional de México preparar otra presentación, como introducción al tema del desarrollo sostenible de los recursos hídricos**.** En esta presentación se destacó la experiencia mexicana en materia de proyectos específicos en los que se han utilizado técnicas y herramientas innovadoras, como son la recarga artificial y la recirculación del agua, la evaluación de la evapotranspiración mediante percepción remota, métodos geofísicos y la desalación de agua salobre en acuíferos costeros.



Portada del Primer libro de la Serie

Participación en el V Taller de Coordinación, en Montreal

El 31 de octubre de 2007 se presentaron los avances y logros del programa, en el seno de la 2ª Reunión del Conamexphi, realizada en las Instalaciones del IMTA en Cuernavaca, Morelos. El propósito de esta reunión fue la presentación de avances y plan de trabajo de los distintos programas que integran el PHI.

Ecohidrologia

En el programa de Ecohidrologia se llevó a cabo Foro Nacional para la determinación del uso ambiental o caudal ecológico en México del 11-al 13 junio 2007. En las instalaciones del IMTA con la colaboración de la *World Wildlife Found* y el Programa Desierto Chihuahuense y Manejo de Cuencas Hidrográficas). El Objetivo general fue Identificar entre la comunidad académica y expertos en el tema, criterios básicos y recomendaciones para la determinación e implementación del concepto de caudal ecológico en cuencas hidrográficas y acuíferos.

Dentro de los Objetivos específicos que se tuvieron fueron:

- Identificar experiencias en la determinación e implementación de caudal ecológico en México y en otros lugares del mundo.
- Evaluar, aportar y homogeneizar la información aplicable al uso ambiental del agua con un enfoque integral, mutidisciplinario e interdisciplinario, tomando en cuenta aspectos ecoógicos, hidrológicos, jurídicos, sociales y económicos.
- Discutir criterios para garantizar la conservación y restauración de los ecosistemas acuáticos del país.

Resultados del Foro:

- 110 participantes.
- 38 instituciones que incluyen ONG´s nacionales, Universidades, Institutos de Investigación e Instituciones Gubernamentales tanto Nacionales como Internacionales.
- 5 conferencias magistrales por reconocidos ponentes internacionales : Argentina, Australia, Sudáfrica, Estados Unidos
- Desarrollo y discusión de cinco mesas redondas con las principales temáticas involucradas en la implementación de Gasto ecológico: Ecológica, Hidráulica, Social, Económica y Jurídica.
- Recopilación de principales recomendaciones para la implementación de gasto ecológico y generación de norma, por los expertos de las diferentes disciplinas tanto nacionales como internacionales
- Generación de memoria audiovisual DVD (1er disco 37 min y 2do disco 3h, 47min)
- Publicación de libro “Requerimientos para implementar el caudal ambiental en México publicado por IMTA-alianza WWF/FGRA-PHI/UNESCO-Semarnat ISBN 978-968-5536-96-7

PCCP

En este programa se trabajó en la Guía para resolución de conflictos en cuencas hidrográficas, IMTA. A continuación se tiene una reseña de la misma. En 1990 se inicia en México la transformación de la gestión del agua, y a partir de 1992 queda establecida en la Ley de Aguas Nacionales varios de los elementos que constituyen lo que actualmente se conceptúa como Gestión Integrada de los Recursos Hídricos, GIRH. Con este enfoque se inicia en México la transición de un modelo de gestión centralizada de la oferta de agua, a otro de gestión descentralizada de la demanda, teniendo como unidad de gestión las cuencas hidrológicas bajo un enfoque 'integrado', considerando a la participación social como un componente principal para lograr la autosuficiencia financiera, operar y mantener los sistemas hídricos y dirimir conflictos. El principal espacio de participación social quedó establecido en los consejos de cuenca y sus órganos auxiliares. Sin embargo, en muchas cuencas y acuíferos del país ya no hay agua disponible para más usos y usuarios, y la que existe se ve mermada en cuanto a su calidad. Esta situación ha provocado multiplicidad de conflictos entre usuarios, y que crezcan las demandas y presiones sobre el arreglo institucional para que garantice el acceso al agua en cantidad y calidad.

Con el fin de promover procesos de resolución de conflictos por el agua a una escala de cuenca o acuífero, se consideró oportuno adaptar de las distintas propuestas metodológicas para la resolución de conflictos ambientales, una que pudiera ser incorporada en la visión de quienes están a cargo del establecimiento, promoción o seguimiento de los consejos, comisiones o comités de cuenca y acuífero. Una primera actividad fue la elaboración de una manual para la mediación de conflictos por agua, enfocado a los espacios de participación social. Este manual tiene como principal objetivo apoyar el diseño

de estrategias para la intervención en conflictos por el agua en cuencas y acuíferos, con base en los principios de la resolución de conflictos a través de métodos que privilegian la negociación sobre la competencia y confrontación.

La propuesta de este manual se fundamenta en la mediación, como una de las técnicas más flexibles y aplicables bajo los principios de la gestión integrada de los recursos hídricos, GIRH, en las que se busca la construcción de opciones y alternativas a la confrontación abierta de posiciones entre las partes en disputa, con el fin de llegar a acuerdos aceptables para todos. La mediación es una de las técnicas no adversariales más conocidas. Está constituida por procedimientos a través de los cuales se busca que las partes en conflicto acepten "sentarse a la mesa" a negociar sus diferencias –respecto a su acceso a recursos o en cuanto a principios–, sin que esto implique someterse a la regulación jurídica o administrativa directa. El proceso puede ser más o menos elaborado, ya que requiere de la voluntad de todas las partes para ceder algo a cambio de que todos obtengan algún beneficio de la negociación. También establece que se incorpore en la negociación una parte mediadora, la cual debe contar con la aceptación de todos para desempeñar ese papel, y fomentar la confianza por medio de su imparcialidad frente a las posiciones en conflicto. En breve se tendrá lista una versión para su primera edición impresa, y la siguiente etapa consistirá en ofrecer talleres a funcionarios públicos, organizaciones sociales e investigadores interesados en los conflictos por el agua en nuestro país.

También se tiene prevista la organización de un informe analítico sobre la situación de varios conflictos por agua en la nuestro país que permita presentar una tipología de situaciones características de nuestras cuencas hidrológicas.

WWAP

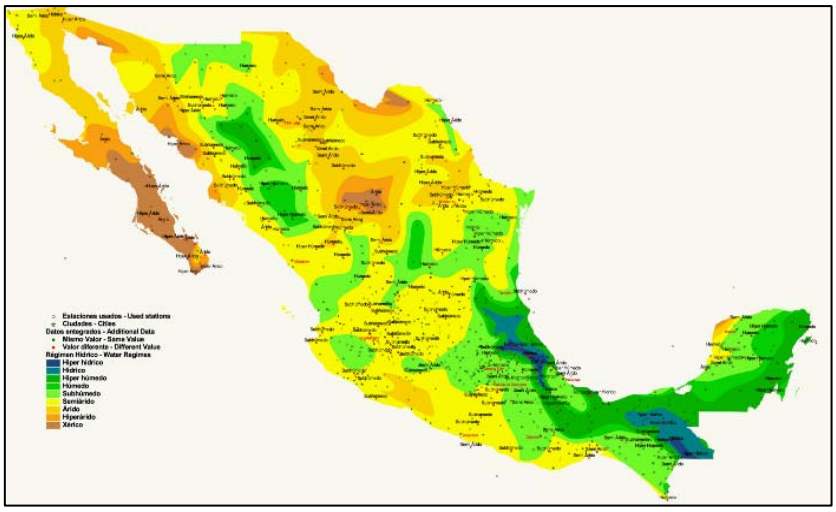
Como parte del programa se propuso realizar un Manual de balance integral de agua en cuencas hidrográficas la cual fue impresa en su versión original en español y durante el año 2007 se trabajo en la versión en Ingles dirigida a los países de habla inglesa en la región del Caribe. Estas formaron parte de las publicaciones de los documentos técnicos del PHI –LAC con ISBN 92-9089-090-8.

G-WADI

Los días 9 y 10 de octubre se llevó a cabo el taller nacional de discusión y análisis "Mapa de zonas áridas, semiáridas y subhúmedas secas de américa latina y el caribe: el caso de mexico" en las instalaciones del IMTA. Como parte del Plan de Operaciones que en conjunto CAZALAC, PHI/UNESCO e IMTA, acordaron realizar desde 2005; este taller tuvo el propósito fundamental de revisar, discutir y en su caso adecuar la metodología para elaborar el *Mapa de*

Zonas Áridas, Semiáridas y Subhúmedas Secas de América Latina y El Caribe, aplicado a México.

Resultados del taller:
• Obtención del *Mapa de zonas áridas, semiáridas y subhúmedas secas de México*, de acuerdo con los estándares de FAO.
• Aportación al *Mapa de zonas áridas, semiáridas y subhúmedas secas de Latino América y El Caribe*, según los estándares de FAO y con la metodología desarrollada por la Universidad de Chile.



Mapa de zonas áridas de México

AGUA Y EDUCACION

Con el fin de respaldar la decisión de transversalidad de la educación ambiental en los contenidos de la educación básica, En octubre de 2007 se inicio la revisión de los contenidos de educación ambiental de la educación básica (preescolar, primaria y secundaria). A la fecha se han integrado los documentos:

- Propósitos de la educación ambiental para la sustentabilidad, a fin de ser incorporados en la actualización al documento normativo de educación básica plan de estudios 2006, en el apartado iv características del plan y de los programas de estudio.
- Perfil Ambiental para los estudiantes que egresan de la Educación Básica a fin de ser considerado en la actualización al Plan de Estudios 2006.
- Propuesta de criterios para la revisión de libros y materiales de apoyo desde la perspectiva de la educación ambiental.

Como respuesta a la convocatoria de Cecadesu y UNESCO, se han incorporado al equipo de trabajo que tiene como objetivo la realización de un Seminario de

Educación, Comunicación y Cambio climático, el cual esta planeado para el mes de Octubre del presente año. El objetivo de este evento es revisar el estado actual en esta materia y proponer, respaldar y promover estrategias de educación y comunicación que involucren a la población para la mitigación, adaptación y prevención de efectos del cambio climático.

En marzo de 2008 se realizó el ciclo de conferencias y exposiciones "2008: año del saneamiento del agua", las conferencias que se presentaron fuero "Desarrollo de la biofiltración: una tecnología sustentable para el saneamiento en México" la cual fue dictada por el Dr. Marco Garzón y "Los efectos del Cambio Climático en los recursos Hídricos de México" dictada por el Dr. Ariosto Aguilar Chavez.

De igual manera se convocó a la Universidad Politécnica del estado de Morelos a la organización de un grupo de trabajo interinstitucional la cual tuvo como objetivo el organizar un ciclo de conferencias dirigido a estudiantes de diversas disciplinas de esta casa de estudios.

En el evento participaron alrededor de 80 estudiantes, se presentaron 5 ponencias, una de ellas magistral y se montó la exposición de cartel *EL agua, desde una visión de jóvenes universitarios.*

GÉNERO Y AGUA

1. Realización de un taller entre integrantes del IMTA, Red de Género y Ambiente, SEMARNAT y PNUD. El objetivo general del taller fue analizar y profundizar el contenido de la "Agenda Azul de las Mujeres" y diseñar una estrategia de seguimiento para la incidencia en las políticas públicas, así como en procesos organizativos de gestión del agua desde un enfoque de equidad de género. Resultados: Diseño de una estrategia de seguimiento de la "Agenda Azul de las Mujeres". La estrategia contempla tres ámbitos: a) incidencia en política pública, b) fortalecimiento de capacidades y c) promoción de procesos organizativos con mujeres de base.

2. Realización de un evento para la presentación de la Agenda Azul de las Mujeres a nivel nacional, con la presencia de la comisión legislativa de equidad de género, PNUD, SEMARNAT y CONAGUA, a fin de que se involucren en el compromiso de crear las condiciones para que se concrete una política hídrica con enfoque de equidad de género. Resultados: El evento contó con la presencia de 50 asistentes, provenientes de distintas organizaciones civiles, organismos internacionales, universidades e instituciones gubernamentales, entre ellos: Centro Mexicano de Derecho Ambiental, Coalición de Organizaciones Mexicanas por la Defensa del Agua (COMDA), Fundación Henrich Boell, Red de Investigadores Sociales sobre el Agua, Instituto Mexicano de Tecnología del Agua (IMTA), Comisión Nacional del Agua (CONAGUA), la Secretaría de

Agricultura. Desarrollo Rural, Pesca y Alimentación, Comisión Nacional para el Desarrollo de los Pueblos Indios, Secretaría de Energía y Programa de las Naciones Unidas para el Desarrollo (PNUD).

DESALACIÓN

En el marco de las actividades del programa de Desalinización, se desarrollo y aprobó un cuestionario con todas las coordinaciones de Desalación de Latinoamérica y el Caribe para realizar el inventario de plantas desaladoras de la región. Así mismo, se plantearon los puntos a desarrollar para los lineamientos para plantas desaladoras, que se pretenden discutir durante el 2008-2009.

Con base en la experiencia adquirida en desalación mediante el intercambio de experiencias con expertos del país (UNAM, ITSON, UBC, entre otras), se diseño, creo y desarrollo el laboratorio de membranas, el más grande de Latinoamérica, el cual cuenta con los equipos comerciales de membrana más utilizados a nivel nacional e internacional. Con ellos será posible evaluar la posibilidad de instalar una planta desaladora de agua de mar o salobre en zonas determinadas, así como para remover contaminantes específicos como F, As, entre otros. Los procesos con los que cuenta el Laboratario son: micro y ultrafiltración, filtración arena como pretratamiento, nanofiltración, OI para agua de mar, OI para agua salobre (procesos de remoción de sales), desinfección con ozono. Así mismo, se cuenta con un laboratorio para autopsia de membranas que está equipado con un microscopio de Fluorescencia de RX, así como con equipo para realizar pruebas no destructivas y destructivas de las membranas. El montaje de estos equipos en una estructura definida se realizará durante el 2008.

Con este tipo de herramientas, contará con la capacidad de realizar pruebas de tratabilidad en sitio para el diseño de sistemas de desalación (agua de mar, salobre o de pozo), así como para optimizar los pre y pos tratamientos, vida útil de las membranas y finalmente los costos de operación utilizando los procesos de membranas.

AGUA Y CULTURA

Como parte del programa Agua y Cultura de la UNESCO se propuso realizar un Atlas que dé cuenta de las culturas indígenas y su relación con el agua en América Latina y El Caribe. La importancia de este material radica en que contribuye al conocimiento sobre los pueblos originarios, ritos, mitos, conocimientos tradicionales y permite tener una base de información para consulta y conocimiento. Durante 2007 el IMTA tuvo a su cargo el desarrollo del Atlas de Culturas del Agua en América Latina y El Caribe, capítulo México, primera etapa.

Para el capítulo México el Atlas fue coordinado por el IMTA, a través del Comité Nacional Mexicano del Programa Hidrológico Internacional, para la elaboración de 22 fichas de pueblos indígenas.

Una de las actividades programadas en este proyecto fue la realización de un taller de expertos para discutir y conocer la metodología de realización de fichas por cultura. Para ello se convocaron a investigadores de las siguientes instituciones: la UNAM, el Museo de Antropología de la Ciudad de México, el Colegio de Michoacán, el Centro de Investigaciones en Ecosistemas, el Instituto Nacional de Antropología e Historia y el Archivo Histórico del Agua.

Las culturas sistematizadas fueron las siguientes:

Maya Prehispánica	Purépechas
Mexica	Otomí
Olmeca	Mixe
Chontal de Tabasco	Nahua de La Montaña de Guerrero
Tzotzi	Tlapaneco
Mazahua	Zapoteca
Nahua de la Sierra norte de Puebla	Huichol
Totonaca	Nahua de La Huasteca
Mixteca	Tepehua
Teenek	Raramuri
Huave	Xochimilca

Con la UNESCO, además de la coordinación académica del Atlas, se contribuyó con un artículo para el libro *Agua y Diversidad Cultural en América Latina*, que editó el PHI con sede en Uruguay, coordinado por Daniel Murillo Licea (IMTA) e Israel Sandré Osorio (Archivo Histórico del Agua), libro impreso durante los primeros meses del 2008.

Actividades planificadas hasta diciembre 2009

- Guía para resolución de conflictos en cuencas hidrográficas
- Diplomado en Sedimentación en forma conjunta con la UP de Cataluña
- Aplicación de metodología de Agua y Cultura a pueblos originarios de Michoacán
- Taller sobre elaboración del mapa de zonas áridas de México
- Talleres Agua y Educación para maestros y educadores no formales de México. Colaboradoras: Cecadesu, Delegaciones Semarnat, SEP, FGRA, Nestlé Waters.
- Talleres (4) de formación de facilitadores del programa Agua y Educación para las Américas y el Caribe (regionales)
- Talleres (4) de lanzamiento del programa Agua y Educación para las Américas y el Caribe en países de la región.
- Taller "Isótopos en la hidrología subterránea". Colaboradores: Organismo Mundial de Energía Atómica.
- Taller sobre "Vulnerabilidad de los recursos hídricos ante el Cambio Climático". Colaboradora: UNAM.

El Conamexphi está constituido por los siguientes programas los cuales son coordinados por las siguientes personas:

Programa	**Coordinado por**	**Coordinador Alterno**
Friend	Ing. Mario López Pérez	
Help Cuencas	Dr. Nahum García Villanueva	Dr Roberto Salmon
ISARM	Dr. Ruben Chávez Guillén	M.C. Carlos Gutierrez
ISI	Dr. Rafael Val	Dr Fabian Ribera
IFI	Dr. Aldo Iván Ramirez	
PCCP	Dr Javier Matus	Dr. Sergio Vargas
Eco-hidrología	M.I. Roberto Mejía	
Agua y Educación	Lic. Claudia Espinoza	
WWAP	Dr. Carlos Díaz	M.I. Ernesto Aguilar Garduño
GWADI	Dr. Israel Velasco	Dra Helena Cotler
Agua y Cultura	Antr. Jorge Martinez	
Agua y Genero	Dra. Denise Soarez	M. C. Patricia Herrera
Desalinización	M.I. Manuel Fuentes	

Presidente: Dr. Polioptro F. Martinez Autria
Vicepresidente: M en C. Alberto Güitrón de los Reyes
Secretario: Dr. Ariosto Aguilar Chávez

NATIONAL REPORT FOR THE 18th SESSION OF THE IHP INTERGOVERMENTAL COUNCIL
PARIS
(9 -14 June 2008)

NATIONAL REPORT OF NEW ZEALAND

1. ACTIVITIES UNDERTAKEN IN THE PERIOD OCTOBER 2006 – MAY 2008

1.1 Meetings of the IHP National Committee

1.1.1 Decisions regarding the composition of the IHP National Committee

Dr Richard P Ibbitt and R J (Bob) Curry continued as Chairman and Secretary respectively on the IHP National Committee during the reporting period. However Bob Curry has, due to his pending retirement, handed over the position of Secretary to Dennis Jamieson with effect from 1 October 2007. Bob would like to take this opportunity to thank colleagues in the RSC for their support and cooperation over the years and wishes the RSC members every success in their continued collaboration towards furthering the IHP goals and aspirations in the region.

Dennis Jamieson, who attended the RSC meeting in Manila in November 2007, has had a long association with South East Asia, beginning with water resources development projects in Northeast Thailand associated with approaches developed at Khon Kaen University in the 1980's, and continuing with other projects in the region over the years.

1.1.2 Status of IHP-VI activities

The following projects, which commenced under IHP-V, continue to be funded:

- WG 1.1 (Information on New Zealand's Freshwaters: Water Resources Archive);
- WG 2.7 (Land Use Intensification: Sustainable Management of Water Quality and Quantity); and
- WG 2.8 (Reducing the Impacts of Weather Related Hazards)

(refer IHP-V Technical Documents in Hydrology No.2 UNESCO Jakarta Office 1999 for details).

While WG 1.1 is an on-going long-term project, projects WG 2.7 and 2.8 have undergone name changes to reflect changes in research direction and the way research projects are now organised in New Zealand. Funding for WG 2.7 now extends to the end of June 2009, while that for WG 2.8 extends to the end of 2008. Both projects are subject to periodic review.

WG 1.1 – "Information on New Zealand's Freshwaters: Climate and Water Resources Archives" was reclassified some years ago as "Nationally Significant Databases" with guaranteed long-term funding. Since reclassification funding levels have been static, and have been eroded by inflation. Although advances in technology and operating efficiencies have offset some of this inflation, both the climate and hydrometric network were operating in a minimal maintenance mode with only essential upkeep, site visits and data downloads being done. Following the increase in funding referred to in last years report, activity associated with the upgrading of recording stations and instrumentation, and the general lifting of standards, particularly those associated with the maintenance of stage / flow ratings at the less stable flow recording stations, has continued.

In 2000 New Zealand started to build a national soil moisture monitoring network. These sites take time to stabilize. The network, including some local government sites, has now reached 60 in total and is increasing, as appreciation of the value of the network is gained, particularly as pressure increases to make better use of limited water available for irrigation.

The year has seen the implementation of NIWA's nationwide data logger and radio/cellular-phone/satellite communications telemetry upgrade project which was designed to replace the ageing Aquitel (1980's) telemetry system and involves the upgrading of about 180 hydrometric stations.

In addition significant reinvestment funding has been assigned to:
- upgrade the general standard of the ageing hydrometric network infrastructure;
- standardise station layouts and instrument configurations;
- station "hardening" (floods & droughts), i.e. making stations more robust to provide better data on flood and low flow conditions;
- the installation of duplicate, but independent "back-up" recording systems (to minimise occurrences of missing record);
- accelerate the conversion from conventional mechanical type current meters to Acoustic Doppler Current Profilers (ADCP); and,
- use hydraulic gauging winches in order to deploy slackline cableways on wider rivers and thus remove gauging personnel from the hazards of gauging rivers from manned cableways and busy highway bridges (important health & safety issues).

In addition the automation / telemetry of a number of key climate stations continues to be implemented. These and other initiatives have enabled a significant increase in the numbers of telemetered climate and hydrometric stations, and this has enabled the provision of expanded near real time data services, while the ease of data input has facilitated the publication of regular bulletins such as "The Climate Update" and "Water Resources Update".

Also from an operational and health and safety point of view, the satellite phones which have been introduced as standard equipment with NIWA field teams have proved their worth on a number of occasions on field campaigns into remote areas. Extremely positive feed-back has been received on the assurance and comfort of having these phones available when working alone in remote field locations. Apart from the health and safety considerations, the phones have proved extremely useful for logistical purposes where no other forms of communication are available.

As a result of the latest review of WG2.8 the funding authority has invited the National Institute of Water and Atmospheric Research (NIWA) to renegotiate future funding for this project rather than require NIWA to write a new proposal for competitive rebidding. While this is good news as it recognizes the quality and value of the work already done, it precludes any funding increase above the present value of the contract, i.e. future work will be eroded by inflation. NIWA will be working with other government agencies to further improve funding support for national hydrometric (and other environmental data networks) to ensure information is available for local, national, and international decision making.

1.1.3 Decisions regarding contribution to/participation in IHP-VI

Key components of the New Zealand hydrological research programme are aligned with IHP-VI themes in eco-hydrology and sustainability. It should be noted that the bulk of hydrological research in New Zealand is funded through the Foundation for Research Science and Technology (FRST), whose mandate is to fund research that is in the national interest. All proposals submitted to the Foundation must therefore demonstrate that results will address national needs, and alignment with IHP themes is possible only to the extent that these themes are relevant to resource management requirements in New Zealand. Additional sources of support (e.g. WMO, internal support from NIWA and other institutes) are important to maintain links with colleagues in the Asia-Pacific region.

1.2 Activities at national level in the framework of the IHP

1.2.1 National/local scientific and technical meetings

Scientific and technical meetings are generally held within the context of professional societies (particularly the New Zealand Hydrological Society) and resource management affairs (e.g. workshops organized by the Ministry for the Environment under the aegis of its National Agenda for Sustainable Water Management and the governments inter-departmental Water Plan of Action).

The Secretary and Chairman of the IHP National Committee have met regularly to discuss IHP matters.

1.2.2 Participation in IHP Steering Committees Working Groups

The Chairman is a member of New Zealand's UNESCO Science Sub-Commission where he is able to promote hydrological matters at a national level.

Dr Ibbitt and Mr Curry attended the 14th RSC meeting held in Bangkok, Thailand and attended the 12th Technical Sub-Committee meeting associated with the 14th RSC meeting. Dr Ibbitt and Mr Jamieson attended the 15th RSC meeting held in Manila and participated in associated workshops and in follow up visits to colleagues in Lao and Vietnam.

1.2.3 Research/applied projects supported or sponsored

None

1.2.4 Collaboration with other national and international organizations and/or programmes

- Sustainable Water Programme Of Action (SWPOA)
  The NZ government launched a suite of actions, coordinated through the Ministry for the Environment and Ministry of Agriculture and Forestry in 2006 to:
  - Improve the quality and efficient use of freshwater by building and enhancing partnerships with local government, industry, Māori, science agencies and providers, and rural and urban communities
  - Improve the management of the undesirable effects of land use on water quality through increased national direction and partnerships with communities and resource users
  - Provide for growing demands on water resources and encourage efficient water management through increased national direction, working with local government to identify options for supporting and enhancing local decision making, and developing best practice.

  The SPWOA takes a "whole of government approach" to deal with the situation where the existing regulatory environment was struggling to cope with issues such as, water allocation where the available water resources were becoming fully allocated.
  IHP activities under IHP-V and capabilities resulting from these activities are being used to inform the process, together with wide-ranging consultation. Specific initiatives under the SWPOA include the development of National Environmental standards for Water Measuring Devices, Ecological Flows and Water Levels, and National Policy statements for Flood Risk Management and Freshwater Management. The above tasks are particularly challenging given they aim to bring consistency to a government system that was devolved to regional authorities some 25 years ago.

- The Chairman and Secretary of the National Committee are in frequent contact with the Regional Hydrological Advisor to the President of the WMO Regional Association V, and with the Hydrological Adviser, Charles Pearson, to New Zealand's Permanent Representative to the WMO. This contact enables coordination of activities under the aegis of IHP and the WMO

OHP in New Zealand. Frequent contact is also maintained with SOPAC's Suva based Water & Sanitation Unit, through its role of representing the SW Pacific Island states on water related issues.

- SOPAC – Pacific HYCOS project

  A WMO Workshop and launch of Pacific-HYCOS meeting was organised in Brisbane, Australia. This was attended by representatives from all the Pacific Island countries and was a key step in the initiation of the HYCOS project and programme in the Pacific. The project, which is designed to establish and consolidate hydrometric network monitoring in the various countries, and provide capacity building over the next three years, was discussed in detail. Subsequent meetings were held with the two SOPAC co-ordinators with a view to assisting with the provision of standardised instrumentation and hydrometric recording equipment familiar to the countries, and the establishment of the various pilot networks. A history of the hydrometric activities that NIWA staff had been involved with in Vanuatu, Solomon Islands and Papua New Guinea over the years was provided prior to SOPAC's visit to each country to evaluate their needs. Information on the status of each country's current network operations, its hydrometric database, local staff, and instrumentation purchased in recent years, was provided, along with an assessment of each country's capabilities.

  A generic proposal was provided to Ben Parakoti – Chief Water Supply Engineer with the Cook Islands Ministry of Works for instrumentation of an existing catchment under the HYCOS programme. The proposal is to telemeter one of the existing weir sites and two rainfall sites within the catchment. The sites are believed to be within cellular phone coverage of Rarotonga and the near-real time data could be transferred to the SOPAC regional archive via the Internet

  The Chairman and Secretary of the National Committee are in regular contact with Pacific HYCOS staff and are actively working to advance key lessons from this project. The most important factor for future success will be the higher prioritization for funding and access to services (transport, vehicles etc.) for ongoing, "routine" monitoring work by Pacific countries. By the end of the project term there will be sufficient specialist equipment and trained personnel, but these advances need to be supported by ongoing local funding.

- WMO

  Important outcomes of the Brisbane WMO Workshop (Working Group on Hydrology) were support for Pacific HYCOS, initial thoughts for a South East Asian HYCOS and a hydrological training centre (Bandung, Indonesia), and strategic plans and directions for greater coordination of national Hydrological and Meteorological services across the region. The sustainability of the Pacific HYCOS after the initial three years of European Union (EU) funding was recognised as a key challenge.

- Cook Islands Hydrology Network

  Whilst visiting the Cook Islands NIWA staff member (Pete Mason) spent four days working with local colleagues from the Cook Islands Ministry of Works to reinstate the Cook Islands hydrometric monitoring programme which had all but stopped, except for one flow site. While the installations were all fine, the main problems came from a faulty serial port on the back of their borrowed laptop which was used to download data, and logger batteries that had been run so flat that they were unable to be brought back up to charge. A new set of batteries and charger were immediately air-freighted to Rarotonga with SOPAC funding support. All logger batteries were then replaced. A further day was spent gauging the three main river intakes on Mangaia Island with the Director of Infrastructure, Ora Henry. This was the first time any flow gaugings had been done on this island. All data files since the last visit have been processed and updated to the Pacific Islands section of the Hydrometric Database. Since the support funding finished two years ago, there has been a lot of missing record, which is clear evidence that even the simplest of networks will not survive without proper support.

  On another occasion a NIWA donated, used Panasonic CF27 laptop was sent to the Cook Islands Ministry of Works after receiving word that the hard drive had failed on their field laptop.

This replacement laptop will be used to download all the field loggers until funding can be obtained to buy a new replacement laptop. Two rain-loggers were serviced and also sent as back ups to those already in the field

Such technical advice, assistance and maintenance of equipment service is typical of the type of on-going support required by Pacific Island nations. The level of work required is modest and will contribute to critical decisions about water resource availability and its use. However, such arrangements need to be formalised and funding arrangements made if long term monitoring networks are to survive.

- Samoa hydrometric network upgrade
  A total of 16 Hydrologgers were provided to Samoa via NIWA Instrument Systems, signaling the start of an upgrade of their hydrometric network, facilitated via SOPAC.

- Fiji - Navua & Rewa Flood Forecasting Projects
  NIWA staff (John Fenwick, Marty Flanagan, Martin Robertson) were contracted by SOPAC to undertake an EU funded telemetry and flood forecasting project on the Navua catchment on the main island of Viti Levu in Fiji. The Navua project involves the supply and installation of telemetered rainfall and river flow monitoring equipment and a flood forecasting system, together with the appropriate training required for the Fiji Public Works Department to operate the system.

  Three water-level and rainfall stations were installed and commissioned, as was a fourth rainfall-only station and the main telemetry base station at Suva which was set up to run the Flosys 2 data management software. Remaining work includes a visit to re-set the radio frequencies once these are established at the repeater, setting and/or checking the TDServer/Client data transfer operation (with the broadband connection), refining alarms and the development of the forecasting model after some initial data collection at these new sites.

  The Flosys hydrology data collection telemetry system is to be operated by the Hydrology section of the former PWD in Suva. Advanced warnings are to be forecast by running a flood forecasting model developed by NIWA which will be operated by the Fiji Meteorological Service (FMS) in Nadi, and warnings disseminated to the general public by the National Disaster Management Office (NDMO).

  On a related project, advice was received from SOPAC that the EU funded flood warning and forecasting project in the Rewa catchment in Fiji has been approved. This proposal is similar to the project already underway for the Navua catchment, with many synergies existing with instrumentation, equipment, installation, flood forecast modeling etc.

- Palau hydrometric network upgrade
  NIWA (John Fenwick) was contracted by SOPAC to undertake the appraisal and reporting on the proposed reinstatement of ex-USGS hydrological stations (8 flow and 5 rainfall) in Palau. A visit to Palau was made to install the Tideda hydrometric database software, provide the data converted from USGS format, and assess the needs for an on-going programme. Most of this work was carried out with the Environmental Quality Protection Board (EQPB). Following the evaluation a senate briefing paper was provided and an evaluation report was prepared detailing the “data rescue” from USGS format to Tideda, and detailing the resource, engineering and hardware needs for re-establishment of the stations and an on-going hydrometric programme for the main island of Babeldoab. Providing the Palau Government finds resources (a staff member), then funding will be available from the EU via SOPAC for the second phase - the upgrade of the network (including equipment procurement and installation) and data management system.

- Papua New Guinea – Ramu River flow monitoring
  A proposal from the PNG Department of Environment and Conservation to SOPAC for a flow monitoring system in the Ramu River has been approved in principle by the EU, and the PNG

Water Resources Management Bureau (WRMB) has requested a quotation. This was provided in the form of the above mentioned Pacific HYCOS generic proposal and will be further modified to suit the Ramu case. This project is to monitor the environmental effects of a proposed Nickel and Cobalt mining operation in the lower reaches of the Ramu catchment

- Papua New Guinea – Digitiser acquisition
  An investigation into available digitisers suitable for digitising rainfall and water-level charts was undertaken following a request from the Water Resources Management Branch of the PNG Department of Environment & Conservation. It is understood that SOPAC may fund this acquisition for PNG and possibly other Pacific Island countries. A similar request for a suitable digitiser was received from Sri Lanka showing the emphasis countries are placing on the rescue of old chart record data for archiving on electronic databases.

- Papua New Guinea – Data Rescue
  Following a change of data processing software the PNG Bureau of Water Resources was left without access to much of their early hydrological data. Over the past two years the old data files have been retrieved and been the subject of international collaboration to translate the data into Tideda format consistent with the current PNG operated hydrological data processing software. The conversion began with the Australian Bureau of Meteorology (Ross James), converting the old files into a text format that NIWA (Richard Ibbitt, Jani Diettrich) with financial support from SOPAC (Llyod Smith) were then able to convert into Tideda format and assemble into a hydrological archive for return to PNG.

- Vanuatu – Data Rescue
  Following a change of data processing software the Vanuatu authorities were left without access to much of their early hydrological data. The problem was exacerbated when offices of the Department of Mines, where the data were stored, were recently destroyed by fire. Owing to the foresight of a SOPAC hydrology specialist (Llyod Smith) who visited the offices just before the fire, an electronic copy of the more recent Tideda data was made. Earlier electronic data files held in Noumea were not affected. However, it is understood that most, if not all, paper records were lost in the fire. NIWA (Richard Ibbitt, Jani Diettrich), with support from SOPAC and assistance from Noumea (Geoffroy Wotling) have recently completed conversion of the Excel files into Tideda format, combined the data with the "rescued" Tideda data, and assembled the surviving hydrological data for Vanuatu into a hydrological archive. Copies of the data have been supplied to Vanuatu and SOPAC. This incident is not the first time that hydrological data has been lost to fire in the Pacific region and serves to remind everyone of the need to make back up copies that are stored off-site. NIWA and SOPAC are happy to provide off-site storage facilities for copies of electronic data.

- Republic of Korea Water Resources Association – MOU with NZ Hydrological Society
  An MOU between the NZ Hydrological Society and the Republic of Korea Water Resources Association (KWRA) was signed in Wellington on 13 February 2007. Present at the signing ceremony were representatives of both organisations (Prof JaeWoo Song – President, KWRA plus three KWRA delegates, and Paul White & Tim Davies – past and present President, HydSoc), the Korean Ambassador to NZ (His Excellency Joon-gyu Lee), FRST (Anne French), MoRST (Amanda Tomlinson), The Royal Society (CEO – Steve Thompson and Eddie Davis – Manager International). The MOU aims to promote collaboration between the two societies through attendance at annual conferences and exchange of publications. Further to the MOU, in May four NZHS members gave papers at the KWRA annual conference in Gangwon Province, South Korea. In November NZHS will host four KWRA delegates at the NZHS annual conference in Rotorua. Further details on this collaboration can be found at: http://www.hydrologynz.org.nz/KWRA_link.php

- Lao PDR – hydrometric data collection reviews
  NIWA continued to provide review and analysis of hydrometeorological data collected by the Department of Meteorology and Hydrology (DMH) for the Nam Theun Power Company (NTPC).

1.2.5 Other initiatives

Diatom invasion - Didymosphenia geminata

Concern about the spread of the diatom *Didymosphenia geminate* continues. The alga, which forms massive slimes over riverbeds and which appears to have been introduced by tourist fisherman, is slowly extending its range over South Island rivers and has been declared to be an 'unwanted species' in New Zealand because of the way it affects the quality and pristine status of our key trout fishing rivers. MAF has implemented a wide-scale containment strategy: actions have included preparing fact sheets, provision of information on the alga's biology to regional government agencies, and work to assess rates of dispersal, potential risks, habitat requirements, and border control / disinfection measures.

Trials to test biocides that might be used to control didymo have identified a compound that has proved effective in a trial situation, and which could be used in streams with flows up to 10 m^3/s and where an economic justification can be shown.

Regional government agencies have been trained to recognize the alga and carry out periodic surveys of their regions. In November 2007 a national survey will be carried out to identify the current extent of the alga.

EcoConnect

Eco-Connect is a system aimed at delivering accurate weather forecasts for environmental forecasting. It uses a meso-scale weather model (NZLAM) run on a super-computer to downscale global weather forecasts with assimilation of satellite data which are delivered through a standardized information portal. Forty-eight hour forecasts are produced on a 12 km grid covering New Zealand. Output from the weather model is now input to five calibrated river basin models. Furthermore the operation of the rainfall-to-runoff models has been enhanced by introducing assimilation of hydrological data into each model. This process enables more accurate forecasts as the latest data on the state of the catchments is automatically included in each forecast. Over the past 18 months presentations have been made of the system to many local government agencies responsible for flood warning and also to the NZ Minister of Science and Technology.

1.3 Educational and training courses

1.3.1 Contribution to IHP courses

None.

1.3.2 Organisation of specific courses

Courses and workshops are generally organized in New Zealand to meet national needs. Because of the country's relative remoteness and distinctive resource management requirements, courses are not always suitable for participation by people from overseas.

NIWA Courses / workshops

Over the course of a year NIWA provide many courses for regional government agencies and their own staff. These cover many topics from general hydrological training to courses on specific topics. For examples of the courses and a full program for the coming year please refer to http://www.niwascience.co.nz/edu/unitech.

NZ Hydrological Society Workshops

The following workshops were conducted by the NZ Hydrological Society in conjunction with the NZ Association of Resource Management and the Meteorological Society of NZ at their annual joint symposia in Christchurch (ref 1.5.1):

- Uncertainty in model predictions
- How should groundwater be allocated?
- National groundwater Monitoring Programme: water quality with age
- Sustainable nutrient management
- Where to with telemetry?

ADCP Training for regional councils
NIWA provided training to several regional councils in the use of Acoustic Doppler Current Profiler (ADCP) instrumentation to measure river flows. This training was provided on a one-to-one basis with individual council staff through an "Envirolink" funding initiative offered by the New Zealand Government to foster technological and knowledge transfer from research institutions to smaller regional councils.

Hydrology of Ungauged Basins
A two-day training course on the Hydrology of Ungauged Catchments was attended by 10 Regional Council staff and consultants. The course covered new methods and national data resources to assist in estimating streamflow information (mean flow, seasonal patterns, floods, low flows) in ungauged catchments. A particular emphasis was placed on using the river network from the River Environment Classification as a method for organising data about rivers.

1.3.3 Participation in IHP courses

See 1.3.1.

1.4 Publications

Contributions to IHP publications have been principally through the Regional Steering Committee and the Asia-Pacific FRIEND. Other publications related to IHP activities include:

- Mean Annual Low Flow Model
  We have completed development of a new method to estimate mean flows in ungauged catchments (Woods, R. A., J. Hendrikx, et al. (2006), "Estimating mean flow of New Zealand rivers." Journal of Hydrology (NZ) 45(2): 95-110.), using a new national rainfall map (Tait, A., R. D. Henderson, et al. (2006). "Spatial interpolation of daily rainfall for New Zealand." International Journal of Climatology 26(14): 2097-2115.). Work is now focusing on long series of monthly flow data at several hundred locations throughout NZ.

- The "Climate Update" monthly bulletin
  The National Climate Centre (NCC) has published a further 12 issues (88 to 99) of the monthly circular entitled "The Climate Update". (http://www.niwa.co.nz/ncc/cu/archive) This publication summarises each month of New Zealand's climate, including soil moisture and river flows. It also predicts the following three month's climate, soil moisture and river flows, and states how good was the previous month's forecast. Prediction of river flows continue to be used by Greater Wellington Water as input to its water supply planning for summer low flow periods.

- The "Island Climate Update" monthly bulletin
  The National Climate Centre (NCC) has published a further 12 issues (73 to 84) of the monthly circular entitled "The Island Climate Update" (ICU). This NZAID, funded bulletin provides an overview of the present climate in tropical South Pacific Islands and a forward outlook, which continues to be published, and circulated widely throughout the South Pacific. (http://www.niwa.co.nz/ncc/icu/archive).

  The ICU, produced by NIWA's NCC in collaboration with SOPAC, is a multi-national project with important contributions from the meteorological services of countries around the region. The bulletin provides El Nino/Southern Oscillation and seasonal rainfall forecasts, discusses climate developments each month and provides a tropical rainfall outlook for the next three

months and tropical cyclone outlooks during the cyclone season. It also includes an editorial on some topical aspect of relevance and interest to end-users.

NZAID via SOPAC continues to support this activity through 2007 and to focus on climate effects on end users and a more collaborative and consultative approach with the recipient countries.

- "Water Resources Update" bulletin
  The National Centre for Water Resources (NCWR) has published a further 5 issues (19 to 23) of the bulletin entitled "Water Resources Update" (http://www.niwa.co.nz/ncwr/wru/archive) This publication summarises seasonal groundwater, river flows, water clarity, water temperature and slime (periphyton) and focuses on a number of topical issues confronting New Zealand scientists.

- Access to climate and water resources information
  NIWA has developed a real time environmental data site called EDENZ (**E**nvironmental **D**ata **E**xplorer **N**ew **Z**ealand) which is available to the public on the web (http://www.edenz.niwa.co.nz) .

  EDENZ provides visitors with near real-time access to Foundation for Research, Science & Technology (FRST) Public Good Science and Technology (PGS&T) funded data that are collected from the NIWA nationwide network of monitoring stations, installed as a component of the Nationally Significant Database programme.

  Data on this site are automatically transferred using a national telemetry network and are un-audited. The goal of this programme is to provide comprehensive and accessible data as a basis for improved knowledge on New Zealand's climate and freshwater resources.

  The programme collects, stores, and disseminates data from national monitoring networks, and comprises two core nationally significant databases - the Climate Database (CliFlo) and the Water Resources Archive. The data include air temperature, barometric pressure, wind direction, rainfall, lake and river water levels, river flows and sediment loads, and river water quality variables.

  A key aspect of the archiving programme is application of stringent quality control procedures ensuring national consistency and providing assurance that data can be confidently used for scientific and planning purposes.

  A recent review of NIWA's policy with regard to charging for labour in the provision of FRST funded data from its Nationally Significant Databases (includes clmate and hydrometric archives) has been undertaken. As from the 1st July 2007 free access has been provided to all 100% FRST funded climate and hydrological data via the automated web based systems "CliFlo" and "EDENZ" (Environmental Data Explorer New Zealand) located on the NIWA website. This includes all hydrometric data from NIWA owned sites which are fully or partially funded by FRST, the terms and conditions for release of data from jointly funded sites being subject to individual site arrangements with the respective co-funders.

  Free access to CliFlo in particular has seen an exponential increase in the use of the data. Usage rates are up by 4.5-fold (> 15 million rows downloaded in July) compared with last years monthly average, and there were ~550 registered users (up > 4 fold). A similar pattern has been observed with the greater use of the hydrometric data around the country.

  The change in NIWA policy reflects changes in expectations by NIWA's owner and aligns with the long term position of NIWA personnel that easier access to data provides local, regional, national and international benefits.

1.5 Participation in international scientific meetings

1.5.1 Meetings hosted by the country

NZ Hydrological Society Annual Symposium

The annual conference of the New Zealand Hydrological Society, was held from the 20-23 November 2006 in Christchurch, New Zealand with the theme "Resource management under stormy skies: Water allocation @ the crossroads?" The Symposium was run in conjunction with the New Zealand Association of Resource Management and the Meteorological Society of New Zealand

1.5.2 Participation in meetings abroad

- New Zealand was represented at the 15th RSC meeting and scientific conference held in Bangkok, Thailand, 19-20 November 2007 by Dr Ibbitt and Mr Jamieson.
- New Zealand was represented at the 14th RSC meeting and scientific conference held in Bangkok, Thailand, 19-20 October 2006 by Dr Ibbitt and Mr Curry.
- Dr R A Woods convened a special session at the American Geophysical Union meeting in December 2006 on the topic of classification and similarity in hydrology.
- Dr Woods attended a PUB workshop on "Model Diagnostics" in Tucson, Arizona, USA in April 2007.
- Drs R A Woods and M P Clark attended the IUGG meeting in Perugia, Italy in July 2007. Dr Clark gave a keynote address while Dr Woods attend the Prediction in Ungauged Basins (PUB) workshop and contributed to the PUB report of the workshop.

1.6 Other activities at regional level

1.6.1 Institutional relations/co-operation

There is considerable contact between New Zealand and other UNESCO Member Countries in the Asia-Pacific region, principally through overseas development assistance and consulting. For example, the Tideda hydrological database management system has been or is being installed in various agencies in Australia, Cambodia, Indonesia, Malaysia, Vietnam, Cook Islands, Fiji, Samoa, Solomon Islands, Papua New Guinea, Vietnam and Vanuatu. Many such contacts have been enabled via the IHP, even though subsequent work has been in the context of bi-lateral assistance.

New Zealand Government Assistance In Development (NZAID) recognises the importance of effective water management in efforts to achieve sustainable development in the Pacific and look forward to continuing their engagement in the Pacific Type II Partnership Initiative on Sustainable Water Management.

Pacific Island Mentoring and Technical Assistance

NIWA staff were involved in liaising with, and mentoring, of staff of the various water resources agencies in the various Pacific Island nations throughout the year. This involved technical assistance with hardware and software systems and general advice on the installation and operation of hydrometric stations. A proposal is currently being considered by SOPAC / NZAID for the funding of this essential activity.

Cook Islands Ministry of Works

A request has been made from the Ministry of Works, Rarotonga, to price the construction of another weir and flow station in the large Avana catchment on the eastern side of the island. Also requested were two more automatic rainfall recorders for the top and bottom areas of the catchment. The work is being supported by Geoff Mavromatis, Team Leader of Lincoln International who are coordinating research studies in the same area.

NZ Hydrological Society Workshops

The following workshops are scheduled to be run in conjunction with the NZ hydrological Society's annual symposia on 20 November 2007 (above):

- Water Programme of Action & emerging fresh water issues (led by NZ Ministry for the Environment)
- Forest hydrology
- GIS and hydrology
- Water quality and water allocation in the horticulture industry
- Hydrological statistics

15th Regional Steering Committee Meeting

Attendance at the 15th RSC meeting in Manila from 19-23 November 2007 and the associated meetings.

2.2 Activities planned for 2008

Scientific activities planned at the national level are, as explained in Section 1.1.3, within the context of the research programme funded by the Foundation for Research Science and Technology (FRST). A significant proportion of this activity will be in areas that are included within the IHP, but is not explicitly implemented as a component of the IHP.

Future activities are expected to depend very much on decisions reached by the Regional Steering Committee, and we are committed to participate in its deliberations, with the intention of being involved in future scientific work at the regional level.

NIWA Courses

Further training courses for regional council and NIWA staff will be provided as follows:

- Hydrological data collection
- General environmental data logging
- Hydrological statistics
- ADCP flow measurements
- Advanced flow regime analysis

For a full list of courses refer to http://www.niwascience.co.nz/edu/unitech

These courses are also open to overseas participants.

Snow and Ice Monitoring Network

A new project, funded from NIWA's Strategic Capex Fund, has been initiated this year for the establishment of a snow and ice monitoring network to measure snow depth and mass, glacier thickness and meltwater outflow, and high-elevation climate data.

Snow and ice are New Zealand water resources that are likely to be subject to significant change over the next 20-100 years, depending on the pace of global climate change. Such changes will have significant impacts on the hydro-electricity, agriculture and tourism/skiing industries. The changes are likely to be increased rainfall and temperature, leading to possibly less snow and more rain, more river flow and less snow cover in winter, and possibly less river flow in spring. These projected changes in the amount and seasonal pattern of river flows have not been quantified in detail, and remain research questions. Such changes would be desirable for electricity generation (assuming current demand patterns are unchanged), but undesirable for irrigators and tourism/skifield operators.

In the first year of development of the NIWA Snow and Ice Monitoring Network, 3 lower elevation sites were established. These were located on existing infrastructure at Mt Cook (730m), Arthur's Pass (620m) and at the Chateau at Ruapehu (1120m). This year the plans are well underway for

the establishment of several high elevation remote alpine stations (elevation ranges from 1200-2400m) in various parts of the New Zealand mountains. Once established these sites will provide valuable real time observations of alpine climate, snow and ice in New Zealand. Besides the regular monitoring a field data campaign was held in September. During this campaign extensive measurements of snow density and depths were made in the Jollie catchment to improve process understanding and spatial variability.

Hydrological support programme proposal for the Pacific

During the 1st course of the Pacific Islands Hydrological Training Programme held in Suva in April/May 2004, it was identified that major constraints to effective operation for most countries were skills shortages, failure of equipment, inadequate resources for repair and servicing of instruments, and the lack of funds for software purchase and maintenance. These constraints were further evident during the 2nd and 3rd courses which were held in Suva during April / May 2005 and June 2006. It is obvious that many of these constraints have a massive negative effect on the availability of information on water in Pacific Island countries – but that they are individually minor issues that could be resolved by some carefully targeted, practical training and "collegial" support.

A project whereby NIWA provides hydrological database software maintenance, instrument and equipment repairs and maintenance, database management support, and an in-country technical colleague mentoring and a year-round technical support service, has been proposed jointly with SOPAC in collaboration with the National Hydrological Services (NHS's) in the Pacific. NZAID have indicated its support for such a programme which will provide continuity of assistance to NHS's and complement parallel bilateral water resources based aid projects. NZAID support is still to be finalised pending assessment of the need that is being carried out by the Pacific HYCOS implementation personnel. In the meantime the HYCOS program is providing some support so that a partial service can be maintained.

2.3 Activities envisaged in the long term

New Zealand, with large freshwater resources and the need to balance water use (particularly for irrigation) in agriculture and hydropower against the needs to maintain high quality aquatic environments for other industries and uses has been active in Hydrology and Ecohydraulics for many years. Activities associated with Hydrology and Ecohydraulics, introduced to UNESCO as part of IHP-5, have continued to evolve and develop. This has provided seamless integration from IHP-V, through to IHP-VII. This continuity, both by funding agencies in New Zealand and through UNESCO interest, is leading to significant technical and policy advances and the ability to evaluate new risks and opportunities affecting aquatic environments. This is expected to continue.

The latest initiative based on these IHP activities has been the release of a proposed National Environmental Standard and supporting documents in May 2008 by the Ministry for the Environment. This material will be subject to considerable public scrutiny and debate. Progress will be reported at the16th RSC meeting and scientific conference held in Ulaan Baatar, Mongolia in October 2008 by Dr Ibbitt and Mr Jamieson

Continuation of the:

- NZAID funded Pacific Hydrological Training Programmes as required;
- NZAID funded monthly "Island Climate Update" publication with stronger links to end users.
- Monthly NZ "Climate Update" publication.
- Periodic "Water Resources Update" publication.

Commencement of the formal Pacific-wide hydrological support programme (if approved), as outlined in Section 2.2 above.

Norwegian Hydrological Council

NATIONAL REPORT ON IHP RELATED ACTIVITIES

NORWAY

1. ACTIVITIES UNDERTAKEN IN THE PERIOD JULY 2006 – MAY 2008

1.1 Meetings of the IHP National Committee

1.1.1 Decisions regarding the composition of the IHP National Committee

The Norwegian Hydrological Council (NHR) acts as the national IHP-committee. There are 20 member institutions; each represented in the Council. The Council holds one annual meeting, and its steering committee meets 5-6 times a year.

1.1.2 Status of IHP-VI activities

FRIEND.
Norway has been represented in the Northern Research FRIEND Steering Commitee by Lena Tallaksen, University of Oslo.

Until december 2006 Tallaksen was the leader of project 2 : Low Flow. From december 2006 Tallaksen has been a member of the prosject group. Other Norwegian members are: Hege Hisdal (Norwegian Water Resources and Energy Directorate) and Anne Fleig (University of Oslo).

Norwegian member in Project 3: Large scale variations in hydrology characteristics are Lars Gottschalk (University of Oslo), Irina Krasovskaia (University of Oslo) and Kolbjørn Engeland (SINTEF).

Norwegian members in Project 4: Techniques for extreme rainfall and flood runoff estimation were Thomas Skaugen, Lars Roald and Elin Langsholt (all Norwegian Water Resources and Energy Directorate).

Severel Norwegian scientists attended the 5th FRIEND Conference in Havana, Cuba, 26 November – 1 December 2006.

1.2 Activities at national level in the framework of the IHP

1.2.1 National/local scientific and technical meetings

NHR organises many meetings and workshops at national and regional level in Norway, which attract contributions from both the academic (universities and research institutes) and operational sectors. Recent events have included:

- Estimating pollution inflow to lakes and coastal waters
- Water research and water management 2007
- Water - in short supply? World Water Day 2007

- Weather forecast: Extreme and erratic - Are we prepared for the consequences?
- Water for life - Sanitation for better health and environment, World Water Day 2008
- Norwegian water research 2008. Winter in Norway - A thing of the past?

1.3 Publications

NHR publishes presentations from their conferences/workshops on web-site : www.hydrologiraadet.no

1.4 Other activities at regional level

1.4.1 Institutional relations/cooperation

NHR`s steering committee has visited the Norwegian UNESCO-delegation in Paris and the IHP-Secretariat in Paris in november, 2007.

NHR participated on the Regional meeting of Electoral Group 1 on the IHP in Istanbul on 20-21 September, 2007.

2. FUTURE ACTIVITIES

2.1 Activities planned until December 2009

Norwegian scientists intend to continue their participation in IHP initiatives, like FRIEND.

The Norwegian representative Jim Bogen, who is leading ICCE, is also contributing to this Scientific Assembly in arranging an ICCE workshop in co operation with ISI and WASER, in connection with the conference/ assembly “Water: A vital Resource under Stress – How Science can help.”, the 8th IAHS Scientific Assembly, Hyderabad, India, 7-12 September 2009.

National meetings :

- Hydrology in the Arctic climate, Longyearbyen, june 2008
- Climate change and infrastructure, autumn 2008
- Excursion to Southwest Norway – Hydrology and water management, autumn 2008
- Hydropower hydrology, autumn 2008
- World Water Day 2009
- Hydrological Research 2009

2.2 Activities foreseen for 2010-2011

Norwegian scientists intend to continue their participation in IHP - initiatives, like FRIEND.

National meetings :

- World Water Day 2010, 2011

Ministry of Regional Municipalities and Water Resources
Sultanate of Oman
National Report on IHP Related Activities

1. - Activities and Framework in the Period July 2006 to May 2008

1.1 - Meetings of Oman IHP National Committee:

1.1.1- Decision regarding the composition of Oman IHP National Committee:

Oman National Committee for IHP has initiated in 1997 by a Ministerial decision No. (257/97) from The Ministry of Water Resources and has been reissued in 2005 by a Ministerial decision No. (224/2005) from Ministry of Regional Municipalities, Environment and Water Resources after merging of the two Mysteries. Oman National committee has representatives from the Ministry of Health, Ministry Housing, Electricity and Water, Ministry of Agriculture, Office of Dhofar Governorate, Muscat Municipality, Oman Commerce and Industrial Chamber, Sultan Qaboos University and Petroleum Development Oman.

The committee normally holds three meetings annually in March, August, and in December of each year. The December meeting usually discussed the program conducted during the year and plans the new program for the next year. Also extra meeting can be conducted according to the needs especially in the implementations of seminars and workshops. The Objectives of Oman National Committee include:

- Making recommendations on Oman's participation in the UNESCO International Hydrological Program and assisting upon request in the formulation and review of other UNESCO international water resources activities.

- Providing advice on local and international activities related to UNESCO programs that advance research, education, or training in water resources sciences or the application of water resources sciences to specific problems.

- Providing advice to local organizations involved in water resources activities.
- To make contacts with international organizations and agencies thorough in order to obtain the recent technical information and assistance available within the mandate of such organizations and agencies.

- To obtain technical assistance form IHP and UNESCO through its contacts and exchange of knowledge and experience with national, regional and international organizations.

1.1.2 - Status of IHP-VI activities.
1.1.3 - Decisions regarding contribution to/ participation in IHP-VII.

1.2 – Activities at National Level in the Frame Work of the IHP:

1.2.1 - National / local scientific and technical meetings

- **Celebrating world water Day 2007** through a large seminar on coping with Water Scarcity (Use of Brackish Water and Contamination Prevention) 21st of March 2007. The Seminar addressed diverse topics related to water and its scarcity, and provided an excellent opportunity for scholars and practitioners from a variety of disciplines and different parts to meet and discuss the many fascinating aspects of water. The major themes of the seminar were :

  - Water Contamination, health and Sanitation.
  - Contamination Prevention Issues.
  - Use of Brackish Water for Food Production.
  - Sustainable Groundwater Management.
  - Investing in Water Supply and Desalination.
  - Meeting the Challenge of Water Scarcity.
  - Salinity Problems in Coastal Aquifers.

- **International Workshop on Flashflood in Urban Areas and Risk Management 4th to 6th of September 2006;** Oman National Committee for IHP has contributed in the workshop as an organizer with the Ministry of Regional Municipalities and Water Resources.
- Oman National committee attended the **Seventh Secession of the Water Resources Committee in ESCWA Region** that was held in Muscat during the period of 20th to 22nd of March 2007 and participated in Muscat Regional Water Week from 18th to 22nd of March 2007.
- **Water Demand Management in Urban Areas in the light of Tourism Development and Need for Water – 2-4 September 2007;** Oman National Committee for IHP has contributed in the workshop the objectives of the symposium was to direct attention towards the adoption of the principles of integrated water resources management. The Symposium covered the following aspects :

  - Water desalination, wastewater treatment and use of non-conventional water resources in order to decrease demand for fresh water
  - Review of types and patterns of current water uses and the application of the principles of integrated water resources management and water demand management .
  - The importance of the tourism sector as a source of national income and achieving a balance between supply and demand for water within the tourism sector and rationalization of water use in the tourism sector through the use of water conservation devices and techniques in hotels and accommodation facilities
  - Contribution of traditional knowledge towards mitigation of stress on water resources.

- The effect of decentralization of demand management on water and its efficient and rational use at the local level.
- Regional and national cooperation in management of local and trans-boundary water resources and review of available means and expertise in the field of demand management and water conservation.
- Socioeconomic analysis of the costs and benefits of various institutional arrangements as well as the analysis of the effect of economic mechanisms (taxes, pricing and valuation) on the use of available water.
- Exchange of expertise in modern techniques for comprehensive policies and strategies of integrated water resources management and requirements for their development and implementation in social, economic, health and environmental settings. Review of the expertise available in this field in the participating states and international and national organizations.
- Dissemination of knowledge related to water demand management and water awareness programs.

- Oman National Committee for IHP has contributed in the **Fourth International Conference on Wadi Hydrology 2 - 4 December 2007** that was held in Muscat in cooperation with UNESCO and other international and regional organizations. The main objectives of the conference were:

  - To improve the understanding and knowledge of the hydrological processes in arid and semi-arid zones with emphasis on Wadi Hydrology.
  - To develop a concept of integrated and sustainable development and management of wadi systems and improve methodologies and education on coping with water scarcity in dry regions.
  - Improving and consolidating knowledge on the physical processes of Wadi Hydrology through research and development;
  - Enhancing the water resources development and management capabilities in Wadi systems through the development of approaches and cost effective techniques for the integrated development and management of wadi systems.
  - Strengthening human resources, awareness and institutional Capacity Building.

- Oman National Committee for IHP has have celebrated the World water day 2008 (Water and Sanitation) with the Ministry of Regional Municipalities and Water Resources and Sultan Qaboos University.

1.2.1 National/local scientific and technical meetings

Oman National Committee for IHP has undertaken 3 meetings in the year 2006 and 3 meetings in the year 2007 as well as it received students from Sudan University on a scientific visit to Oman. The invitation was supported by the Ministry of Regional Municipalities and Water resources in Oman. The visit was continue to 2 weeks where the student has made several activities and made many scientific and research visits.

1.2.2 Participation in IHP Steering Committees/Working Groups
1.2.3 Research/applied projects supported or sponsored
1.2.4 Collaboration with other national and international organizations and/or programmes
1.2.5 Other initiatives

1.3 Educational and training courses

1.6.2 Contribution to IHP courses
1.6.2 Organization of specific courses
1.6.2 Participation in IHP courses

1.4 Cooperation with the UNESCO-IHE Institute for Water Education and/or international/regional water Centers under the auspices of UNESCO

Oman National Committee have contributed in all workshops that have been organized by RCUWM and the Ministry of Regional Municipalities and Water resources in Oman especially in the workshop Recommendations for the International Workshop on Demand Management in Urban Areas in Light of Tourism Development from 27th to 28th of August 2007 in Muscat, Sultanate of Oman. The workshop have recommended countries to address water demand problems through diversification of water resources and use of non-conventional water resources such as desalination of seawater , rainwater harvesting and use of treated wastewater for irrigation.

- To achieve sustainable development goals and improvement of living standards, it is therefore a need to coordinate efforts in order to develop an integrated strategy aiming at rationalization of water consumption world wide.

- Rationalization of water use in the tourism sector through the use of water conservation devices and techniques in hotels and accommodation facilities and the Contribution of traditional knowledge towards mitigation of stress on water resources is highly recommended.

- The effect of decentralization of demand management on water and its efficient and rational use at the local level.

- Regional and national cooperation in management of local and trans-boundary water resources and review of available means and expertise in the field of demand management and water conservation is required.

- Socioeconomic analysis of the costs and benefits of various institutional arrangements as well as the analysis of the effect of economic mechanisms (taxes , pricing and valuation) on the use of available water is needed.

- Countries are required to exchange expertise in modern techniques for comprehensive policies and strategies of integrated water resources management and implementation in social, economic, health and environmental dissemination of knowledge related to water demand management and water awareness programs.

1.5 Publications

1.6 Participation in international scientific meetings

1.6.1 Meetings hosted by the country
1.6.2 Participation in meetings abroad

1.7 Other activities at regional level

1.7.1 Institutional relations/cooperation
1.7.2 Completed and ongoing scientific projects

2. FUTURE ACTIVITIES

2.1 Activities planned until December 2009

Oman National Committee for IHP will have 2 more meetings in the year 2008 and 3 meetings in the year 2009 as well as it will contribute in the International Conference in Water Resources and Climate Change in MENA Region that will be held in Muscat from 2- 4 November 2008. The committee also will plan to celebrate the WWD 2009 and also plan to attend the meetings of the of Oman Water Society which is under initiation. The Committee will give support to the new born society.

2.2 Activities foreseen for 2010-2011

Oman National Committee for IHP will cooperate in all the scientific activities regiponaly and locally as well as will contribute in all the IHP meetings.

2.3 Activities envisaged in the long term

REPÚBLICA DEL PERÚ

PROGRAMA HIDROLÓGICO INTERNACIONAL
De la UNESCO para América Latina y el Caribe

COMITÉ PERUANO PARA EL PROGRAMA HIDROLÓGICO INTERNACIONAL
(C O N A P H I - PERÚ)

SERVICIO NACIONAL DE METEOROLOGÍA E HIDROLOGÍA

S E N A M H I

Informe Nacional de las Actividades Desarrolladas CONAPHI - PERÚ 2006 - 2008

Lima - Perú

2008

SERVICIO NACIONAL DE METEOROLOGÍA E HIDROLOGÍA

COMITE NACIONAL PARA EL PROGRAMA HIDROLÓGICO INTERNACIONAL DEL PERÚ

PRESIDENTE DEL CONAPHI - PERÚ

Mayor General FAP (r) WILAR GAMARRA MOLINA

PRESIDENTE EJECUTIVO DEL SENAMHI

VICEPRESIDENTE DEL CONAPHI – PERÚ

Ingº CARLOS PAGADOR

REPRESENTANTE DEL INRENA

SECRETARIO TÉCNICO DEL CONAPHI – PERÚ

M.Sc. Ingº JUAN JULIO ORDOÑEZ GALVEZ

LIMA - PERÚ
2008

Contenido del Informe

1.- Actividades realizadas en el período Julio 2006 – Mayo 2008

Durante dicho período, el CONAPHI – PERÚ ha desarrollado actividades conducentes a mantener y difundir los diferentes programas que el PHI – UNESCO, viene impulsando a nivel regional y mundial, como proceso de sostenibilidad del recurso hídrico. Entre ellas, tenemos:

1.1 Reuniones realizadas del Comité Nacional del PHI.

Dentro del programa de actividades que desarrollamos, esta la búsqueda del fortalecimiento del comité, a través de la participación activa y dinámica de cada uno de los miembros, el cual se ve reflejado en cada uno de las reuniones que ejecutamos.

1.1.1 Decisiones concernientes a la composición del comité nacional del PHI.

Actualmente el CONAPHI – PERÚ, está abocado a la actualización de cada una de las instituciones miembros que la conforman, debido a que muchas de ellas han experimentado cambios en su razón social o han fenecido en el tiempo. En vista de ello, se viene elaborando el proyecto de Ley para la actualización de los miembros e inclusión de otras instituciones más; que por su relevancia institucional deben ser parte integrante de este Comité.

Esto permitirá consolidar nuestra presencia en el quehacer nacional, aportando y fortaleciendo las actividades técnico-científicas, en materia de recursos hídricos, de tal manera que se articulen todos los procesos bajo un sólo objetivo, el de contribuir en forma eficiente y responsable al Desarrollo Sostenible de los Recursos Hídricos.

1.1.2 Estado de las actividades del PHI – VI.

Las actividades contempladas en la VI Fase, y que se han desarrollado durante el período 2006 – 2008, han permitido de cierta manera fortalecer el accionar del PHI en el Perú, a través la articulación de los temas que son la base del desarrollo de la hidrología en la región, y entre los cuales tenemos:

A) Dentro de los programas de la VI Fase, se tiene:

- **Tema 1**: Los cambios mundiales y los recursos hídricos.

  Ante los impactos que se vienen presentando en los recursos hídricos, el SENAMHI y CONAM, con el apoyo del PNUD están ejecutando el sub Proyecto Determinación de la Relación entre el Cambio Climático, el retroceso de los Glaciares y los Impactos en la Disponibilidad del Agua en el Perú, que se ejecuta a nivel nacional en cuencas con glaciares y en la cuenca del río Santa.

  Actualmente se están ejecutando los trabajos de campo, para evaluar los aportes de agua de los glaciares hacia el río Santa, proceso que tiene en su programa la realización de 04 campañas de aforos; que se desarrollan en la parte alta de las subcuencas (zona cercana al Glaciar) y en la parte baja (confluencia con el río Santa).

- **Tema 2**: La dinámica integrada de las cuencas y los acuíferos.

  En la elaboración de la Estrategia de Gestión de los Recursos Hídricos, se viene considerando como una sola unidad la gestión del recurso hídrico superficial y subterráneo, el cual tiene un eje temático, que además, está asociado a la cuantificación de la cantidad y calidad del recurso agua; tarea que esta siendo articulado con la Intendencia de Recursos Hídricos.

- **Tema 3**: La hidrología de los hábitats terrestres.

  Una de la grandes preocupaciones al respecto, son los cambios que se vienen observando en el comportamiento hidrológico de los ríos amazónicos, producto de los procesos antrópicos, tales como: Deforestación, agricultura migratoria, actividad minera y últimamente la extracción de hidrocarburos.

  Ante esta enorme preocupación se está articulando esfuerzos para dar inicio al Proyecto Sistema de la Vigilancia Amazónica en el Perú, con el apoyo y colaboración del CENSIPAM de BRASIL; así como también, con su asesoramiento técnico.

- **Tema 4**: El agua y la sociedad.

  Una de las grandes preocupaciones, del gobierno actual es generar y brindar a la población los mecanismos necesarios para lograr atender las demandas en materia de recurso agua, es por ello que surgen programas y proyectos tales como:

  Proyecto Agua para todos

  El Programa Agua para todos, es un programa diseñado para mejorar las condiciones de vida de la población rural del país, disminuyendo la incidencia de enfermedades diarreicas a través de la implementación y el mejoramiento de la calidad de los servicios de agua y saneamiento, la adopción de mejores prácticas de higiene por parte de la población, el fortalecimiento de las capacidades de la Municipalidad y otras organizaciones responsables de la sostenibilidad. Con ello se busca contribuir de una manera eficiente a lograr los objetivos del Milenio.

  Programa Crecer

  Nace como una necesidad urgente para reducir la pobreza y la desnutrición crónica infantil en el país; el programa "Crecer", es una estrategia nacional que contempla acciones orientadas a mejorar los niveles de nutrición, educación, salud e identidad, y reducir la mortalidad materno-infantil, la desnutrición, el analfabetismo y la carencia de servicios básicos, en las zonas más pobres del país.

  En este proceso, involucra la participación del estado y de la actividad productiva privada que de cierta manera contribuirá con la componente de saneamiento, la cual esta articulada con los objetivos del Milenio.

  Programa Sierra exportadora

  Nace como una necesidad de establecer una estrategia de desarrollo territorial, integrador y multidimensional para enfrentar el problema de pobreza rural en la sierra. Para estos efectos, se implementa Sierra Exportadora como un organismo que busca el mejoramiento de la competitividad rural y el alineamiento de incentivos. Este esquema concuerda con el Plan Nacional de Competitividad, Plan Nacional Exportador y Plan de Desarrollo Agrario, entre otras estrategias de desarrollo nacional aprobadas, las cuales debidamente articulada contribuirán a obtener una agricultura sostenible y planificada.

- **Tema 5**: La educación y la formación en recursos hídricos.

  A través del CONCYTEC, se esta articulando esfuerzos dentro del Plan Nacional de Ciencia, Tecnología e Innovación para la Competitividad y el Desarrollo

Humano, siendo una de las áreas claves que se ha identificado el Programa Nacional de Ciencia, Tecnología e Innovación en Recursos Hídricos, en el cual se han identificado los ejes temáticos siguientes:

- Disponibilidad de recursos hídricos
- Gestión integrada de recursos hídricos
- Abastecimiento de agua potable y saneamiento
- Calidad del agua
- Gestión de riesgos

B) Dentro de los programas globales, que coordina el PHI - UNESCO, tenemos:

- **FRIEND/AMIGO**

FRIEND, es un programa internacional de colaboración para generar estudios e investigación a través de un intercambio mutuo de datos, de conocimiento y de técnicas, a nivel regional, para una mejor comprensión de la variabilidad hidrológica a nivel espacial y temporal. El conocimiento avanzado de los procesos hidrológicos y de los regímenes de flujo generados a través de FRIEND, ayuda a mejorar los métodos aplicables en la gestión de los recursos hídricos.

En el marco de esta iniciativa, se esta implementado el sistema de monitoreo de Sequía, desarrollado por los especialistas del Instituto de Meteorología de Cuba, que se ha iniciado con el desarrollo de un curso taller transferencia de tecnología.

- **HELP**

HELP, es una iniciativa del PHI, que busca integrar la componente de la gestión integrada del recurso hídrico y el fortalecimiento de los procesos de desarrollo de capacidades. De la perspectiva técnica, los objetivos generales de la HELP son consolidar la hidrología operativa y aplicada en la región. La cuenca HELP, que se esta trabajando en el Perú es Jequetepeque, a través de una ONG.

En base a ello, se han realizado coordinaciones, sobre la posibilidad de incluir la cuenca del río Lurín como una cuenca piloto dentro del programa HELP. Aprovechando la estadía del Dr. Henrique Chávez, especialista de la Universidad de Brasilia y del programa, realizamos una visita técnica a esta cuenca, con el fin de ver sus fortalezas y cualidades para que pueda ser considerada como parte integrante de las cuencas HELP.

- **ECOHYDROLOGÍA**

Ecohydrology es una nueva ciencia que busca integrar, soluciones específicas vinculadas al recurso hídrico, teniendo en consideración la componente social y ambiental. Uno de los conceptos fundamentales implicados en ecohydrology es que la sincronización y la disponibilidad de de agua dulce está ligada íntimamente a los procesos del ecosistema, y los bienes y servicios proporcionados por las aguas a la sociedad. Esto significa que el énfasis está puesto en el ciclo hidrológico y sus efectos sobre procesos ecológicos y bienestar humano.

En coordinación con la Hidróloga Regional para América Latina y el Caribe, se nos solicitó a pedido de la Dra. Lisa Hiwasaki, coordinadora del programa Ecohydrology, para que el Dr. Jorge Recharte del Instituto de Montaña, sea parte integrante de este programa Task Force de Ciencias Sociales.

- **PCCP**
  Del Conflicto Potencial a la Cooperación Potencial

  El PCCP, programa del PHI y que representa una contribución al WWAP, apunta situaciones en las que los usuarios del agua necesitan apoyo para gestionar sus recursos hídricos compartidos en forma pacífica y equitativa. Capitaliza la voluntad de las partes interesadas de gestionar exitosamente esos recursos, para crear las bases para la consolidación de la paz y la cooperación; así como ayudar a los Estados Miembros de la UNESCO y promover la cooperación.

  En base a ellos, el PHI, organizó cursos internacionales dentro del cual el Perú tuvo la oportunidad de participar en uno de ellos, el cual se realizo en Ecuador, en el cual se impartió la metodología y técnicas de análisis para la solución de conflictos en temas de recursos hídricos.

C) Dentro de los programas regionales que coordina el PHI - UNESCO, tenemos:

- **Balance Hídrico**

  El Perú culminó, presentó y publicó, con la ayuda del PHI-UNESCO, el Balance Hídrico Multianual del Perú, documento técnico que ha sido distribuido a todos los sectores involucrados con el recurso agua.

  Actualmente el SENAMHI a través de la Dirección General de Hidrología y Recurso Hídricos, está comprometida en culminar el Balance Hídrico Superficial de la vertiente del Pacífico (53 cuencas), a nivel mensual, tarea en la cual se tiene culminado 38 cuencas hidrográficas, habiéndose iniciado las gestiones con el PHI para su pronta publicación.

1.1.3 Decisiones concernientes a la contribución / participación en el PHI – VII.

Durante este período, contribuimos de una manera permanente a la consolidación de los temas de la VII Fase. Dentro de nuestras propuestas, planteadas tenemos las siguientes:

a) La investigación hidrológica,

- La amazonía como fuente de agua.
- Hidrología en cuencas internacionales.
- Efectos de la reconversión forestal y el ciclo hidrológico.
- El manejo de agua en cuencas binacionales.
- Elaboración del Atlas Hidrológico de la cuenca amazónica peruana.

b) La gestión de los recursos hídricos,

- Identificación de los principales actores en la gestión del recurso agua.
- Contribución de los servicios hidrológicos en la gestión del agua.
- Los cambios climáticos y sus efectos en la gestión del recurso hídrico.

c) La educación y el fortalecimiento de capacidades,

- Curso de hidrología forestal

Conocer el ecosistema de la amazonía peruana, como una unidad, plantea la necesidad de un desarrollo de capacidades, como por ejemplo el curso de Hidrología Forestal (Bosques Tropicales), que permitirá desarrollar el

esquema conceptual de la interrelación entre las variables que intervienen en el ciclo hidrológico y el bosque tropical.

El PHI – UNESCO, comprometido en el fortalecimiento de las actividades de hidrología en la región y conocedor de nuestras debilidades y fortalezas, ve con sumo interés el desarrollo sostenible de la cuenca amazónica.

- Curso de aforo en grandes ríos

Hablar de amazonía, es sinónimo de grandes ríos, que requieren ser evaluados con tecnología moderna y métodos integrados, para lo cual se requiere el desarrollo de capacidades en las técnicas de Aforo en Grandes ríos, que permita uniformizar los procesos metodológicos en la evaluación de este importante ecosistema fuente de agua.

1.2 Actividades a nivel nacional dentro del marco del PHI.

1.2.1 Certámenes científicos y técnicos nacionales / locales.

Durante el período 2006 - 2007, el CONAPHI – PERÚ, se reunió en 15 oportunidades periodo en el cual se trataron diversos temas técnicos, entre los cuales tenemos:

- **Actividades administrativas.**

  - **Actividades por el 30° Aniversario del CONAPHI – PERÚ.**

Se realizaron coordinaciones con la Hidróloga Regional, para la celebración de los 30 años de creación del Comité Nacional Peruano para el Programa Hidrológico Internacional – CONAPHI – PERÚ, lográndose articular la realización de dos actividades: Una Conferencia técnica con la participación de la Dra. Maria Concepción Donoso, Hidróloga Regional del PHI - UNESCO, y un Curso Taller, dirigido por el Dr. Henrique Chávez, de la Universidad de Brasilia y especialista del programa HELP.

  - **Actividades sobre la celebración del Día Mundial del Agua.**

Todos los años, realizan eventos técnicos y sociales, que están orientados a resaltar los valores culturales y fortalecer los técnicos. Es así como las instituciones miembros del CONAPHI contribuyen a esta celebración.

En el 2008, se planificó un evento denominado "1er Festival: Agua Limpia", que se desarrollo del 18 al 28 de Marzo, donde se interrelacionaron cada uno de los eventos que generan las diferentes instituciones (Municipalidades, Gobiernos Regionales, Universidades y otras más), así como los miembros del CONAPHI. En el Anexo, se muestra el programa desarrollado, logotipo y fotos de algunos de los eventos.

Se espera que en los subsiguientes años, que el CONAPHI desarrolle este tipo de eventos; como una ventana a la difusión de la necesidad de articular esfuerzos hacia la búsqueda de un desarrollo sostenible del recurso agua.

  - **Análisis y actualización de los miembros del CONAPHI.**

Se retomó esta actividad, por considerarla prioritaria en el proceso de funcionamiento del Comité, análisis que permitirá modificar y/o actualizar a los miembros del CONAPHI – PERÚ; tarea que se tiene pendiente para la aprobación del documento por los miembros del CONAPHI, y su posterior tramitación a nivel Ministerial.

- **Actividades técnicas.**

  - **Reunión con la Representante de UNESCO en Perú, Dra. Katherine Müller-Marin.**

Se realizaron coordinaciones con la Representante de UNESCO en Perú, para estrechar los vínculos de cooperación técnica; permitiendo fortalecer las actividades del CONAPHI – PERÚ, y ser parte integrante de los programas que la UNESCO impulsa y orienta con el fin de alcanzar el Desarrollo Sostenible del Recurso Hídrico y los objetivos del Milenio.

Durante la organización del evento por el día Mundial del Agua, se contó cuna vez más con el apoyo invalorable y la colaboración en forma permanente, permitiéndonos alcanzar el éxito trazado en nuestra tarea de concientizar a la sociedad, técnicos e investigadores sobre la problemática del recurso hídrico en el país.

  - **Reunión de coordinación con el Servicio de Agua Potable y Alcantarillado – SEDAPAL.**

Con motivo de la celebración por el día Mundial del Agua - 2008, se realizaron reuniones de coordinación con la empresa SEDAPAL, encargada de dotar con agua potable a la ciudad de Lima y Balnearios, a fin de unir esfuerzos para organizar un mega evento, el cual lamentablemente no se concreto por acciones ajenas al CONAPHI y a la empresa.

1.2.2 Participación en Comités de dirección / Grupos de Trabajo del PHI.

Dentro de los grupos de trabajo tenemos:

- **Nieve y Hielo**

La unidad de Glaciología del Instituto Nacional de Recursos Naturales – INRENA, es quien está asumiendo la representación en este programa a través de la participación del Dr. Marco Zapata, con quien se viene realizando las coordinaciones sobre los avances en este tema, y en el cual el SENAMHI viene participando en la generación y ejecución de proyectos, cuyo objetivo es conocer las implicancias de los impactos del Cambio Climático en los Recursos Hídricos; y en forma especial en las cuencas con glaciares tropicales, como es el caso de la cuenca del río Santa.

1.2.3 Proyecto de investigación o de aplicación apoyada o patrocinada.

Dentro de este tema, se ha recibido apoyo para la publicación del Balance Hídrico Multianual del Perú, a través del PHI.

También se ha tenido cooperación del programa CAZALAC, para la generación del mapa de zonas húmedas y subhúmedas del Perú. Además, se esta impulsando un convenio para desarrollar el Atlas de Sequía.

1.2.4 Colaboración con otras organizaciones o programas nacionales e internacionales.

El SENAMHI, tiene convenios internacionales entre los cuales, figura el IRD de Francia, con quienes se están desarrollando investigaciones en dos programas principales:

- **GREAT – ICE**

Programa dedicado a la investigación de la problemática de los glaciares tropicales, asociados con los cambios climáticos.

- **HYBAM**

Programa dedicado a generar información e investigación sobre la geoquímica de la cuenca amazónica; así como también se plantea la necesidad de conocer los impactos que pudiera presentar la cuenca amazónica con respecto a los cambos climáticos. Además, se implementa un programa de sedimentos en la vertiente del Pacífico.

1.2.5 Otras iniciativas.

- Se viene colaborando con la Doctorando Paulina Aviles, de la Universidad de Kassel, en el desarrollo de la investigación sobre los efectos del Cambio Climático en los recursos hídricos de la cuenca del río Santa.
- Con el Consejo Nacional del Ambiente - CONAM, se esta llevado la ejecución del Proyecto de Segunda Comunicación, dentro del cual estamos ejecutando el subproyecto de la Disponibilidad Hídrica de las cuencas con glaciar y el retroceso de los glaciares. Así también, se esta articulando la ejecución del Proyecto Regional Andino de Adaptación- PRAA para Monitoreo de Glaciares.
- Se viene realizando coordinaciones con la Unión Internacional para la Conservación de la Naturaleza - UICN, para el desarrollo de un proyecto vinculado a la Gestión de los Recursos Hídricos en la cuenca del río Santa, ante los impactos de los Cambios Climáticos.

1.3 Cursos académicos o de adiestramiento.

1.3.1 Contribución a cursos del PHI.

- **SENAMHI - CONAM organizaron el Panel "La gestión del agua y su incidencia en la cultura, ecosistemas y poblaciones", que se llevo a cabo en el auditorio del SENAMHI.**

Fue uno de los programas que se desarrollo, dentro del marco de la celebración de los 30 años de creación del CONAPHI - PERÚ, evento que fue auspiciado por el PHI – UNESCO, a través de la Representante de UNESCO en Perú, Dra. Katherine Müller Marin y de la Hidróloga Regional Dra. Maria Concepción Donoso.

1.3.2 Organización de cursos específicos.

El CONAPHI, durante este periodo no se ha programado cursos específicos; sin embargo, se articularon actividades de capacitación puntuales en función a las necesidades que tiene cada una de las instituciones miembros del comité.

1.3.3 Participación en cursos del PHI.

- **Se participó en el curso piloto "Prevención de conflictos y manejo del agua en América Latina", en el marco del programa (*PccP*) coordinado en la región por el Programa Hidrológico Internacional para América Latina y El Caribe (PHI-LAC); en Guayaquil – Ecuador, del 15 al 21 de Enero de 2006.**

Este curso, tuvo como finalidad la cooperación entre las diferentes partes que interviene en la gestión de los recursos hídricos compartidos con el propósito de reducir el riesgo, y que los conflictos potenciales se conviertan en reales. Este curso se dictó inicialmente en Africa, con excelentes resultados por dicho éxito, la UNESCO presentó el curso esta vez adaptado a la realidad latinoamericana.

- **Se llevó a cabo el curso "Sostenibilidad de Cuencas Hidrográficas en América Latina y el Caribe", a cargo del Dr. Henrique Chávez con el apoyo de la Oficina Regional del Programa Hidrológico Internacional para América Latina y El Caribe (PHI-LAC) - 2007.**

Este evento, estuvo enmarcado dentro de las actividades contempladas por la celebración de los 30 años de creación del CONAPHI – PERÚ, Auspiciado por el PHI - UNESCO y por el programa CAZALAC.

El evento tuvo la concurrencia de 35 participantes, de las diferentes instituciones involucradas con el agua, despertando entre ellos gran inquietud por la aplicación de la metodología desarrollada por el Dr. Henrique Chávez.

- **Se llevó a cabo el curso y transferencia del *"Sistema de Alerta Temprana de la Sequía Hidrometeorológica"*, organizado por el PHI – FRIEND, realizado entre el 10 al 14 de Diciembre de 2007.**

El curso "SISTEMA DE ALERTA TEMPRANA DE LA SEQUIA HIDROMETEOROLÓGICA", contó con la participación de dos destacados profesionales del Instituto Meteorológico de Cuba, El Dr. Braulio Lapinel Pedroso y el Ing. Reynaldo Baez, quienes han implementado el Sistema de Vigilancia de la Sequía en Cuba. El objetivo fue entrenar a los participantes en el manejo del programa: Sistema de Alerta Temprana de Sequía – SAT, con fines de aplicaciones prácticas en la evaluación de los recursos hídricos, orientado a la prevención de fenómenos extremos como las sequías para la mitigación de los impactos económicos y sociales en el país.

- **Se participó en el taller *"Atlas de Sequía"*, organizado por CAZALAC, realizado 25 y 26 de Marzo de 2008, en la Universidad de Talca –campus Santiago de Chile.**

En el 2008, esta propuesto el desarrollo del proyecto Elaboración del Atlas de Sequías, el cual se ha dado inicio con la realización de este taller, cuyo propósito es capacitar en la metodología L-moments en una cuenca piloto con series de precipitación totales mensuales.

1.4 Cooperación con el Instituto UNESCO – IHE para la educación Relativa al Agua, y otros centros internacionales / regionales con los recursos hídricos, bajo los auspicios de la UNESCO.

Por el momento no se tiene ninguna coordinación o contacto; sin embargo, consideramos importante la articulación para el desarrollo de capacidades en la región, por lo cual sería conveniente tener un centro regional de capacitación del IHE.

1.5 Publicaciones.

- El Balance Hídrico del Perú a nivel multianual, publicado con el apoyo del PHI-LAC de la UNESCO, en el 2006.

- El estudio del Balance Hídrico Superficial a nivel mensual por cuencas, se está realizando las coordinaciones con el PHI - UNESCO para recibir su apoyo y colaboración al respecto, en el 2006.
- El estudio de Zonas Áridas y Semi - Áridas del Perú, por el CAZALAC – PHI, en el 2006.

1.6 Participación certámenes científicos internacionales.

1.6.1 Certámenes realizados en el país.

- **Participación en la reunión del Proyecto SIVAM - SIPAM (2 al 5 Julio 2007).**

El Sistema de Vigilancia Amazónica (SIVAM), es una herramienta que permite proveer de información necesaria al Sistema de Protección de la Amazonía (SIPAM), de manera tal, que sumada a las informaciones recolectadas por cada organismo de manera individual, permitiendo desarrollar planes de forma eficaz e integrada, el cual ha sido desarrollado con gran éxito en el Brasil.

El SIPAM esta concebido como un organismo capaz de integrar, analizar, sistematizar, procesar y difundir información completa y actualizada. Este moderno e innovador modelo de gestión pública aplicado para la región amazónica, esta siendo replicado en el Perú; y es por ello que se desarrolló este taller técnico en el marco de una cooperación técnica bilateral entre Brasil y Perú.

- **Programa Nacional de Ciencia Tecnología e Innovación en Recursos Hídricos - Propuesta de portafolio de ideas de proyectos, 14 de Febrero de 2007.**

El CONCYTEC, en el marco del Plan Nacional de Ciencia, Tecnológica e Innovación para la Competitividad y el Desarrollo Humano, viene promoviendo el proceso participativo para el establecimiento de programas nacionales en áreas claves, como el programa nacional de CTI en Recursos Hídricos, cuyo objetivo esta orientado a definir un plan de acción a largo plazo para el período 2006 – 2021. Tarea que se está desarrollando con la participación de las instituciones involucradas en la gestión de los recursos hídricos en el Perú.

- **Visión Social del Agua – Comunidad Andina de Naciones – CAN - 06 de Marzo de 2007.**

El proyecto visión social del agua, busca mediante la investigación regional, identificar la visión ciudadana del agua y las normas, políticas, y los marcos constitucionales que afectan la gobernabilidad del agua en los andes.

El proyecto pretende reducir las tensiones entre el estado y la sociedad, mediante procesos participativos de investigación, formación, información e incidencia.

- **Gestión Integrada de los Recursos Hídricos – Comisión Técnica Multisectorial – Fase II.**

La Estrategia Nacional de Gestión de Recursos Hídricos, está orientada a generar un esquema que defina un rumbo en la toma de decisiones, que se implementen las acciones consideradas fundamentales y que nos conduzcan hacer realidad la visión compartida por los principales agentes económicos y sociales del país en materia de recursos hídricos.

Este proceso pretende adelantarse a los acontecimientos para que los tomadores de decisiones reaccionen antes de que los hechos se produzcan y puedan modificar las tendencias no

deseadas. Es por ello que estamos comprometidos, todas aquellas instituciones vinculadas en forma directa e indirecta con el recurso agua.

1.6.2 Participación en certámenes en el extranjero.

- **Participación en la presentación del 2do. Informe de las Naciones Unidas sobre el Desarrollo de los Recursos Hídricos en el mundo (Expo Zaragoza 2008), 12-13 de diciembre de 2006: El agua, una responsabilidad compartida, Zaragoza, España.**

Con motivo de la presentación del 2do. Informe de las Naciones Unidas sobre el Desarrollo de los Recursos Hídricos en el mundo, cuyo informe es producido por el programa mundial de evaluación de los Recursos Hídricos de las Naciones Unidas (WWAP), el cual muestra una visión general de la situación de los países de América Latina y el Caribe, y España centrándose particularmente en los temas relacionados con la gobernabilidad del agua, los Objetivos de Desarrollo del Milenio (OMD) y el valor del agua.

- **Participación en la II reunión de Trabajo Binacional Perú – Brasil en el ámbito del Proyecto SIVAM – SIPAM, 25 y 26 de Setiembre 2007 en Porto Velho - Brasil.**

En esta II reunión de trabajo se buscó desarrollar el intercambio estratégicos entre los gobiernos del Perú y Brasil, incentivando el desenvolvimiento de mecanismos eficaces de transferencia de tecnología entre instituciones de monitoreo ambiental y de recurso hídricos.

Las reuniones se realizaron determinándose tres áreas de trabajo: Grupo de Trabajo Institucional, Grupo de Trabajo de Sensoramiento Remoto y Grupo de Trabajo de Hidrología; contándose con la participación de instituciones como CENSIPAM, ANA y EMAER del Brasil.

- **Jornadas Iberoamericanas Sobre Cambio Climático y Recursos Hídricos.**

El IPCC (Panel intergubernamental sobre el cambio climático), presentó su último informe en febrero del presente año, dentro de los que inciden en que los recursos hídricos en Latinoamérica disminuirán entre 10 y 30%, lo cual implicará cambios en los sistemas físicos hidrológicos de los continentes.

A través del CYTED (Ciencia y tecnología para el desarrollo), se viene desarrollando Programa "Desarrollo Sostenible, Cambio Global y Ecosistemas" cuya coordinadora es la Dra. Alicia Fernández Cirelli. Conjuntamente con la AECI (Agencia Española de Cooperación Internacional), organizaron del 7 al 11 de mayo del 2007 las Jornadas Iberoamericanas sobre cambio climático y recursos hídricos), en la ciudad de la Antigua en Guatemala.

Dentro de este marco contextual, se desarrollaron las jornadas hidrológicas sobre cambio climático y recursos hídricos, con temas multidisciplinarios orientados al estudio del cambio climático y los recursos hídricos, en la cual se presentó un avance sobre la tesis "Modelos de balance hídrico a nivel mensual en territorio peruano con fines de evaluar el impacto del cambio climático en la cuenca amazónica peruana", tesis que está desarrollando el Ing. Waldo Lavado Casimiro en la Escuela Doctoral de Ciencias del Universo, del Ambiente y del Espacio de la Universidad Paul Sabatier (UPS) de Toulouse (Francia), en la especialidad de Hidrología.

- **Participación en PROHIMET – CYTED Jornadas Internacionales sobre Gestión del Riesgo de Inundaciones y Deslizamientos de Laderas. San Carlos (Brasil).**

A este evento asistieron investigadores representantes de los países de Argentina, Bolivia, Brasil, Chile, Colombia, Costa Rica, Cuba, Ecuador, España, Guatemala, México, Perú,

República Dominicana, El Salvador, Uruguay, Venezuela y Panamá, quienes presentaron diferentes trabajos de investigación, proyectos y aplicaciones relacionados a la gestión integrada de crecidas y deslizamientos. El SENAMHI presentó un trabajo sobre "Análisis Hidrológico de la Crecida Extraordinaria del río Tumbes del 27 de Febrero de 2006", con énfasis en la modelización hidrológica e hidráulica de dicho evento.
Estas Jornadas, tuvo la particularidad de reunir a dos redes, la Red PROHIMET que tiene como coordinador al Dr. Angel Aldana de España y la Red de Deslizamientos que tiene como coordinador al Dr. Rafael Guardado de Cuba.

Este Taller ha servido para conocer el nivel de avance que se tiene en los países Iberoamericanos sobre la Gestión de Riesgos de Inundaciones y Deslizamientos. Las diferentes experiencias presentadas muestran que los esfuerzos técnico-científicos están bien encaminados pero falta una articulación más eficaz en la toma de decisiones de los órganos involucrados en este proceso en beneficio de las poblaciones expuestas a riesgos. Los niveles de decisión política a veces son un obstáculo para la implementación de un Sistema de Gestión más efectivo.

1.7 Otras actividades a nivel regional.

1.7.1 Relaciones / cooperación Institucionales.

Dentro de las relaciones y cooperación, con las diversas instituciones públicas o privadas, dentro del ámbito nacional e internacional, tenemos:

Convenio SENAMHI -IRD
El SENAMHI y el IRD de Francia, están desarrollando trabajos de investigación en los programas de GREAT – ICE e HYBAM.

INRENA – Intendencia de Recursos Hídricos
Se esta trabajando, en forma coordinada y responsable, en la implementación de la Estrategia Nacional de la Gestión Integrada de los Recursos Hídricos.

INRENA – GEF Amazonas
Se forma parte del comité técnico, del proyecto GEF – Amazonas, a través de cual se pretende impulsar el conocimiento de la disponibilidad en cantidad y calidad del recurso hídrico amazónico.

Convenio FAP - SIVAM – SIPAM
Es la implementación del Sistema Vigilancia de la Amazonía Peruana y a nivel nacional, como parte de la componente del Perú al programa que desarrolla el Brasil.

Convenio CONAM
Esta referido a la ejecución del proyecto de segunda comunicación, sobre cambios climáticos en el Perú. La componente hidrológica esta referida a la disponibilidad del recurso hídrico en cuencas con glaciares.

Convenio CONAM
Esta referido a la ejecución del Proyecto Regional Andino de Adaptación – PRAA, para el Monitoreo de los Glaciares.

1.7.2 Proyectos científicos concluidos y en marcha.

Convenio SENAMHI - IRD
El SENAMHI y el IRD de Francia, están desarrollando trabajos de investigación en los programas:

GREAT – ICE

- **Estudio: Glaciares y recursos hídricos de altura en los Andes Peruanos.**
  Permite monitorear la evolución de los glaciares de la Cordillera Blanca y Central, con posibles extensiones al sur del país (Cordillera Occidental, Cordillera del Vilcanota, etc.) y sus recursos hídricos en el contexto del cambio climático global actual y sus impactos a escala regional.

  Reconstruir el clima de los últimos siglos para tener un mejor entendimiento de cómo podría ser en el futuro con las correspondientes proyecciones; se usan las mismas herramientas para investigar el clima actual, principalmente los isótopos (del hielo como de las precipitaciones), pero también la liquenometría y la dendrocronología.

  Otros de los temas de investigación que se está desarrollando, dentro del marco del convenio, es el análisis Isotópico de la precipitación.

HYBAM

- **Estudio de la Climatología, Hidrología, Geoquímica y Flujos Sedimentarios en la cuenca Amazónica y los ríos costeros del Perú.**
  Permite medir los flujos de agua y de sedimentos, desde los Andes hasta el océano Atlántico; evaluar su variabilidad temporal con la finalidad de desarrollar un modelo hidrológico actual de toda la cuenca amazónica. La finalidad del modelo es prever el impacto de la variabilidad climática global, de la presión antrópica y de la geodinámica actual sobre estas transferencias.

- **Estudio de Sedimentos en los ríos de la vertiente del Pacifico.**
  Se está implementando el desarrollo de una investigación sobre la cuantificación y distribución espacial y temporal de sedimentos en los ríos de la vertiente del Pacifico, habiéndose seleccionado para ellos las cuencas cuyo régimen hidrológico es natural; es decir, no reguladas. Se viene recopilando muestras de agua en cada una de las estaciones hidrológicas, seleccionadas en las cuencas.

<u>Proyecto SEQUIA</u>
El SENAMHI y el Instituto Nacional de Defensa Civil (INDECI), formularon y ejecutaron "El Proyecto de Sequías a nivel de cuencas para Programa de Prevención", el cual fue culminado con gran éxito. Actualmente, el SENAMHI ha incluido dentro de su Plan Operativo Institucional, como actividad permanente y de gran importancia para la prevención y alertas.

Para el 2008, se tiene la implementación de 07 cuencas más, dentro de este programa, entre las cuales tenemos: Santa, Moquegua, Tacna, Ilave, Ramis, Urubamba y Mantaro.

<u>Proyecto Segunda Comunicación SENAMHI - CONAM - PNUD</u>
Como parte de la ratificación de la Convención sobre Cambio Climático, los países firmantes deben realizar estudios nacionales, y dentro de la Segunda Comunicación Nacional del Perú a la CMNUCC, el SENAMHI en convenio con CONAM viene ejecutando el Proyecto **"Determinación del Cambio Climático, el Retroceso Glaciar y los Impactos en la Disponibilidad del Agua en el Perú"**, el mismo que esta siendo financiado por el Fondo para el Medio Ambiente Global (GEF, por sus siglas en inglés) e implementado por el Programa de las Naciones Unidas para el Desarrollo (PNUD), cuyo objetivo general es estudiar el impacto del cambio climático global en el comportamiento hidrológico de las cuencas con áreas glaciares en el Perú.

2.- Actividades futuras

El CONAPHI, esta inmerso en la necesidad de viabilizar, contribuir e impulsar de una manera dinámica y activa la gestión de los recursos hídricos en el país, así como articular la participación responsable y eficiente de sus miembros, con el apoyo invalorable del PHI.

En base a ellos se, esta trabajando en las posible actividades a desarrollar dentro del plan de la VII Fase, así como fortalecer la Visión del CONAPHI, para ello se plantea lo siguiente:

2.1 Actividades planificadas hasta diciembre 2009.

Para este año, se tiene planificado desarrollar las actividades siguientes:

- Desarrollar el 2do **Festival del Agua**, con motivos de realzar la celebración del Día Mundial del Agua.
- Contribuir a la celebración del Día Interamericano del Agua.
- Desarrollo de eventos técnicos sobre la problemática del recurso hídrico asociado a los cambios climáticos.
- Realizar Seminarios nacionales (internacional, si es posible) sobre el uso de las aguas de cuencas internacionales.
- Participación en los eventos técnicos que organiza el PHI

2.2 Actividades previstas para 2010 – 2011.

- Coordinar y desarrollar la celebración por el día Mundial del Agua
- Contribuir a la celebración del Día Interamericano del Agua.
- Desarrollo de eventos técnicos sobre la problemática del recurso hídrico asociado a los cambios climáticos.
- Desarrollo de capacidades, con el apoyo y colaboración del PHI.
- Difusión de las Fases y actividades y del PHI,
- Participación en los eventos técnicos que organiza el PHI

2.3 Actividades vislumbradas a largo plazo.

- Contribuir y participar en los procesos de gestión de los recursos hídricos.
- Contribuir, apoyar y difundir sobre la problemática del agua y los cambios climáticos.

ANEXO

Programa Tentativo del 1er Festival : Agua Limpia

Del 18 al 27 de Marzo del 2008

Organiza: CONAPHI-PERÚ

	Martes 18-Mar	Miércoles 19-Mar	Jueves 20-Mar	Viernes 21-Mar	Sábado 22-Mar	Domingo 23-Mar	Lunes 24-Mar	Martes 25-Mar	Miércoles 26-Mar	Jueves 27-Mar	Viernes 28-Mar
09:00 a.m.	Mesa Redonda Proyección video "Que pasaria si la Tiera aumenta de 1º a 6º" CONIDA Auditorio de CONIDA	Conferencia Técnica Día Mundial del Agua DR-AREQUIPA	FERIADO	FERIADO		Celebracion pro el dia Mundial del Agua Municipalidad de Miraflores Municipalidad de Breña		Experiencias del Saneamiento del G.R. del Callao "El Saneamiento Importa" DIGESA OPS/OMS		I Curso Internacional de Hidrologia Estocástica Universidad Nacional Agraria La Molina	I Curso Internacional de Hidrologia Estocástica Universidad Nacional Agraria La Molina
10:00 a.m.											
11:00 a.m.					Mensaje x "Dia Mundial del Agua" Presidencia del CONAPHI					Lanzamiento de la Campaña del Agua 2008 Comisión Episcopal de Acción Social - CEAS	
12:00 p.m.	"Día Mundial del Agua" Conferencia y proyección sobre "Oscurecimiento Global". IMARPE							II Simposio Nacional del Agua Universidad Nacional Agraria la Molina Auditorio A-2 Escuela de PostGrado	I Curso Internacional de Hidrologia Estocástica Universidad Nacional Agraria La Molina		
01:00 p.m.											
02:00 p.m.	**Inauguración Sede CONAPHI**						Forum por el Día Mundial del Agua 2008 Saneamiento INRENA CONAM SUNASS Auditorio del Inrena				Conferencia x el día Mundial del Agua FMF-UNMSM
03:00 p.m.											
04:00 p.m.	Evento Técnico: "Día Mundial del Agua" Ciclo de conferencias CONAPHI									I Curso Internacional de Hidrologia Estocástica Universidad Nacional Agraria La Molina	**Clausura del Festival**
05:00 p.m.								Foro Parlamentario "El Proyecto de Ley General Del Agua Frente a la Crisis de Gestión del Agua en el PERÚ" Congreso de la República			
06:00 p.m.											
07:00 p.m.											
08:00 p.m.	Conferencia x el día Mundial del Agua CEIGA - UNFV 5:00 pm a 9:00 p.m.										
09:00 p.m.											
10:00 p.m.											

1er Festival: "AGUA LIMPIA"

Inauguración del Festival en el Auditorio del SENAMHI

Foto1.- Discurso de Apertura del Presidente del CONAPHI.

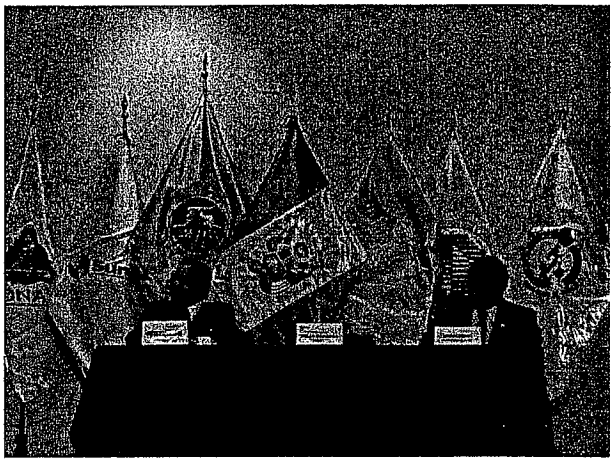


Foto 2.- Invitados especiales a la ceremonia de la inauguración.

Eventos Técnicos

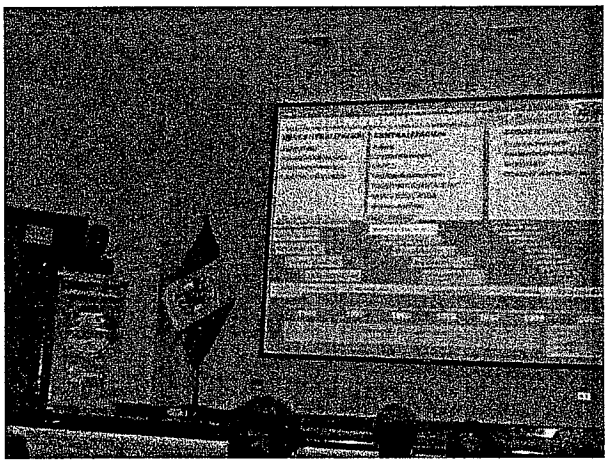


Foto 3.- Evento técnico CONAPHI – El CC y sus impactos en los Recursos Hídricos.

Foto 4.- Panel de Invitados Conferencia Técnica en el IMARPE.

Foto 5.- Afiches de los distintos Eventos Técnicos organizados por la celebración del "Día Mundial del Agua", desarrollado dentro del "1er Festival: AGUA LIMPIA".

Evento Social

Foto 6.- En la ciudad blanca de Arequipa, se realizó un pequeño evento para conmemorar el "Dia Mundial del Agua"

Foto 7.- Los niños manifestando la necesidad de cuidar el Agua.

Clausura del Festival en la UNALM

Foto 8.- El Presidente del CONAPHI – Perú, junto a la Representante de de la UNESCO en el Perú y otros miembros del CONAPHI.

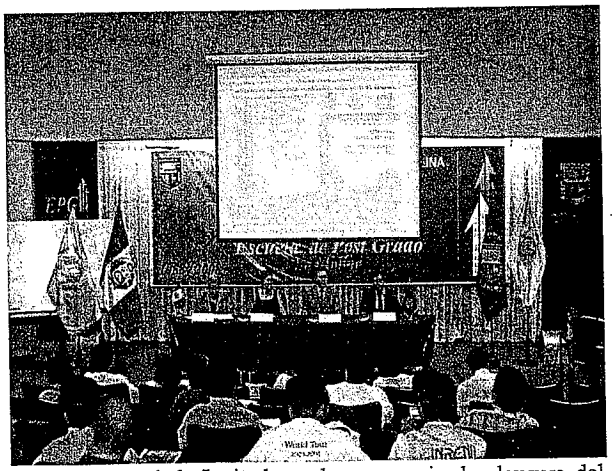


Foto 9.- Panel de Invitados a la ceremonia de clausura del "1er Festival: Agua Limpia", en el auditorio de la Universidad Agraria La Molina.

Foto 10.- Foto Oficial del evento, después de la ceremonia con la participación de autoridades y público en general.

NATIONAL REPORT ON IHP RELATED ACTIVITIES OF THE REPUBLIC OF POLAND

1. ACTIVITIES UNDERTAKEN IN THE PERIOD JULY 2006 – MAY 2008

1.1 Meetings of the IHP National Committee

1.1.1 Decisions regarding the composition of the IHP National Committee

The Polish Academy of Sciences has established the Committee for International Hydrological Programmes. Its Sub-committee for IHP/UNESCO consists of three persons:

Prof. Dr Witold G. Strupczewski – Chairman (e-mail: wgs@igf.edu.pl)
Dr Artur Magnuszewski - Secretary (email:asmagnus@uw.edu.pl)
Prof. Dr Maciej Zalewski - member (email:mzal@biol.uni.lodz.pl).

Informal meetings and other forms of contacts are very frequent.

1.1.2 Status of IHP-VI activities

IHP-VI Ecohydrology. International Institute of Polish Academy of Sciences, European Regional Centre for Ecohydrology under the auspices of UNESCO (ERCE) and Department of Applied Ecology, University of Lodz (UL) headed by Prof. M.Zalewski and Dr I. Wagner.

Northern European FRIEND

Project 2. "Low Flows". The team headed by Prof. E. Kupczyk (Faculty of Geography and Regional Studies, Warsaw University) participates in execution of this project. The members of the team: Adynkiewicz-Piragas M., Dubicki A. (IMWM – Wroclaw), Jakubowski W. (Agricultural Academy – Wroclaw), Kasprzyk A., Mordalska H., Pokojski W., Suligowski R. and Tokarczyk T.

Project 5. "Catchment hydrological and biogeochemical processes in changing environment". Department of Hydrology, Faculty of Geography and Regional Studies, Warsaw University actively participates in the Project execution. Prof. M. Gutry-Korycka acts as the coordinator of the team consisting of seven persons: Dr Artur Magnuszewski, Dr Urszula Somorowska, Dr Barbara Nowicka, Dr Maciej Lenartowicz, Dr Dariusz Woronko, Dr Jarosław Suchożebrski and Dr Aneta Afelt. Their work is closely related to the activity in **European Network of Experimental and Research Basins (ERB) –** the team of Jagiellonian University, Krakow headed by National Correspondent of ERB Prof. W. Chelmicki.

Team 2, Focal Area 2.1. "Extreme events in land and water resources management" – Flood Frequency Modelling – the team of Institute of Geophysics PAS, Krakow Technical University and Texas A & M University headed by Prof. W.G. Strupczewski

1.1.3 Decisions regarding contribution to/participation in IHP-VII

We would like to participate in IHP VII.

1.2 Activities at national level in the framework of the IHP

1.2.1 National/local scientific and technical meetings
1.2.2 Participation in IHP Steering Committees/Working Groups

International Institute of Polish Academy of Sciences, European Regional Centre for Ecohydrology under the auspices of UNESCO (ERCE) and Department of Applied Ecology, University of Lodz (UL):

Prof. Maciej Zalewski:

- Member of the Steering Committee of UNESCO IHP Programme on Ecohydrology

Dr Iwona Wagner:

- Member of Task Force for IHP-VII drafting
- Co-chairman of the Task Force for Demonstration Projects on Ecohydrology

- Member of the core group of the Steering Committee of UNESCO IHP Programme on Ecohydrology

1.2.3 Research/applied projects supported or sponsored

1.2.4 Collaboration with other national and international organizations and/or programmes

Co-operation of ERCE and UL :

- UNESCO - Man & Biosphere Programme
- UNESCO HELP
- UNEP-IETC: International Environmental Technology Centre (IETC)
- UNEP-GEMS WATER
- SIL: International Society of Limnology
- InterAcademy Panel: A global network of the world's science academies (Co-ordination of the European Region Water Project)

1.2.5 Other initiatives

1.3 Educational and training courses

1.3.1 Contribution to IHP courses

ERCE and UL: Participation in the courses related to Ecohydrology and IHP activities as lecturers:

- Launching of the 5th edition of the MSc Course on Ecohydrology, 2 Invited Lectures on Ecohydrology – Dr Iwona Wagner;University of La Plata, March 2007, Argentina.
- Colloquium on Lakes and Reservoir Management, 31 July 2007, Malaysia – Prof. M. Zalewski: invited lecturer

1.3.2 Organization of specific courses
1.3.3 Participation in IHP courses

1.4 Cooperation with the UNESCO-IHE Institute for Water Education and/or international/regional water centres under the auspices of UNESCO

ERCE and UL co-operation with UNESCO IHE:

- Joint European Project:
  2005-2010- SWITCH - Sustainable Water Management Improves Tomorrow's Cities' Health. Project Officer for the project partner - University of Lodz

ERCE and UL co-operation with regional water centers under the auspices of UNESCO:

- University of Lodz (UL) cooperates with **ERCE - International Institute of the Polish Academy of Sciences, European Regional Centre for Ecohydrology under the Auspices of UNESCO,** based on the co-operation agreement;
- ERCE and UL co-operates with the **International Centre for Water Hazard and Risk Management u/a of UNESCO, Tsukuba, Japan (ICHARM).** e.g.,: Joint organization of a conference:
  International Conference: "Ecohydrological Processes and Sustainable Floodplain Management Opportunities and Concepts for Water Hazard Mitigation, and Ecological and Socioeconomic Sustainability in the Face of Global Changes", under the auspices of International Hydrological Programme UNESCO and InterAcademy Panel Water Programme, 19-23 May 2008, Lodz, Poland. Conference dedicated to the 50th Anniversary of Scientific Activity of Professor John E. Thorpe.

ERB :

Steering committee meeting in Brno (Czech Republic), 4 September 2007.

W. Chełmicki presented the main theme of the conference 'Hydrological extremes in small basins'. The leading conference topics and technical details on the conference announcement were discussed. The steering committee members agreed that the proceedings of oral presentations would be published in the UNESCO Tech. Documents in Hydrology series and the full papers of posters would be published in the journal series of '*Folia Geographica, ser. Geographica Physica*'.

1.5 Publications

ERCE and UL:

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Kiedrzyńska, E., Jóźwik, A. 2006. Analiza procesu transportu rumowiska unoszonego na tle dynamiki przepływów rzeki Pilicy z wykorzystaniem metod statystycznych. Infrastruktura i Ekologia Terenów Wiejskich, Komisja Infrastruktury Wsi PAN, Kraków 3-4; pp. 45-53.

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Kaczorowski, D., Sekulska-Nalewajko, J., Biedrzyńska, E. 2006. Three-dimensional model of flooding of the river floodplain - visualization of ecohydrological interactions. In: Mkhaylo Lobur (Ed.). MEMSTECH. Technical University of Lviv, Ukraine; pp. 146-148.

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Drobniewska, A., Michalska-Hejduk, D., Sumorok, B. 2007. Hydrological and chemical changes of dehydrated peatland generated by the different agriculture management – Goslub in the Bzura River Valley (Poland). In: Okruszko, T., Malty, E., Szatyłowicz, J., Świątek, D., Kotowski, W. (eds). Wetlands. Monitoring, modelling and management, A.A. Balkema Publishers – Taylor & Francis Group; pp. 307 – 313.

Drobniewska, A., Sumorok, B., Nałęcz-Jawecki, G., Sawicki, J. 2007. The toxicity analyses of soil and sediments as a first step during remediation of degraded rivers valley – a case study on the Pilica, Bzura, Ner and Utrata Rivers In: Soil protection

strategy – needs and approaches for policy support, IUNG, Puławy. ISBN: 83-89576-03-1.

Krauze, K., Zawilski, M., Wagner, I. 2008. Habitat Rehabilitation: Goals, Constraints and Techniques. In: Wagner, I., Marsalek, J., Breil, P. (eds). 2008. Aquatic Habitats in Sustainable Urban Water Management: Science, Policy and Practice. Taylor and Francis/Balkema: Leiden.

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1.6 Participation in international scientific meetings

1.6.1 Meetings hosted by the country

2006 European Regional Workshop of IAP Water Programme on "Coupling Surface and Groundwater Researches: A New Step Forwards Towards Water Management". Magnuszewski A. – presentation 'Hydrological control of the ground water quality' 28-30.09.2006. Lodz, Poland,

2007 VI Konferencja Naukowo-Techniczna: Ochrona i rekultywacja jezior. Ekohydrologia - systemowe podejście do ochrony i rekultywacji jezior. June 2007, Poland.

2008 International Conference: "Ecohydrological Processes and Sustainable Floodplain Management Opportunities and Concepts for Water Hazard Mitigation, and Ecological and Socioeconomic Sustainability in the Face of Global Changes", under the auspices of International Hydrological Programme UNESCO and InterAcademy Panel Water Programme, 19-23 May 2008, Lodz, Poland. Conference dedicated to the 50th Anniversary of Scientific Activity of Professor John E. Thorpe.

1.6.2 Participation in meetings abroad

Ecohydrology

2006 8th Kovacs Colloquium. Maciej Zalewski – "Flood pulses and river ecosystem robustness". France.

2006 MAB PHI Seminar on Ecohydrology. Maciej Zalewski – "Ecohydrology as a concept and tool for enhancement of ecosystem services". Rumania.

2006 International Conference on Perspective Technologies and Methods in MEMS Design. Edyta Kiedrzyńska – "Three-dimensional model of flooding of the river floodplain - visualization of ecohydrological interactions". Ukraine.

2007 International network of urban biospheres. Agata Drobniewska – "Ecohydrology concept for integrated urban water management". Istanbul workshop. November 2007, Turkey.

2007 First Scientific Meeting of SWITCH Projekt. Katarzyna Izydorczyk – "Inclusion of ecohydrology concept as integral component of IUWM". January 2007, Great Britain.

2007 Lahti Science Day, 27 November 2007. Katarzyna Izydorczyk – "Ecohydrology as a tool for Integrated Watershed Management". Finland.

2007 ILTER Coordinating Committee Meeting. Kinga Krauze – "ILTER Science Agenda: A Science to Meet the Challenges of Sustainable Global Ecosystems". 20-28 August 2007, Beijing, China.

2007 2nd SWITCH Scientific Meeting. Kinga Krauze - "Building integrated strategy to increase resilience of urban catchments - Ecohydrological approach". 25-29th November 2007, Tel Aviv. Israel.

2007 ANET: ALTER-Net All Parties' Conference. Kinga Krauze - "UNESCO-UNEP Pilica Demonstration Site - a potential European LTSER Platform". 5-9 January 2007, Majorka, Spain.

2007 Fifth Symposium for European Freshwater Sciences. Joanna Mankiewicz-Boczek – "Occurrence of microcystin-producing cyanobacterial in Polish water bodies and associations with environmental factors". 8-13 July 2007, Palermo, Italia.

2007 SIL Congress: Redefining Theoretical and Applied Limnology for the 21st Century. Organisation of Special session on Ecohydrology: Ecohydrology as a Tool for Integrated Watershed Management (organizers: Richard D. Robarts, UNEP GEMS/Water Programme, Maciej Zalewski & Iwona Wagner, ICE PAS, Christiane Hudon, Environment Canada). 12-18 August 2007, Montreal, Canada.

2007 SIL Congress: Redefining Theoretical and Applied Limnology for the 21st Century. Iwona Wagner & Maciej Zalewski - "The Limnological Research as a Basis of Development And Implementation of Ecohydrology". 12-18 August 2007, Montreal, Canada.

2007 SIL Congress: Redefining Theoretical and Applied Limnology for the 21st Century. Iwona Wagner – "Ecohydrology Concept as an Integral Component of Systemic Urban Water Resources Management". 12-18 August 2007, Montreal, Canada.

2007 International Symposium: New Directions in Urban Water Management, UNESCO Head Quarters. Iwona Wagner – "Urban Aquatic Habitats in Integrated Urban Water Management". 11 - 14 September 2007, Paris, France.

2007 International Symposium: New Directions in Urban Water Management, UNESCO Head Quarters. Iwona Wagner – "Inclusion of Ecohydrology Concept as Integral Component of Systemic in Urban Water Resources Management. The City of Lodz Case Study". 11 - 14 September 2007, Paris, France.

2007 International Symposium: New Directions in Urban Water Management, UNESCO Head Quarters. Maciej Zalewski - Organisation of session and lecture: "Ecohydrology – the use of water and ecosystem processes for healthy human environments". 11 - 14 September 2007, Paris, France.

2007 International Symposium: River Restoration - Decision Making Process and Success Evaluation. Maciej Zalewski – Invited lecture: "Ecohydrology for River Restoration- Decission Making Process". 4-6 September 2007, Kartause Ittingen, Switzerland.

Others:

2006 ERB Uncertainties in the 'monitoring-conceptualisation-modelling' sequence of catchment research, Afelt A. – Poster 'The Loess Mictostructure Transformation Through Infiltration Processes in Blind Drainage' ; Jakubowski W. – Presentation „Does the threshold level selection have an influence on the low flow extreme indices distributions?"; Nowicka B., M. Bieroza – Poster 'Uncertainty in lake net groundwater flow assessment in the river-lake systems (the water budget method)' ; Somorowska U.

– Presentation 'Quantifying the uncertainties in the terrestrial water storage-runoff relation using in-situ soil moisture data'. 18-23.09.2006, Luxembourg.

2007 Workshop on 'Water balance and runoff/water quality generation in tile-drained agricultural catchments'. Chełmicki W., J. Siwek., M. Żelazny – Presentation: "Land-use as a factor determining streamwater chemistry dynamics in small Carpathian Foothill's catchments". 5.09.2007, Brno, Czech Rep.

2007 XXIV General Assembly IUGG 2007. Session HW2003 'Analysis of Variability in hydrological data series': Kochanek, K. , W.G. Strupczewski, V.P. Singh, S. Węglarczyk – Presentation "Probability weighted moments techniques applied to heavy-tailed distributed samples deprived of largest element"; Markiewicz, I., W.G. Strupczewski, K. Kochanek – Presentation "Initial study of two-shape-parameter flood frequency distributions". Perugia 2-13 July 2007.

2007 XXIV General Assembly IUGG 2007. Session HW3008 'Changes to hydrological extremes and water quality': Strupczewski W.G., K. Kochanek, W. Feluch – Presentation "On non-stationary flood frequency analysis". Perugia 2-13 July 2007

1.7 Other activities at regional level

1.7.1 Institutional relations/cooperation

1.7.2 Completed and ongoing scientific projects

ERCE and UL:

1. 2005-2010- SWITCH - Sustainable Water Management Improves Tomorrow's Cities' Health. Project Officer for the project partner - University of Lodz; Project Coordinator: UNESCO-IHE; EU FP6 IP Project;
2. UNESCO IHP Demonstration Site "Application of Ecohydrology and Phytotechnologies for Water Resources Management and Sustainable Development"; Project Coordinator –Prof. Maciej Zalewski, Dr Iwona Wagner
3. ALTER: A Long Term Biodiversity, Ecosystem and Awareness Research Network Supporting institution: EC GOCE-CT-2003-5052298-Alter-Net; Co-ordination: M. Zalewski, K. Krauze Duration time: 2004-2009; www.alter-net.info
4. LORIS WIZJA Regional Technological Foresight; – long-term predictions about technological development in the Lodz Province – to 2020; www.loriswizja.pl
5. UNESCO IHP – Demonstration Projects on Ecohydrology – Coordination on behalf of UNESCO.

2. FUTURE ACTIVITIES

2.1 Activities planned until December 2009

University of Warsaw Hydrology Department plans to continue cooperation with Friend program (group 5. Catchment hydrological and biogeochemical processes in changing environment") and ERB. Prof. M. Gutry-Korycka acts as the coordinator of the team consisting of seven persons: Dr Artur Magnuszewski, Dr Urszula Somorowska, Dr Barbara Nowicka, Dr Maciej Lenartowicz, Dr Dariusz Woronko, Dr Jarosław Suchożebrski and Dr Aneta Afelt.

Jagiellonian University, Institute of Geography and Spatial Management together with ERB, IHP UNESCO North European FRIEND Project 5 and IAHS Prediction in Ungauged Basins (PUB) organizes 12th Biennial Conference of Euromediterranean Network of Experimental and Representative Basins "Hydrological extremes in small basins". The conference will take place in Kraków on 18-20 September 2008. The details are announced at www.geo.uj.edu.pl/erb2008/ . Prof. W.Chełmicki is a member of international scientific committee. The local organizing committee consists of: W. Chełmicki (coordinator), M. Baścik, M. Kasina, A. Magnuszewski, J. Pociask-Karteczka, B.Rzonca, R. Soja, J. Siwek, M. Żelazny.

2.2 Activities foreseen for 2010-2011

2.3 Activities envisaged in the long term

NATIONAL REPORT ON IHP RELATED ACTIVITIES
IN
REPUBLIC OF KOREA

May, 2008

Korean National Committee
for
The International Hydrological Programme
Republic of Korea

1. ACTIVITIES UNDERTAKEN IN THE PERIOD JULY 2006-MAY 2008

1.1 Meetings of the IHP National Committee

1.1.1 Decisions regarding the composition of the IHP National Committee

For the solution of water problems and the protection of mans welfare and the quality of human life, a UNESCO Resolution in 1964 created the International Hydrological Decade(IHD). Korea as a participant in the program, then appointed within its Ministry of Construction a IHD National Committee(later, IHP National committee), which undertook pioneer hydrologic surveys of selected representative basins in three major river systems during the program period, and embarked in 1975 on a 6-year International Hydrological Programme (IHP) project as the first step toward an extension of surveys of domestic river basins in order to fulfill its responsibilities in the world's consolidated efforts to cope with the water problem. After the completion of the first phase of IHP in 1980, the second phase of IHP project(1981~1983), the third phase of IHP project(1984~1989), the fourth phase of IHP project(1990~1995), the fifth phase of IHP project(1996~2001), the sixth phase of IHP project(2002~2007) and the seventh phase of IHP project(2008-2013) followed for the continuation of representative basin studies, the adoption of new techniques of water resources development and water quality control, the hydrological evaluation of urbanization and variations of watershed including sustainable development in a changing environment, hydrology and water resources development in a vulnerable environment, water interactions of systems at risk and social challenges and water dependencies of systems under stress and societal responses, and education and training in hydrology and water resources.

From the beginning of the New Millennium through this year(2008), Korean National Committee for the IHP was reorganized and strengthened to fulfill the IHP activities more effectively and actively. All members of the Committee were from every part of water related organizations in the country and executive functions are carried out within the Water Resources Bureau, Ministry of Land, Transport and Maritime Affairs.

Decisions regarding most of IHP related activities are made by this committee which is held regularly and on request in special occasion.

1.1.2 Status of IHP-Ⅵ activities

During the sixth phase(2002~2007) of IHP, the Korean National Committee for the IHP paid its efforts to achieve the objectives set by UNESCO for this phase of IHP and the following projects have been executed in Korean river basins and in the field of hydrology and water resources in Korea.

(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

Based on these projects(themes), more practically-oriented-projects for Korean hydrologic and water resources conditions have been executed and their detailed information are listed in Table-1.

Table-1 IHP National Events in IHP-Ⅵ

Projects/Activities	Brief Description	IHP-Ⅵ Subprogram	Location and Duration	Supporting Body	Gov. Input	Output
1. 2006 IHP Representative Basin Studies	·Water demand management planning and its studies ·Runoff characteristics change and runoff reduction studies according to large-scale housing area development ·Runoff analyses by future landuse and climate change ·Int'l river management examples investigation and development of management strategy of South-North Korean co-boundary river basins ·River basin management manual for Integrated River Basin management(IRBM) ·Optimal water resources use and its management technique development in island and coastal region ·Groundwater variation characteristics in urban areas ·River and culture/civilization studies in river basin ·Selection and design of new Representative basins for hydrological data collection ·Review of study results and future direction of present Representative basins	Theme 1, 2, 4 and 5	Korean rivers	MOCT	Major Gov. input	Report and Papers
2. 2007 IHP Representative Basin Studies	·Water demand management planning and its studies(cont'd) ·Runoff characteristics change and runoff reduction studies according to large-scale housing area development(cont'd) ·Runoff analyses by future landuse and climate Change(cont'd) ·River basin management manual for Integrated river Basin management(IRBM)(cont'd) ·Optimal water resources use and its management technique development in island and coastal region(cont'd) ·Groundwater variation characteristics in urban areas(cont'd) ·River and culture/civilization studies in river basin(cont'd) ·Electronic publication and distribution of hydrologic and water quality data ·New representative basin operation and studies	Theme 1, 2, 4 and 5	Korean rivers	MOCT/MLTM	Major Gov. input	Report and Papers
3. Asian/Pacific FRIEND & HELP Studies(2006-2007)	·Basic hydrologic analyses in AP FRIEND river basins ·Comparative regional analyses of hydrology and water resources in AP FRIEND regions	Theme 1 Area 1.1	Korean rivers	MOCT/MLTM		Report and Papers
4. Water resources management during extreme flood and drought	·Extreme flood and drought modeling ·Water resources management techniques during extreme hydrologic periods	Theme 1, 2 and 3	Korean rivers	MOCT/MLTM		Report and Papers
5. Special program of regional hydrology	·FRIEND & HELP basin studies ·PUB studies			MOCT/MLTM MOE		

MOCT : Ministry of Construction and Transportation (from 2008, MOCT was reorganized as MLTM)
MLTM : Ministry of Land, Transport and Maritime Affairs
MOE : Ministry of Environment

1.1.3 Decisions regarding contribution to / participation in IHP-Ⅶ

In the beginning of the seventh phase of IHP(2008-2013) the Korean National Committee for the IHP has prepared the implementation plan of IHP-Ⅶ during the period(2008-2013) as listed in Table-2 and the potential activities to be undertaken by the Korean National Committee for the IHP as listed in Table-3 both according to the core programme Themes and Focal Areas, overviews of which are shown as follows;

WATER DEPENDENCIES: SYSTEMS UNDER STRESS AND SOCIETAL RESPONSES

Theme 1: ADAPTING TO THE IMPACTS OF GLOBAL CHANGES ON RIVER BASINS AND AQUIFER SYSTEMS

Focal area 1.1 - Global changes and feedback mechanisms of hydrological processes in stressed systems
Focal area 1.2 - Climate change impacts on the hydrological cycle and consequent impact on water resources
Focal area 1.3 - Hydro-hazards, hydrological extremes and water-related disasters
Focal area 1.4 - Managing groundwater systems' response to global changes
Focal area 1.5 - Global change and climate variability in arid and semi-arid regions

Theme 2: STRENGTHENING WATER GOVERNANCE FOR SUSTAINABILITY

Focal area 2.1 - Cultural, societal and scientific responses to the crises in water governance
Focal area 2.2 - Capacity development for improved governance; enhanced legislation for wise stewardship of water resources
Focal area 2.3 - Governance strategies that enhance affordability and assure financing
Focal area 2.4 - Managing water as a shared responsibility across geographical & social boundaries
Focal area 2.5 - Addressing the water-energy nexus in basin-wide water resources

Theme 3: ECOHYDROLOGY FOR SUSTAINABILITY

Focal area 3.1 - Ecological measures to protect and remediate catchments process
Focal area 3.2 - Improving ecosystem quality and services by combining structural solutions with ecological biotechnologies
Focal area 3.3 - Risk-based environmental management and accounting
Focal area 3.4 - Groundwater-dependent ecosystems identification, inventory and assessment

Theme 4: WATER AND LIFE SUPPORT SYSTEMS

Focal area 4.1 - Protecting water quality for sustainable livelihoods and poverty alleviation
Focal area 4.2 - Augmenting scarce water resources especially in SIDS
Focal area 4.3 - Achieving sustainable urban water management
Focal area 4.4 - Achieving sustainable rural water management

Theme 5: WATER EDUCATION FOR SUSTAINABLE DEVELOPMENT

Focal area 5.1: Tertiary water education and professional development
Focal area 5.2: Vocational education and training of water technicians
Focal area 5.3: Water education in schools
Focal area 5.4: Water education for communities, stakeholders and mass-media professionals

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Cross-cutting programmes: HELP, FRIEND

Associated programmes: International Flood Initiative (IFI)
International Sediment Initiative (ISI)
Water for Peace: From Potential Conflicts to Cooperation Potential (PCCP)
Joint International Isotope Hydrology Programme (JIIHP)
Internationally Shared Aquifer Resources Management (ISARM)
Global Network on Water and Development Information in Arid Lands (G-WADI)
Urban Water Management Programme (UWMP)
World Hydrogeological Map (WHYMAP)

Education, Training and Capacity Building across all the themes

Table-2 Implementation Plan of IHP-VII Phase

Name of the IHP National Committee REPUBLIC OF KOREA IHP-NC	Country Priorities 2008-2009	Country Participation in Theme and Focal area 2008-2013	Events organized in the Country	Activity lead/Coordinated by the Country
IHP VII Themes and Focal areas				
Theme 1:				MLTM/KWRA*
Focal area 1.1	●	2008-2009		MLTM/KWRA
Focal area 1.2	●	2009-2010		MLTM/KWRA
Focal area 1.3		●2011-2013		MLTM/KWRA
Focal area 1.4	●	2008-2009		MLTM/KWRA
Focal area 1.5				
Theme 2:				MLTM/KWRA
Focal area 2.1		●2010		MLTM/KWRA
Focal area 2.2	●	2008-2009		MLTM/KWRA
Focal area 2.3		●2010-2011		MLTM/KWRA
Focal area 2.4		●2011-2013		MLTM/KWRA
Focal area 2.5				
Theme 3:				
Focal area 3.1	●	2008-2009		MLTM/KWRA/IHES*
Focal area 3.2	●	2008-2009		MLTM/KWRA/IHES
Focal area 3.3		●2010-2011		MLTM/KWRA/IHES
Focal area 3.4		●2011-2012		MLTM/KWRA/IHES
Theme 4:				
Focal area 4.1	●	2008-2009		MLTM/KWRA
Focal area 4.2				MLTM/KWRA
Focal area 4.3		●2010-2011		MLTM/KWRA
Focal area 4.4		●2011-2013		MLTM/KWRA
Theme 5:				
Cross-cutting programmes				
HELP	●	2008-2013		MLTM/IHES
FRIEND	●	2008-2013		MLTM/IHES
Associated programmes :				MLTM/IHES
International Flood Initiative(IFI)	●	2008-2013		
International Sediment Initiative(ISI)				
Water for Peace(PCCP)				
UNESCO-IAEA Isotope(JIIHP)				
Shared Aquifer(ISARM)				
Global Network Arid Lands(G-WADI)				
Unban Water Management(UWMP)	●	2008-2013		MLTM/KWRA
World Hydrogeological Map(WHYMAP)				

* MLTM : Ministry of Land, Transport and Maritime Affairs
  KWRA : Korea Water Resources Association
  IHES : International Hydrologic Environmental Society
* NOTE : Education, Training and Capacity Building activities are to be undertaken across all the themes

Table-3 Activities to be undertaken by the Korean National Committee

Name of the IHP National Committee REPUBLIC OF KOREA IHP-NC	Activities suggested by the IHP National Committee and their method of implementation
IHP VII Themes and Focal areas	
Theme 1:	
Focal area 1.1	Case studies on facility management techniques for abnormal climate
Focal area 1.2	Case studies of climate change impact on hydrological cycle Case studies of effect on water resources by climate change and development of evaluation system
Focal area 1.3	Case studies on regional hydrological extremes and water-related disasters
Focal area 1.4	Case studies of large scale groundwater dependencies related global change
Focal area 1.5	
Theme 2:	
Focal area 2.1	
Focal area 2.2	Best practices of good governance, capacity development and stakeholder participation at regional level
Focal area 2.3	
Focal area 2.4	
Focal area 2.5	
Theme 3:	
Focal area 3.1	Case studies of ecohydrological measures to protect and remediate catchment process
Focal area 3.2	Case studies on complementing engineering solutions with ecological measures resulting in sustainable carrying capacity of ecosystems Case studies on gravel contact oxidation process technology applied to improvement of stream quality
Focal area 3.3	
Focal area 3.4	
Theme 4:	
Focal area 4.1	Methodologies for safeguards against water borne biotic and abiotic pollutants
Focal area 4.2	
Focal area 4.3	
Focal area 4.4	
Theme 5:	
Cross-cutting programmes	
HELP	Regional casse studies in HELP experimental river basins
FRIEND	Regional comparative case studies in Asia-Pacific river basins
Associated programmes :	
International Flood Initiative(IFI)	Regional case studies on flood and water-related disasters
International Sediment Initiative(ISI)	
Water for Peace(PCCP)	
UNESCO-IAEA Isotope(JIIHP)	
Shared Aquifer(ISARM)	
Global Network Arid Lands(G-WADI)	
Unban Water Management(UWMP)	Development of urban water management strategies and technologies
World Hydrogeological Map(WHYMAP)	

* NOTE : Education, Training and Capacity Building activities are to be undertaken across all the themes

1.2 Activities at a national level in the framework of the IHP

1.2.1 National / local scientific and technical meetings

Annual regular or many special scientific and technical meetings in the framework of the IHP were held in collaboration with International Hydrologic Environmental Society(IHES), Korea Water Resources Association(KWRA), Korean Society of Civil Engineers(KSCE), ICOLD Korean National Committee (KNCOLD), IWRA Korea Geographic Committee(IWRA-KGC), Korea Federation of Water Science and Engineering Societies(KFWSES), Korea Water Resources Corporation, and other water-related organizations in Korea. In those meetings, national/local hydrologic issues and water resources problems were dealt with special solution measures and their results were published in the form of scientific or technical reports and papers.

1.2.2 Participation in IHP Steering Committees / Working Groups

Republic of Korea was one of most active member countries in IHP Regional Steering Committee's activities for Southeast Asia and the Pacific. Republic of Korean delegates actively participated in the IHP Regional Steering Committee and Working Group meetings held in the period of 2006~2008.

1.2.3 Research / applied projects supported or sponsored

Research projects supported by the Government in the framework of the IHP in the period of 2006~2008 are listed in Table-1. Some other research or applied projects were also supported or sponsored by the Government and other water-related organizations such as Korea Water Resources Corporation during this period.

The following projects have been and are being implemented for the Asian Pacific FRIEND in the three representative river basins chosen as the Korean Asian Pacific FRIEND and HELP basins(Wichun, Kumho and Hwang river basins).

· Basic hydrologic analyses and data collection

· Comparative regional flow regimes analyses

  - Rainfall models and design storm

  - Flood models and design flood

· FRIEND river basins studies

· HELP river basins studies

1.2.4 Collaboration with other national and international organizations / or programmes

The Korean National Committee for the IHP is functioning in the execution of IHP activities in collaboration with the following national and international organizations/or programmes; Korea Water Resources Corporation(The K-Water); Korea Water Resources Association(KWRA); Korean Society of Civil Engineers(KSCE); Korean Society of Agricultural Engineers(KSAE); Korean Meteorological Society(KMS); ICOLD Korean National Committee(KNCOLD); IWRA Korean Geographic Committee; International Hydrologic Environmental Society(IHES); Korea Federation of Water Science and Engineering

Societies(KFWSES); Korea Institute of Construction Technology(KICT); Korean Universities Hydrology and Water Resources Programmes.

1.3 Educational and training courses

1.3.1 Contribution to IHP courses

The Korean National Committee for the IHP is contributing to the Korean Universities hydrology and water resources courses in the framework of the IHP in which graduate students and engineers are mostly involved with IHP projects and also educated or trained through the formal courses.

1.3.2 Organization of specific courses

Special workshops and seminars in the field of hydrology and water resources are annually organized by the Korean National Committee for the IHP in collaboration with above mentioned organizations in 1.2.4. In these specific courses, special topics are dealt with practical application in river basins.

1.3.3 Participation in IHP courses

The Korean National Committee for the IHP has actively been participating in IHP courses which were held in Asia-Pacific regions such as Japan, China and Malaysia by sending highly qualified hydrologists or proper candidates.

1.4 Cooperation with the UNESCO-IHE Institute for Water Education and/or international /regional water centres under the auspices of UNESCO

The Korean National Committee for the IHP had particularly close cooperation with International Center for Water Hazard and Risk Management(ICHARM) under the auspices of UNESCO in its preparatory activities for the establishment during last two years through the participation in workshops and strong support at the UNESCO Council and regional meetings. Furthermore, Korea Water Resources Corporation(The K-Water) which is a member of the Korean National Committee for the IHP established a special cooperation program with the UNESCO-IHE since 2007.

1.5 Publications

The Korean National Committee for the IHP is publishing IHP Annual Research Report and the Catalogue of Rivers in Korea every year in the form of Government Publication since 1975. These reports are distributed to all water-related organizations and IHP-KNC members and research results are published on the journals of academic societies or organizations.

Some other technical reports, proceedings of scientific meetings and specific course's materials are also published by the IHP-KNC.

1.6 Participation in international scientific meetings

1.6.1 Meetings hosted by the country

The following IHP meetings were hosted and organized by the IHP-KNC, IHES and KFWSES.

- 2006 International Symposium on Hydrological Environment(in Sri Lanka)
- 2007 International Symposium on Climate Change and Flood

1.6.2 Participation in meetings abroad

The Korean National Committee for the IHP actively participated in the IHP Inter-Governmental Council meeting as well as the regional IHP meetings such as Meetings of IHP Regional Steering Committee for Southeast Asia and the Pacific, Asian Pacific FRIEND Project and its workshops, working Group meetings and etc.

2. FUTURE ACTIVITIES

2.1 Activities planned until December 2009, foreseen for 2010-2011 and envisaged in the long term

From the beginning of 2008, IHP-KNC prepared concrete national plan for the seventh phase of IHP and began to implement this plan in Korean river basins. IHP-KNC will also actively continue and participate in the Asian Pacific FRIEND project to complete with successful results for the Southeast Asia and the Pacific.

The following international symposiums and workshops will be organized until December 2009 and during 2010-2011 as the IHP-VII activities of IHP-KNC.

- 2008 International Symposium on Hydrological Environment
- 2009 International Symposium of Hydrologic Environment
- Korean Workshops of FRIEND, HELP and PUB during 2010-2011

National Committee of Russia for the International Hydrological Programme of UNESCO

Report of the Russian National Committee for the IHP to the XVIIIth Session of the Inter-governmental Council for the IHP of UNESCO (June 2008)

Moscow – St Petersburg

2008

Contents

Introduction

The present report is prepared at the State Hydrological Institute on the basis of materials received from the following agencies and organizations:

- Federal Service for Hydrometeorology and Environmental Monitoring (ROSHYDROMET)
- Russian Agency on Water Resources (RosVodResursy)
- State Hydrological Institute (Roshydromet)
- Moscow State University
- Institute of Geography of the Russian Academy of Sciences (RAS)
- Russian State Hydrometeorological University
- Institute of Water Problems of the Russian Academy of Sciences (RAS)
- State Oceanographic Institute (Roshydromet)
- Altai State Technical University
- North-Caucasus Administration for Hydrometeorological Service (Roshydromet)

The Report is prepared according to the structure, format and volume, developed at the UNESCO IHP Secretariat.

ACTIVITIES OF THE RUSSIAN NC FOR THE IHP UNDERTAKEN IN THE PERIOD JUNE 2006– MAY 2008

1. Meetings of the IHP National Committee of Russia

NC RF exists since establishing within UNESCO the International Hydrological Programmes, however its personnel has been periodically renewed. According to the decision of the RF Government made in 2003 the present NC personnel includes Chairperson Mr. Alexander V. Frolov, Deputy Director of Roshydromet, and two deputy Chairpersons – Mr. Victor M. Kotlyakov, Academician of the Russian Academy of Sciences (RAS), Director of the Institute of Geography, (IG RAS), and Mr. Igor A. Shiklomanov, Director of the State Hydrological Institute (SHI, Roshydromet). At present the Committee consists of 24 members – scientists and specialists known both in Russia and all over the world, representatives of different ministries and departments, organizations and institutions who actively work in the fields of hydrometeorology, water resources, water management, and education. During the period under consideration the Committee personnel has changed. Mr. R.Z. Khamitov, Head of the Federal Agency for Water Resources (Roswaterresources) recommended Mr. S.E. Bednaruk of Roswaterresources to be appointed instead of Mr. S.S. Koskin who got a different work.

In the last meeting of the NC in May 2008 Igor A. Shiklomanov also recommended Ms. Jeanna A.Balonishnikova from State Hydrological Institute to be appointed as a member of the NC.

For the period under consideration three NC meetings have been held where discussed were the current issues and strategic plans for future within the frameworks of the 6TH and 7TH Phases of IHP. Also consideration was given to the results of work done in Russia in the fields of hydrology and water resources. Also NC has developed a common approach to the key issues of international cooperation in the areas in question, in particular, with participation of RF delegation at the sessions of IHP Intergovernmental Council of UNESCO.

2. Status of participation at IHP-VI and contribution into IHP-VII.

2.1. Participation in the activities of constitutional and working bodies of UNESCO.

The report of NC RF was prepared and submitted at the 17th session of the IHP Intergovernmental Council (UNESCO, Paris, 3-7 June 2006). All members of NC participated in the preparation of this report, which was submitted as in Russian and English versions.

The materials for this report are received from the following agencies and organizations:

- ***Federal Service for Hydrometeorology and Environmental Monitoring (ROSHYDROMET)***

State Hydrological Institute (SHI)

State Oceanographic Institute (SOI)

North-Caucasus Administration for Hydrometeorological Service

- *Russian Agency on Water Resources (RosVodResursy)*
- *Ministry of education and sciences*

Moscow State University

Altai State Technical University

Russian State Hydrometeorological University

- *Russian Academy of Sciences (RAS*)

Institute of Geography

Institute of Water Problems

The Russian Delegation took part in work of the 17th Session of the IHP Intergovernmental Council. The Russian Delegation was headed by R.Z. Khamitov, Head of Roswaterresources, and included representatives of RosVodResursy, Roshydromet (SHI, SOI) and the Ministry of Foreign Affairs of the Russian Federation. The Russian Delegation worked actively at the plenary meetings of the session, making comments on all major issues of the Agenda.

At working meetings with the Secretariat and at the meetings with participation of countries of Region II (Eastern and Central Europe), discussed were the candidatures of Russian representatives proposed by the Committee for elections into the governing bodies of IHP and steering councils of the UNESCO centres. As a result of all discussions, the Intergovernmental Council elected a Russian representative to the Financial Committee of UNESCO-IHP with a 4-year mandate (O.V. Gorelits, SOI). Russian experts were elected into the governing councils of the UNESCO International Research and Educational Centre for Erosion and Sediments, Beijing, China, (Mr. Zurab Kopaliani, SHI) and the European Regional Centre for Eco-hydrology, Lodz, Poland (Mr. O.V. Gorelits, SOI).

In the course of the discussion, the Russian Delegation approved the draft Plan of IHP-VII for 2008-2013, as a whole, mentioning, however, the necessity of developing scientific hydrology within IHP-VII to avoid an illusion that in hydrology, there are no unstudied phenomena or processes and the only task for hydrologists remains to correctly apply the existing knowledge.

During the discussion of the 2006-2007 Plans and the Seventh Phase of IHP (IHP-VII), the Russian Delegation emphasized the necessity of more active participation of UNESCO- IHP in the Arctic hydrological studies, in particular, within the International Polar Year Programme created by the initiative of Russia. This proposal was supported by the delegations of Iceland, Canada, the Netherlands and other countries and was reflected in the decisions of the Council.

When discussing work of UNESCO-IHE Institute for Water Education, the Russian Delegation proposed establishing a closer cooperation between IHE and the Russian State Hydrometeorological University (RSHMU), which was supported by UNESCO authorities. This proposal was also supported by the Governing Board and Director of UNESCO-IHE who assured the Russian Delegation that he would undertake immediate necessary actions in this direction.

A detailed report on work of the Russian Delegation was submitted to the RF Commission for UNESCO affairs.

Deputy Chairman of NC RF Igor Shiklomanov, as a member of the Governing Board of UNESCO – IHE Institute for Water Education, participated in its meetings in Delft, the Netherlands, 2006-2007.

At the meetings, UNESCO-IHE Working Plan and Budget for 2007-2008 were discussed, as well as the contents of the Academic plan and other current issues of IHE activities. The participants of the December 2007 Meeting expressed great interest in the results of external complex evaluation of UNESCO-IHE activities for the past three years. As a whole, the results were recognized to be positive. However, the Commission made a number of remarks and proposals to improve the future institute activities. A few postgraduate students from different countries presented brief reports on their scientific activities which aroused great interest in the IHE Governing Board members and personnel.

In the period of 25 September to 11 October 2007, Paris, France, the 177th Session of the UNESCO Executive Board was held. At the Session, the thematic discussion took place: "Solving the arising tasks and problems related to knowledge societies and global climate change: multidisciplinary contribution of UNESCO on the regional and country levels." The Roshydromet institutions prepared proposals for this discussion which were presented by Mr. Oleg Anisimov, Head of the Climate Change Research Department of the State Hydrological Institute.

During the discussion of most interest was the report presented by Mr. R. Pachauri, Chairman of International Group of Experts on Climate Change. In his report, Mr. Pachauri presented major conclusions from the IPCC report which stated that climate change consequences exerted the adverse and even catastrophic effects in most countries. To illustrate these conclusions, Mr. Pachauri gave multiple references to the chapters of the report where consideration was given to climate effects on different sectors of economy and individual regions.

Many Russian experts on climate mentioned a serious disadvantage of Mr. Pachauri's report based on the IPCC report. Both reports disproportionably reflected adverse and positive aspects of the climate change problem, including the effects on economy and natural processes. During the UNESCO discussion, Mr. Oleg Anisimov mentioned this disadvantage of the reports. In particular, Mr. Anisimov indicated that neither the IPCC report, nor Mr. Pachauri's report reflected the position of the Russian researchers that many of expected global warming consequences would exert positive effects on economy. Among them are reduced heating expenses, a less severe climate, improved ice conditions for river and sea navigation, an extended navigation period, the development of northern agriculture and other changes. For example, the Resume for politicians does not reflect the dual character of predictable seasonal changes in river runoff depending on the fact if the round-year rain feeding prevails in a river basin or there is a prolonged winter ice period with low river runoff typical of most river basins. The Resume mentions only a predictable decrease in minimum river runoff with rain feeding that occurs in the end of the summer period. This statement leads to the conclusion that the unevenness of seasonal distribution of river runoff would increase, which would exert unfavourable aftereffects. However, this is typical of only the rivers in moderate and southern regions, not of most rivers in Russia, where minimum river runoff occurring in the winter period has considerably increased for the past 20 years and continues to increase. As a result, the seasonal runoff variability decreases, which is a favourable factor.

Besides the report does not reflect the principal position of Russian scientists that the current climate change consequences are caused by the combined effect of natural and anthropogenic factors, therefore at present, there are no reasons to solely attribute them to man's activities.

In addition to the above problem of studying climate change consequences, in the framework of UNESCO discussion, consideration was given to the issue of the future development of the Regional Climate Centres existing in different countries. Mr. Anisimov expressed the idea of their gradual transformation into multidisciplinary centres of "action" for using climatic information in different applications, including the climate risk management in the corresponding regions. An important task for these centres is to develop measures to mitigate the consequences of extreme climatic phenomena and, as a whole, to provide hydrometeorological safety, i.e., the defense of life-important personal interests, society and state from the effects of dangerous natural phenomena and climate change. As to Russia, one of the most economically dangerous climate change consequences is permafrost melting resulting in an increased risk of damaged and ruined dwelling, transport and engineering constructions built on the permafrost areas. UNESCO could play an important role in educational work aimed at forming a scientifically-grounded societal position on this problem, as well as mobilizing necessary intellectual, financial and economic resources to develop the strategy for its solution that could include a comprehensive scientific model-based analysis, engineering methods for mitigating adverse effects of permafrost melting, as well as the system for detecting, forecasting and preventing dangerous situations.

The question was also raised that in the framework of UNESCO activities, along with social and economically-orientated programmes, it is necessary to pay more attention to the scientific problems that have not yet been solved and have alternative points of view from different groups of scientists. In this connection, it is important to determine the role of different factors in the present climate change, in particular, non-anthropogenic; to use various climate prediction methodologies alternative to dynamic modeling and supplementing their results (palaeoclimatic reconstructions, building empiric models based on observation data); to find possible compensation for anthropogenic effects on climatic system at the expense of carbon exchange between atmosphere and ocean; to forecast regional climate on spatial scales from season to several years and decades.

As a whole, participants of the discussion came to the unanimous conclusion that UNESCO, as an influential and competent organization, could play a noticeable role in many aspects of activities related to studying the climate change problem and adaptation to this change. One of the important directions mostly corresponding to UNESCO profile is dissemination of knowledge on the expected climate change.

2.2. Scientific activities in the framework of IHP-VI

Different aspects of the Russian contributions to the IHP-VI projects are always discussed at the NC meetings. A necessity and importance of research to be made within the framework of the IHP-VI projects at the national level are emphasized, which is a specific feature of this programme. The NC members decided to take the account of the main aspects of activities noted in the IHP-VI during a development of the current themes for

scientific and technical studies and works of the leading hydrological and water management organizations in Russia as the first-priority problems.

A particular emphasis was focused on a necessity of active participation of Russian scientists and specialists in the implementation of the following very important IHP-VI Themes where it is possible to obtain the results of a great scientific and applied importance not only for the territory of Russia but on the global scale.

Theme 1. "Global Changes and Water Resources"

Theme 2.1. "Extreme Events on Land and Water Resources Control"

Theme 2.2. "International River Basins and Subsurface Water Storage"

Theme 2.3. "Endorheic Basins"

Theme 5. "Education and Training".

In the framework of Theme 1, the State Hydrological Institute has accomplished two basic works: 1) water resources of Russia and their change were scientifically estimated and the results were presented in the monograph "Water Resources of Russia and Their Use" and 2) the International Data Centre on Lake and Reservoir Hydrology" was created.

The manuscript "Water Resources of Russia and Their Use" consists of 12 chapters:

Chapter 1 (introductory). Actuality of the problem. A review of the completed studies. Features, structure and contents of the monograph.

Chapter 2. Physico-geographical and hydrographic conditions in the territory of the Russian Federation.

Chapter 3. Hydrological cycle and water resources.

Chapter 4. Static (gross) water resources in the RF territory.

Chapter 5. Water resources of river and sea basins.

Chapter 6. Water resources and lake levels.

Chapter 7. Quality of surface waters (State Chemical Institute - SCI).

Chapter 8. Renewable ground water resources (Hydrological and Geological Corporation - HYDEC).

Chapter 9. Anthropogenic changes in water resources of river basins.

Chapter 10. Water resources, water use and water availability of RF subjects.

Chapter 11. Water resources of Russia in future.

Chapter 12. World water resources and their use. Comparison of data on Russia and other countries and regions.

The monograph has been prepared by SHI with participation of SCI (water quality) and HYDEC (ground waters). The scientific leader is Mr. Igor Shiklomanov, Director of SHI, and the responsible executives of SHI are Mr. Vladimir Babkin, Head of Laboratory, Ms. Jeanna Balonishnikova, Head of Department, Mr. Vladimir Georgiyevsky, Head of Department; of SCI - Mr. Anatoly Nikanorov, the Corresponding Member of Russian Academy of Sciences, and of HYDEC - Mr. Boris Borevsky.

The Monograph is based on the analyses of the long-term observation data on hydrological cycle and the quality of surface and ground water bodies and the calculation of using water resources and studying the changes in their formation because of anthropogenic activities on watersheds. The Monograph presents the data

for all major river watersheds, administrative territories of Russian Federation, and hydro-climatic regions, including the data on spatial and temporal, including future, distribution of water resources.

The Monograph thoroughly covers the problems of studying and estimating renewable water resources of Russia (surface and ground waters and their quality), as well as their long-term spatial and temporal (to 2010-2020) distribution under the conditions of economic activities and anthropogenic climate change.

The Monograph summarizes the results obtained by the Russian scientists at present and for the past two decades. This is very important because in Russia, during the past twenty years serious changes occurred to major factors determining variations in water resources and their spatial and temporal distribution, i.e., anthropogenic climate change and drastic transformations in social and economic spheres. Therefore, the major goal of the Monograph was to reveal how these changes affected the major characteristics of water resources and their use in different river basins and regions of the country and what can be expected in this connection in future.

Taking into account the huge territory of Russia occupying more than 10% of the entire land territory on our planet, as well as a large diversity of physico-geographical conditions, it is obvious that Russia is the most important object on the global scale. This means that on one hand, any changes in the global hydrological cycle would greatly affect it, and on the other hand, changes in hydrological cycle components in Russia are a significant factor in the global hydrological cycle. Therefore, the Monograph presents modern ideas about changes in the components of global hydrological cycle and peculiarities of hydrological cycle over the territory of Russia that can noticeably affect the formation and dynamics of water resources.

In the Monograph, major emphasis is given to the renewable water resources whose integral index is the river runoff with its ground component.

Major sections of the Monograph deal with studying and assessing the resources of river runoff on all river watersheds and sea basins, administrative and physico-geographical regions of Russia, their changes because of water consumptive use and other types of economic activities, as well as a result of anthropogenic effects on global climate. All the estimates and analysis of different characteristics of water resources and their use are considered in dynamics for the entire long-term period of observations and individually for the period of stationary climate and stable social and economic development since the start of performing massive hydrological observations to the early 1980s, as well as for the past 20-25 years under the conditions of intensive climate change and drastic changes in social and economic situation in Russia.

The important practical conclusions have been made as to changing annual distribution of water resources in river basins. The analysis of long-term data on monthly runoff of medium rivers with natural hydrological regimes shows that for the past 20-25 years practically over the entire territory of Russia serious changes have taken place in the annual distribution of river runoff, primarily, due to increased river water content in low-water periods, especially in winter months.

During the 20^{th} century there have been no analogs of the extraordinarily increased low-water river runoff, especially in winter time (to 50-100%), observed synchronously over a huge territory. This increase in low-water runoff has caused an increase in water resources even in the river basins with a decreased spring

flood runoff. This situation occurred in Russia for the first time. Earlier all significant low-water and high-water phases were determined first of all by the value of spring flood runoff. The trend to an increased winter river runoff is typical also of the majority of large river systems with natural hydrological regime.

Considerable attention is given to the problems of complex anthropogenic changes in water resources of river basins under the present conditions of social and economic development of the country.

It is shown that under the conditions of modern Russia, the major kinds of economic activities that can noticeably affect the quantitative characteristics of water resources in large regions and river basins are the direct water consumption for industrial and municipal needs, irrigation and agricultural water supply, construction and exploitation of reservoirs, as well as the factors related to anthropogenic influence on climate causing changes in the atmosphere gas composition. Analyzed are the status of calculation of fresh water use in Russia and the results of assessing the long-term dynamics of water consumption and water withdrawal for different economy needs.

Along with anthropogenic changes in quantitative characteristics of water resources, for the first time an assessment of surface water quality is presented for the Russian Federation based on summarizing hydro-chemical data obtained on the Roshydromet network between 1991 and 2005.

Based on all the available data, tendencies and developed methodological approaches, the approximate forecast assessments have been made for 2010, 2015 and 2020 for industrial, municipal and agricultural (irrigation and agricultural water supply) water use (consumption and withdrawal) for all RF subjects, major river basins and hydro-climatic regions. The total water use is supposed to increase by 9% by 2020 and agricultural water use by 85-90%. The industrial fresh water use is planned to decrease approximately by 10% and municipal by 25%, i.e. the total volume of water use in Russia would be about 30% less by 2020 than it was in the 1980s.

The concluding chapter treats on the global scale the most important aspects of complex water problem related to changes in renewable water resources, water availability and water deficiency in countries and world regions. The data cited in the Monograph is mainly based on the results of complex studies made recently at the State Hydrological Institute.

The Monograph considers technical, social, economic and ecological aspects of the possible reduction of fresh water use and increase in the available water resources due to various water management measures. Sooner or later these aspects will find a wide application in the regions and countries where they will turn to be most appropriate, ecologically safe and economically profitable according to their physico-geographical conditions and the type of water use.

To solve the problems related to studying the global hydrological cycle and its changes under man's impact, the international organizations perform a lot of work on collecting and analyzing observation data and creating global databases along with developing the automated technologies for their summarization and free dissemination for use when solving different problems, as applied to individual regions or on the global scale.

According to the Roshydromet proposal supported by the WMO Committee for Hydrology and Executive Council, as well as by UNESCO and other international organizations, in 2006 the decision was made

to create on the basis of SHI the International Data Centre for Lake and Reservoir Hydrology. The Centre started functioning in January 2007 and the period of 2007-2008 was determined as a preparatory stage of its work. For the past year the following work has been done:

- developed are the Concept and other legal documents for establishing the Centre;
- developed are the structure of data base, composition of metadata and coding system;
- developed are suggestions for data sources for the Centre and the procedure for collecting this data;
- determined are the types of information products of the Centre;
- prepared is the draft of legal WMO-Roshydromet agreement on establishing the Centre;
- prepared is the passport information about lakes and reservoirs of Russia and the former USSR, as well as observation stations on them, to be downloaded into the Database Prototype of the Centre;

In addition a number of necessary measures have been undertaken to create the material and technical basis of the Centre: the repair of offices, including the replacement of electric circuits, purchasing the necessary computer facilities, establishing the high-speed Internet, etc.

Upon agreement with the international organizations, in particular UNESCO, the International Scientific-Coordination Committee of the Centre has been created. In June 2007, in Saint-Petersburg, SHI, at the first meeting of the Committee, the work done on creation of the Centre and the start of its functioning were approved, as well as the plan of work for 2008. It was stated that there were all grounds to believe that the Data Centre for Lakes and Reservoirs would occupy with time a decent place in the row of other successfully functioning World Centres collecting observation data on different components of the environment (precipitation, river runoff, water quality, ground water, etc.).

In the beginning of 2008, SHI composed the Questionnaire aimed at collection of information about available observation data on lake and reservoir hydrology in other countries. SHI applied to WMO with the request to disseminate this Questionnaire in all countries. In the fourth quarter of 2008, SHI will hold the Second meeting of the International Scientific-Coordination Committee of the Centre.

Problems on Theme 2.2, in particular in the part of international river basins, are also of great importance for Russia because after the USSR disintegration a large number of new states bordering RF were formed. Much work is being done on this problem by specialists of the Russian Agency for Water Resources and the Roshydromet institutions as to monitoring boundary water bodies and assessing trans-boundary water and pollution transport. The basins of 70 large and medium rivers are trans-boundary for RF.

Studies on Theme 2.3 “Enclosed Basins” are traditionally being carried out in Russia on the problem of the Caspian Sea basin, one of the largest in area and population and economically developed enclosed basins of the world. The Caspian Sea is very important not only for Russia but for all five countries sharing its coast (Russia, Azerbaijan, Iran, Kazakhstan, Turkmenistan). The sea level variations of large amplitude caused by climatic factors and economic activities in the basin affect much the economies, ecology and social conditions

in the Caspian countries. Multipurpose studies of these processes are very important in terms of science and technology. The leading role in these studies belongs to specialists in the field of hydrometeorology.

For the period in question SHI with participation of SOI and other Roshydromet institutions published the monograph "Hydrometeorological Aspects of the Problem of the Caspian Sea and its Basin."

Within the framework of Theme 4 IHP-VI "Water and Society" the Altai State Technical University developed a unique system for support of decisions (DSS) "Hydromanager" aimed at the economic optimization of managing the quality by means of the complex consideration of the status of the environment condition, and social, economic, and legal aspects, as applied to the Russian Federation. This system is adapted to the requirements of considering the status of the environment expressed in the EU Water Directive and Economic Principles as to managing the water resources.

2.3. Contribution and proposals for participation of NC RF in IHP-VII

The problems of formation of IHP-VII within UNESCO have been repeatedly considered at the NC RF meetings.

The National Committee of RF for IHP fully supported the idea of the major directions of UNESCO activities in the framework of IHP-VII to help first of all solving the problems mentioned in the "Plan of Realization" ratified at the Johannesburg World Summit on Sustainable Development, September 2002.

The International group of experts has developed the draft Strategic Plan for Phase VII of UNESCO-IHP. Based on this draft plan the National Committee has prepared proposals for participation of Russian experts in realization of the forthcoming IHP phase. These proposals were submitted to the UNESCO-IHP Secretariat in April 2008.

Personal particulars (CV's) of 17 RF experts for participation in the activities of IHP-VII were also submitted to the UNESCO-IHP Secretariat.

The lists of themes and experts recommended by NC IHP RF for participation in certain IHP-VII sub-themes, as well as the proposed forms of cooperation and the methods for accomplishing the themes, are presented in Tables A and B, respectively.

In the course of IHP-VII preparation, including the meetings of the 17th Session of Intergovernmental Council in 2006, it was repeatedly mentioned that the forthcoming IHP phase, like the previous 2-3 phases, in spite of their extraordinary importance and practical significance for the world community goes farther away from scientific and even general hydrology, though the permanent International UNESCO Programme had been created to serve these tasks, as compared to the programmes of WMO, UNEP, FAO and other international organizations aimed at different practical aspects and problems of hydrology and boundary water sciences.

In particular, out of five IHP-VII themes pure hydrology is presented only in Theme 1 (in its five sub-themes) "Adaptation to Global Changes in River Basins and Ground Water Horizons." The rest four IHP-VII themes are related to a wide circle of problems on water resources management (cultural, social, ecological, economic, financial, organizational and educational aspects).

The above notation supports and strengthens the illusion (under the UNESCO competence) that modern hydrology has no unstudied phenomena and processes and the problem, as a whole, consists only in the correct application of the available knowledge to solve practical problems.

In this connection when preparing the draft UNESCO Programme and Budget for 2010-2011, the NC proposed in February 2008 to include into the IHP Programme an additional cycle of studies on fundamental and methodological problems of modern hydrology as a scientific basis for the entire activities in the framework of IHP and international activities in the fields of hydrology and water-related sciences.

This cycle of studies can be titled as "Scientific and Methodological Grounds of Hydrology and Water Sciences: Modern Status and Directions of Development".

Under this title wide fundamental studies can be accomplished, as well as the analysis and summarization of the obtained results, and the most promising methods for knowledge development in the following directions can be agreed:

- river runoff formation, methods for hydrological calculations and forecasts, mathematical modeling;
- theoretical and methodological grounds of experimental hydrology;
- scientific and methodological estimates of water resources and their management;
- modern theory of channel process and sedimentation;
- hydrological grounds for the formation of composition and quality of surface and ground waters;

scientific and methodological grounds for nature conservation and ecological aspects of stable use of river systems under the conditions of common environment and water ecosystem degradation, climate change effects on natural water cycle, hydrological regime of water bodies, and water balance components.

In many countries, studies on these hydrological problems are expected to develop with the results reflected to this or that extent in publications and periodical IHP-VII reports.

In the course of preparation of IHP-VII many CIS countries, in particular, Kazakhstan, Kyrgyzstan, Moldova, Russian Federation, and Uzbekistan, expressed their wish to participate in IHP. Other countries are believed to join them due to the fact that within IHP-VII, there are the problems whose development can be of undoubted scientific and practical interest for all CIS countries. These are, for instance, the effects of climate change and economic activities on hydrological cycle and water resources (including arid and semi-arid regions), water resources management, extreme hydrological phenomena and water-related disasters, trans-boundary water and pollution transport, ground water management under the conditions of global changes, modernizing hydrological observation systems, etc.

In this connection the National Committee of RF for IHP proposed to organize in October 2008 on the basis of the State Hydrological Institute the meeting of executive representatives of NC for IHP of CIS countries. This proposal was supported by the Commission for UNESCO Affairs. At this meeting, the problems of first priority and the hydrological problems the countries are presently facing will be discussed, the participation in IHP-VII taking into account interests and specificity of CIS countries co-coordinated, and a united strategy and the programme of international cooperation in the framework of UNESCO-IHP and other international organizations developed. The preparation for this meeting started in early 2008. The meeting is

supposed to be held under the auspices of the Department of Natural Sciences of the UNESCO Bureau in Moscow.

PRO FORMA TABLE A: CHECK LIST FOR NATIONAL COMMITTEE CONFIRM PROJECT PROPOSAL CONFORMITY, ACTIVITY AND CONTACT

PART A1

Name of the IHP National Committee _____ _____ _____	Country Priorities 2008-2009	Country Participation in Theme and Focal area 2008-2013	Events organized in the Country	Activity lead/ coordinated by the Country	List and CV of national experts designated as focal points for Themes and/or Focal areas*	CV of national experts*
IHP VII Themes and Focal areas						
Theme 1:						
Focal area 1.1	Y	Y	No	Lead act.	Anisimov O.A.	Anisimov O.A.
Focal area 1.2	Y	Y	No	Lead act. Contrib. Contrib.	1.I.Shiklomanov, J.Balonishnikova 2.Vuglinsky V.S. 3.N.Frolova	I.Shiklomanov J.Balonishnikova Vuglinsky V.S. N.Frolova
Focal area 1.3	Y	Y	No No	Contrib. Contrib.	1.V.Buzin, Z.Kopaliani , S.Borshch 2.Grechushnikoa A.Alabyan, E.Povalishnikova	V.Buzin Z.Kopaliani S.Borshch M. GrechushnikovaM. Ershova, A. Alabyan, E. Povalishnikova
Focal area 1.4	Y	Y	No	Contrib.	Bartsev O. B.	Bartsev O.B.
Focal area 1.5						
Theme 2:						
Focal area 2.1	Y	Y	No	Contrib.	Vuglinsky V.S.	Vuglinsky V.S.
Focal area 2.2						
Focal area 2.3						
Focal area 2.4	Y	Y	Yes No	Contrib. Contrib.	1.I.Shiklomanov J.Balonishnikova 2.V. Georgievskiy A.Shalygin M. Georgievskiy	I.Shiklomanov J.Balonishnikova V. Georgievskiy A.Shalygin M. Georgievskiy
Focal area 2.5						
Theme 3:						
Focal area 3.1						
Focal area 3.2 -						
Focal area 3.3 -						
Focal area 3.4 -						

Theme 4:						
Focal area 4.1 -						
Focal area 4.2 -						
Focal area 4.3 -	Y	Y	No	Contrib.	T.Gronskaya N.Lemeshko	
Focal area 4.4 -						
Theme 5:						
Focal area 5.4	Y	Y	No	Contrib.	M. Grechushnikova	M. Grechushnikova

* **NOTE** The national Committee is requested to provide the IHP Secretariat with the names, contacts & CV's of persons that will cooperate and contribute to Theme and Focal areas and the related activities to be undertaken-

PROFORMA TABLE B: Definition of activities to be undertaken by National Committee

PART B1

Name of the IHP National Committee	**Activities suggested by the IHP National Committees and their method of implementation***
IHP VII Themes and Focal areas	
Theme 1:	
Focal area 1.1	Study of processes of warming, deeper seasonal thawing and disappearance of near-surface permafrost which lead to increased coastal erosion, landslides, and geomorphological changes in the river channels, ultimately leading to changes in the fluvial regime and water quality of the northern rivers. Changes in permafrost may be predicted using mathematical models and scenarios of climate change. Such models may be used to evaluate the probability of destructive processes, i.e. erosion, sedimentation, landslides, under current and projected for the future climatic conditions. Results of these calculations will have important implications in land use planning and environmental risk mitigation.
Focal area 1.2	1. Assessment of current and expected changes of water resources and their use. Estimation of climate changes consequences on hydrological regime and water availability 2. - Participation at the Arctic-HYDRA project realization. Methods of implementation: network at regional level, seminars, conferences, publications, participation at the international experts working group, case study at national level, best practices at regional level - Development of methods to assess the impacts of climate change to ice regime characteristics of northern rivers and likes. Methods of implementation: network at international and regional levels, seminars, conferences, publications, participation at the international experts working group, case study at national level, national programmes results, best practices at regional level 3. Assessment of changes in renewable water resources based on the climate

	models for the European Part of Russia (EPR).
Focal area 1.3	1. - Ice jam floods in the territory of Russia. Risk of occurrence and geographical distribution. Mechanism and the dynamics of ice jams. Methodology of ice jams forecasting. Hydraulic modeling of ice jams and ice jam floods. Methods of ice jams control and prevention. Climate change and ice jam floods. **- Case-studies, development of concrete forecasts and recommendations on ice jam floods mitigation.** - Flash floods forecasting. 2. Studying mechanisms and distribution of hazardous hydrological processes in the territory of Russia . Participation in the project-related working group. Participation in international meetings. Preparation of data, information, documents and case-studies for publication.
Focal area 1.4	Analysis of the negative consequences of technogenic underflooding of the regional ecosystems of ground waters of Russia south and ways of their rehabilitation (2010-2013). The inverbigations of technologenic underflooding in the territory of Rostov region are carried out
Focal area 1.5	
Theme 2:	
Focal area 2.1	Develop better understanding, tools and best practices for integrated water resources management (Lena river basin as a case study) Methods of implementation: networks at regional levels, seminars, publications, case study at national level, national programmes results, best practices at regional level
Focal area 2.2	
Focal area 2.3	
Focal area 2.4	1. - Generalization of international experience of water resources use. - Elaboration of methodological basis and recommendations for water resources use in the international river basins. - As a case study to develop detailed assessment of current and future changes in water resources and water use under different anthropogenic and social factors for Russia and related states. Preparation of effective measures on solution of future water availability problems for countries of former USSR and proposals on elimination of possible consequences. 2. Methods and means for sustainable operation of water economy complex and mitigation of risk of negative water impact in river basins with high load on water resources and flood probability. Case-study of the Kuban River basin. The planned intensive socio-economic development of the Kuban River basin, where even now load on water resources is critically high, requires wide range of measures on optimization of water resources management, especially in low water periods. The Kuban River basin is highly prone to floods, therefore urgent problem arises of prevention of adverse water impact and, first of all, of effective population protection and possible reduction of damage from floods. **Proposed activity** Participation in the project-related working group. Participation in international meetings. Preparation of data, information, documents and case-studies for publication. Preparation of collected works on managing water resources in the Kuban River basin.

Focal area 2.5	
Theme 3:	
Focal area 3.1	
Focal area 3.2	
Focal area 3.3	
Focal area 3.4	
Theme 4:	
Focal area 4.1	
Focal area 4.2	
Focal area 4.3	Develop methods and assessment the ecological status of water systems under stress of large urban cities (St,Petersburg as a case study) Methods of implementation: networks at regional levels, seminars, publications, case study at national level, national programmes results, best practices at regional level
Focal area 4.4	
Theme 5:	
Focal area 5.1	
Focal area 5.2	
Focal area 5.3	
Focal area 5.4	Training specialists in hydrometeorology and popularization of scientific knowledge in the field of hydrology. Organization of educational and training courses for students of the department, active participation in studying process, in particular, drawing up new material for the courses «Continental hydrology» and «Hydroecological computations», implementation of new methodology for students' practices –computerization of studies.

3. Activities on the national and international levels in the framework of IHP.

3.1. Activities on the national level in the framework of IHP.

The National Committee of RF for IHP takes part in preparation and holding in Russia a number of international scientific symposia on different hydrological issues. The most significant events the Committee actively participated in 2006 were:

- International forum "Great Rivers", Nizhniy Novgorod (May 2006).
- International conference on the problems of hydrometeorological safety (prediction and adaptation of the society to extreme climatic changes)" (September 2006).
- International scientific conference "Extreme hydrological events in the Aral-Caspian region", with the support of International association of hydrological sciences, Moscow, October, 2006.
- International conference "Ecological and hydrometeorological problems of big cities and industrial zones", 25-27 October 2006, Saint-Petersburg, Russian State Hydrometeorological University (RSHMU).

Many representatives of the Committee presented their reports at these meetings.

In 2007 the Committee took part in the preparation of several conferences:

- X International symposium on river sediments “The influence of river sediments and channel processes on social, economic and ecological safety” (August 2007, The Lomonosov Moscow State University, Moscow).
- International scientific-practical conference “Conservation of bio-diversity of water-bog areas and stable use of bio-resources in steppe zones” (May 2007, Rostov-on-Don). The Committee participated in the organization of this event together with the Russian committee according to the UNESCO Programme “Man and Biosphere”.
- International symposium “Floods. Risk of arising and strategy of management in the extreme situations” (October 2007, Saint-Petersburg).

In 2006-2007 representatives of the Committee took part in two events that were held by the RF Commission for UNESCO Affairs and the UNESCO Bureau in Moscow:

- Meeting of working group of experts on eco-hydrology problems (Astrakhan, April 2006).
- Congress of UNESCO faculties (Moscow, March 2007).

Representatives of college and academic structures from different regions of Russia took part in work of the Congress of UNESCO faculties. The participants of the Congress reported about the specifics of work of UNESCO faculties in different regions of Russia, the methods of organizing work under the conditions of restricted funds available for their functioning.

3.2 Activities on international level.

27 November – 1 December 2006 in Havana (Republic of Cuba), the 5th international UNESCO conference was held on the FRIEND Programme (Runoff regimes on the basis of international experimental and network data): “Variability of water resources: processes, analyses and effects.” The main themes of the conference were:

- Climate change effects on hydrological processes;
- Hydrological monitoring;
- Using the monitoring data when making decisions.

Mr. S.E. Bednaruk took part in work of the conference. Mr. S.E. Bednaruk is a member of the Committee, Director of the Federal State Unitarian Enterprise (FGUP) “Centre for the Russian Register of Hydrotechnical Structures and the State Water Cadastre” of the Federal Agency for Water Resources IHP RF.

It is necessary to emphasize that because of lack of funds for activities in the framework of IHP, Russia’s representation at this and other similar conferences held under the auspices of international organizations seems to be not enough weighty taking into account its large water resources, economic and intellectual potential.

The Committee submitted proposals to the RF Commission for UNESCO affairs on rendering a financial support for some events in the framework of UNESCO-IHP, however in practice, the activities of the Committee are being carried out at the expense of the organizations in which its members work. The problem of

financing the activities of National Committees on UNESCO programmes requires, as we think, a special additional consideration.

In 2006 Roshydromet and administration of the Nizhniy Novgorod Region with participation of members of NC RF for IHP accepted the regional purpose Programme "Provision of Hydrometeorological Safety and Monitoring of the Environmental Pollution in the Nizhniy Novgorod Region in 2007-2009". The Programme was developed by the Upper-Volga Administration for Hydrometeorological Services together with the Committee for Nature Conservation and Monitoring of Natural Resources Use in the Nizhniy Novgorod Region. The Programme makes an allowance for realization of the adaptation measures to environmental effects of climate change.

The main goal of the seminar was to discuss the pressing issues of the adaptation policy realization in Russia and EU countries, including the sectored and regional approach for the Nizhniy Novgorod mentioned as an instance, as well as the prospects of Russian-European cooperation on developing the adaptation policy and measures, technology transfer and research.

The seminar was attended by the representatives of the European Commission for Environmental Issues, Roshydromet, the Apparatus of the plenipotentiary representative of RF President in the Volga Federal District, the Government and Legislative Assembly of the Nizhniy Novgorod Region, the Government of Chuvash Republic, the Upper-Volga Administration for Hydrometeorological Services, the Upper-Volga Basin Water Administration (BVU), representatives of forest, fuel-energy and agro-industrial complexes, the Committee for Nature Conservation and Administration for the use of natural resources of the Nizhniy Novgorod region, the Committee for Protection of the Environment and Monitoring and Use of Natural Resources of the city of Novgorod, heads of republican and regional centres for hydrometeorology and monitoring of the environment, scientists and specialists for climate change research and many others.

At the seminar, two reports were presented on the problems of adaptation strategy in water management under the conditions of climate change and economic activities.

The international seminar of Russia-European Union "Questions of Adaptation to Climate Change" was held in Nizhniy Novgorod on 20 September 2007. In the framework of Russia-EU cooperation on Dialogue on the Environment, in 2006 a working subgroup on climate was created whose co-chairmen were the Federal Services for Hydrometeorology and Monitoring of the Environment (Roshydromet) and Directorate-General of the European Commission for the Environment. In April 2007 in Brussels, the working group submitted the summary report on climate change effects on the environment, assessing its vulnerability and adaptation to the current climatic changes.

3.3 Research/applied projects supported or sponsored by the NC

During the recent years a number of national scientific and technical projects in hydrology and water resources are being developed in Russia, which are supported by the NC of Russia and fully agree with purposes and objectives of the IHP-VI. Among these projects, the following should be noted which are implemented by

different agencies and organizations and covering the whole territory of the country or its vast physiographic and economic regions:

- Implementation of the national subprogramme "Water Resources and Water Bodies 2002-2010"; Responsible Agency – Russian Agency for Water Resources. For example, within the framework of this Subprogramme there are projects on a development of schemes for a multipurpose use and conservation of water resources of Russia, aimed at an optimization of planning water projects and higher efficiency of the investments (contribution to Theme 1, IHP-VI). Such schemes are currently being developed for individual large basins of the Volga, Kuban, Don and Amur rivers (contribution to Theme 1, IHP-VI).

- Multipurpose projects implemented by the organizations within the RosVodResursy on a development of outlook, principles and practice for a more effective management of water resources and water ecosystems in transboundary river basins. There are 70 large and mid-sized transboundary rivers in Russia (Theme 2.2, IHP-VI). During 2006-2008 much work has been done in the field of cooperation of Russia and Estonia (Pskovsko-Chudskoye Lake) and Russia-Belarus-Latvia on joint use and conservation of water bodies.

- The project "Strategic prediction for the period of up to 2020-2025 of climate change expected in Russia and its impact on the sectors of Russian national economy". In this project climate change tendencies for different regions of Russia were presented and recommendations were formulated on the priority measures on adaptation of social and economic spheres to these changes. Major results and conclusions were published by ROSHYDROMET (Themes 1 and 2.1 of IHP-VI).

- Preparation of the monograph "Water Resources of Russia and Their Use". The Project was developed by the scientists from the SHI and other organizations of ROSHYDROMET and RosVodResursy. It is planned to publish the monograph by the end of 2008. (Theme 1. IHP-VI).

- Project on the study of the current dynamics of glaciation, maximum snow storage and principles of glacier runoff formation; it is being implemented by the IG of RAS within the framework of Theme 1. IHP-VI for the mountain glaciers in the Urals, Caucasus, Pamir and Tien Shan.

- Publication of 7 volumes of the Proceedings of the VI All-Russia Hydrological Congress. Selected reports of the Congress were translated into English and collected in a separate volume.

3.4 Collaboration with other national and international organizations and/or programmes

First of all, practically all the NC members contribute to the WMO activities on the "Hydrology and Water Resources" Programme, as well as to IAHS projects. For example, Prof. I.A. Shiklomanov, Director of the SHI, is the Chairman of the Working Group on Hydrology for Asia (RA-II) and participates in the WMO Executive Committee every year.

Dr. J.A. Balonishnikova, Scientific Secretary of the SHI, was a member of the IAHS/UNESCO research group on the preparation of monograph "Hydrology 2020" which was published at the end of 2006.

Prof. V.S. Vuglinsky, Deputy Director of the SHI, is a WG member on Hydrology of Europe (RA-VI) and WG member on "BALTEX" Project; he attends the meetings of these WGs.

Since 1989 the Hydrochemical Institute (GHI) participates in implementation of the international project GEMS/Water. Within the framework of this project, GHI provides scientific guidance for the national subsystem of the Global Environmental Monitoring System (GEMS/Water) ensuring guarantees and control of hydrochemical data quality. GHI is a national coordination centre of this international program on behalf of Russia. Scientific guidance and coordination for the project GEMS/Water is performed by the director of GHI academician A.M. Nikanorov. In the project framework GHI annually collects, analyses and corrects data on water discharge gathered at 19 sites of the national GEMS/Water subsystem. Data on water composition and characteristics are gathered at 26 sites. The processed results of analysis (more than 500 water samples) are submitted by GHI to the GEMS/Water Headquarters (Canada) where they are later used in global water resources assessment. Every year GHI makes an assessment of results of external and laboratory water quality control performed at the water observation laboratories of ROSHYDROMET involved in the project.

Prof. of the department of hydrology of the Moscow State University (MSU) R.S. Chalov is a member of the Presidium of UNESCO World Association for Sedimentation and Erosion Research (WASER).

Prof. R.S. Chalov and N.N. Alexeevsky (MSU) contributes to the work of International Research and Training Centre on Erosion and Sedimentation (IRTCES) (PRC, Peking).

Prof. A.E. Asarin, a NC member, contributes to the work of the Technical Committee "Floods and Dams"/COLD (International Commission on Large Dams).

The members of the NC for the IHP greatly contribute to the editorial boards of international scientific journals:

- Prof. A.A. Tskhai is a co-editor of "Hydrological Environment" Journal (ISSN, 1738-8449);
- Prof. R.S. Chalov is a member of the editorial board of "International Journal of Sediment Research"
- Prof. I.A. Shiklomanov is a member of the editorial board of the international journal "Integrated Assessment".

The members of the Russian NC collaborate with many other international organizations, such as:

- International Association for Hydraulic Research (IAHR)
- International Geographic Union
- Association of Academies of Sciences of Asia
- Wetlands International
- NATO Research Programme
- International Commission of Geophysics Union on Water Sustainability.

3.5 Other initiatives

The International Conference on the Problems of Hydrometeorological Security (prediction and adaptation of the society to extreme climate change) took place in Moscow in the hotel "Cosmos" on 26-29 September 2006.

The Conference was held as a part of events in the framework of Russian Presidency in the "Group of Eight" and was organized by the Federal Service for Hydrometeorology and Environmental Monitoring

(ROSHYDROMET) with participation of interested Federal Bodies of the Executive Authorities of the Russian Federation.

The Organizing Committee was chaired by Dr. A.I. Bedritsky, the Head of ROSHYDROMET. The Board of the Organizing Committee included the representatives of the ROSHYDROMET, Russian Academy of Sciences, Ministry of Economic Development and Trade of the Russian Federation, Ministry of Industry and Energy of the Russian Federation, Ministry of Regional Development of the Russian Federation, Emergency and Civil Defense State Committee, Ministry of Education and Science of the Russian Federation, and Moscow Government.

The Program of the Conference scheduled four full workdays and included the ceremony of Official Conference Opening, plenary and round tables meetings, poster sessions, discussions, adaptation of the resolution, and the Conference Official Closure.

More than 590 persons participated in the Conference: representatives of national hydrometeorological services, hydrometeorological centres, research institutes and organizations, and institutions of higher education from 31 countries.

The main topics of the Conference were as follows:

1. Monitoring of climate changes and related extreme hydrometeorological phenomena. Extreme climate changes.
2. Prediction of extreme hydrometeorological events for early warning systems.
3. Measures for reducing vulnerability and adaptation of the society to extreme manifestations of climate variability, and sustainable development of economy. Economic and social consequences of extreme hydrometeorological events.

In total, 30 plenary papers were presented, including 19 Russian papers and 2 papers in co-authorship with foreign colleagues, and 147 poster papers, including 112 Russian papers, two of which were in co-authorship with foreign colleagues.

In 2007 the Springer Press published the Proceedings of the NATO Advanced Research Workshop (ARW) on Extreme Hydrological Events: New Concepts for Security, which was held in Novosibirsk, Russia, from July 11-15, 2005. The workshop fell within the NATO priority research topic on Environmental Security, Disaster Forecast and Prevention.

At the present time, the necessity of considerable deepening of our understanding about the nature of extreme and catastrophic natural and man-induced events, in particular hydrologic ones, becomes very topical, as well as the development of advanced methods for their prediction, including estimating probability of their occurrence and a risk related to them. Another aspect of this hydrological problem is reducing of vulnerability of social, economic, and engineering systems to the extreme hydrological events and decreasing of a degree of their effect on such systems.

Along with the critical assessment of present-day knowledge on the problems mentioned above the ARW is aimed at to identify directions for future research and to promote close working relationships between scientists from different countries and with different professional experience.

The following topics are considered in this book:

1. Basin case studies on extreme hydrological events
2. Probabilistic estimation in flood studies
3. Ice-induced floods
4. River low flows and climatic conditions and environmental issues
5. Risk assessment and management for floods, low water events, damages vulnerability issues

The book also includes the general conclusions and recommendations, as formulated by the participants of the workshop.

The book contains 30 scientific contributions, of which 8 are from Russia and the Former Soviet Union states, and 22 are from Europe and America.

Land Water Resources in the Light of Climate Change", St Petersburg, 2007, 246pp

The session of Research Council of the RAS "Land Water Resources" took place in Pskov, Russia, on 25-27 June, 2007. The Proceedings of the session "Land water resources in the light of climate change" were published in 2007 under the support of the Federal Agency for Water Resources.

The book includes 17 papers of the representatives of the RAS Institute for Water Problems, SHI, RAS Institute of Geography, RAS Institute of Atmospheric Physics, Institute of Limnology RAS, Institute for Water and Environmental Problems of the Far-Eastern Branch of RAS, Institute for Water and Environmental problems SB RAS, and Murmansk Service for Hydrometeorology and Environmental Monitoring.

The papers are focused on the problems of changes in river discharge, climate impact on lake regime, methods of physical and mathematical modeling of heat-mass land-discharge exchange in the light of climate change, state of the ecosystems of Russian water bodies and others.

Hydrological Impact of Climate Change, Proceedings of British-Russian Conference, Novosibirsk, 2007, 256pp

The International British-Russian Conference and Seminar-School was held in Novosibirsk Academgorodok on 13-15 June, 2007. The Conference was held by the Institute for Water and Environmental Problems SB RAS (IWEP SB RAS) under the initiative of the British Council as a part of events in the framework of the 50th Anniversary of SB RAS.

The Conference was financially supported by the British Council, Federal Agency for Water Resources of the Ministry of Natural Resources of the Russian Federation, Federal Service for Hydrometeorology and Environmental Monitoring (ROSHYDROMET), and Russian Foundation for Basic Research.

The Conference was aimed at to promote mutual knowledge of the current state of research on climate change impact on hydrological processes in rivers, lakes and reservoirs. The applied methodic and the results of assessment of possible changes in hydrological regime of water objects and river runoff were considered. The

scientific agenda included the following topics: the advanced methods for assessment of climate change impact on hydrological processes in rivers, lakes and reservoirs; application experience and the results of assessment of possible hydrological consequences of climate change for hydrological objects of various types and sizes; climate change impact on water resources; the role of climate change in initiation of extreme hydrological events (floods, low water periods, etc). Great consideration was given to consideration of these issues with regard to water objects and hydrological processes in the natural conditions of Siberia and the North of Russia.

Co-chairmen of the Conference: O.F. Vasiliev, Academician, (Institute for Water and Environmental Problems SB RAS), Russia, and Prof Nigel Arnell, University of Southampton, (Great Britain).

65 leading scientists from the institutes of RAS, SB RAS and Karelian Research Centre RAS, organizations of ROSHYDROMET and Federal Agency for Water Resources of the Ministry of Natural Resources of the Russian Federation, University of Southampton and research organizations located in Wallingford (Centre for Ecology and Hydrology and the international hydraulics research and consultancy organization HR Wallingford, Great Britain) participated in the conference.

23 plenary papers and 6 posters were presented. The book includes major part of the papers submitted by courtesy of the authors.

3.6 Educational and training courses

3.6.1 Contribution to IHP courses

At its meeting in 2005, the NC of Russia for the IHP discussed a problem of renewal UNESCO Higher International Courses in Russia, which were organized in Moscow at the Moscow State University during many years. There is a proposal of the Russian State Hydrometeorological University to organize similar courses in St Petersburg, where it is possible to collaborate with the scientists from the SHI and St Petersburg State University.

In 2006-2007 at the department of hydrology of the Russian State Hydrometerological University a work was carried out on implementation of the results of the latest sessions of UNESCO IHP Intergovernmental Council.

At present, the RSHU has all the technical means and amenities and high level of education. However, the Government of the Russian Federation still has not introduced any annexes to the regulation in which the Moscow State University is entitled the only organizer of the UNESCO Higher International Courses.

To confirm that the Russian State Hydrometeorological University possesses enough resources for organization of the courses, detailed syllabi have been developed and a possible staff of lecturers has been designated by the scientists of the hydrological department. These syllabi refer to three sessions connected with the major concepts of IHP Themes: sedimentation, transboundary water objects, extreme hydrological events (disasters). A research is being carried out on all these topics at the RSHU department of hydrology and corresponding chapters are included in lecture courses.

3.6.2 Organization of specific courses

Every year, according to the agreement with ROSHYDROMET, the State Hydrological Institute organizes advanced courses for the specialists in hydrology and water management on different hydrological problems; these courses are attended by hydrologists working in research institutes and at hydrological network of ROSHYDROMET and other agencies, as well as by specialists from universities, design institutions, ministries and companies.

For example, the following courses were arranged during period September 2004 – June 2006:

- Advanced courses for hydrologists "New system of hydrological computations for construction". Set of Rules – SP 33-101-2003 "Determination of basic design hydrological characteristics" 2006, 2007, St Petersburg, SHI.
- Advanced courses for hydrologists "New system of hydrological computations for construction". Preparation of "Territorial Construction Standards (TCS)" 26.06-07.07.2006, St Petersburg, SHI.

Besides, at the end of 2004, in Barnaul, an international educational workshop "Water Resources Management in Russia and in EC" was held at the Altai State Technical University; professors from Belgium, France and Russia and more than 100 students, post-graduate students and lectures attended the workshop.

3.6.3 Participation in IHP courses

During June 2006 –May 2008, UNESCO Higher International Courses were not organized at the MSU due to lack of financing.

4. Publications

Monographs, sets of papers, text books and educational supplies

Monographs

E.N. Bakaeva, A.M. Nikanorov Hydrocoles in water quality assessment. - Moscow, Nauka, 2006 (in Russian)

M.V. Bolgov, G.F. Krasnozhon, A.A. Liubushin Caspian Sea: extreme hydrological events. – Moscow, Nauka, 2006 (in Russian)

V.S. Savenko Geochemistry of phosphorus in global hydrological cycle. 2007 (in Russian)

V.S. Savenko Chemical composition of suspended sediments of the world rivers. 2006 (in Russian)

V.V. Kovalenko Partially infinite mechanism of natural and social processes turbulization.- St.Petersburg, RSHMU Press, 2006, 166 pp (in Russian)

Multi-author monograph Geoecological status of the Arctic coast of Russia and nature management safety. Ed. By N.I. Alexeevsky, 2007 (in Russian)

P.M. Lurie, V.D. Panov, Yu.G. Ilyichev, A.D. Salpagarov Snow cover and glaciers within the Kuban river basin., 2006 (in Russian)

A.M. Nikanorov, V.A. Bryzgalo Freshwater ecosystems in impact regions of Russia. - Rostov-on-Don, NOK Press, 2006 (in Russian)

A.M. Nikanorov, V.A. Ivanov, V.A. Bryzgalo Russian Arctic rivers under present conditions of anthropogenic impact. - Rostov-on Don, NOK Press, 2007 (in Russian)

A.M. Nikanorov, A.G. Stradomskaya Oil pollution problems in freshwater ecosystems. - Rostov-on-Don, NOK Press (in print) (in Russian)

Glacierization of north Eurasia yesterday and in the near future. – Nauka, 2007 (in Russian)

Current gacierization of north and central Eurasia. – Moscow, Nauka, 2006, 484 pp (in Russian)

R.S. Chalov. Study of channels, 2007 (in Russian)
Heat and water exchange of East Siberia frozen grounds and its factors. Ed. by A.G. Georgiadi, A.N. Zolotokrylin, Moscow – Tver, Triada, 2007, 576 pp (in Russian)

V.N. Fedorov Landscape indication of runoff formation. – Irkutsk - Moscow- V.B. Sochava Institute of geography SB RAS Press, 2007, 175 pp (in Russian)

Yu.A. Fedorov, N.S. Tambiyeva, D.N. Garkusha Methane in water ecosystems. - 2nd edition revised and enlarged. – Rostov-on-Don – Moscow, Rostizdat, 2007 (in Russian)

I.A. Shiklomanov et.al Water resources of Russia and their use (in print) (in Russian)

Yu.S. Datsenko Eutrophication of reservoirs, 2007 (in Russian)

Forest Hydrology – results of research in Germany and Russia. Editors Part I: H. Puhlmann, R. Schwarze; Editors Part II: S.F. Federov, S.V. Marunich (dec.) – Koblenz, 2007

Sets of papers:

Water ecosystem of the Upper Don: long term changes of water quality. Editors: A.M. Nikanorov, L.I. Minina, T.A. Khoruzhaya. – St Petersburg, Gidrometeoizdat, 2006 (in Russian)

Hydrochemistry: achievements and outlook at the turn of the century. – Proceedings of the XXX Anniversary Meeting 19-21 September, 2005. Ed. by A.M. Nikanorov, Corresponding Member, RAS - Rostov-on-Don, NOK Press, 2007 (in Russian)

Current global changes in the environment (in 2 volumes). Ed. by R.K. Klige. – Moscow, "Nauchny Mir", 2006 (in Russian)

Proceedings of the Russian State Hydrometeorological University, №5. – St Petersburg, 2007, 163 pp (article on hydrology 21) (in Russian)

Estuary-delta systems of Russia and China: hydromorphological processes, geomorphology and forecast of development. Ed. by V.N. Korotayev, V.N. Mikhailov, D.B. Babich, Li Tsun Syan, Lyu Shuguan. GEOS, 2007, 445 pp (in Russian)

Proceedings of the VIth All-Russia Hydrological Congress. Plenary reports. – Moscow, the Meteoagency of Roshydromet, 2006 (in Russian)

Proceedings of the VIth All-Russia Hydrological Congress. Section 1. State and perspectives for the development of hydrological observational systems and information support. – Moscow, the Meteoagency of Roshydromet, 2006, 211 pp (in Russian)

Proceedings of the VIth All-Russia Hydrological Congress. Section 2. Floods and other hazardous hydrological events: assessment, forecasting and mitigation. – Moscow, the Meteoagency of Roshydromet, 2006, 295 pp (in Russian)

Proceedings of the VIth All-Russia Hydrological Congress. Section 3. Water balance, surface and ground water resources, hydrological consequences of economic activity and climate change, vulnerability and adaptation of socio-economic sphere. (in 2 parts) – Moscow, the Meteoagency of Roshydromet, 2006, 521 pp (in Russian)

Proceedings of the VIth All-Russia Hydrological Congress. Section 4. Ecological State of water bodies. Water quality and scientific basis for their protection. (in 2 parts). – Moscow, the Meteoagency of Roshydromet, 2006, 539 pp (in Russian)

Proceedings of the VIth All-Russia Hydrological Congress. Section 5. Hydrophysical phenomena and processes. Runoff formation and changeability, hydrological and water management design. (in 2 parts). – Moscow, the Meteoagency of Roshydromet, 2006, 524 pp (in Russian)

Proceedings of the VIth All-Russia Hydrological Congress. Section 6. Problems of channel processes, erosion and sediments. – Moscow, the Meteoagency of Roshydromet, 2006, 264 pp (in Russian)

Text books and educational supplies:

N.I. Alexeevsky Hydrophysics Text book for Higher Educational Institutions. – Moscow, "Academia" Publishing Centre. 2006 (in Russian)

N.B. Baryshnikov Dynamics of channel flows. – St Petersburg, RSHMU Press, 2006, 300 pp (in Russian)

N.B. Baryshnikov Channel Processes (in Russian)

Yu.B. Vinogradov, T.A. Vinogradova Introduction to Hydrology (Text Book). – St Petersburg, State University Press (in print) (in Russian)

V.M. Georgievsky, S.V. Shapochkin Hydrological forecasts (in Russian)

A.M. Doganovsky, V.G. Orlov Practical work on hydrology. – St Petersburg, RSHMU Press, 2006 (in Russian)
V.V. Kovalenko, N.V. Victorova, E.V. Gaidukova Modeling of hydrological Processes. – St Petersburg, RSHMU Press, 2006, 580 pp (in Russian)

N.V. Myakisheva The Earth climatic system (in Russian)

M.V. Naumenko Eutrophication of lakes and reservoirs (in Russian)

A.N. Pavlov Hydrophysics (Text book for hydrometeorologists). – St Petersburg, RSHMU Press, 2006, 378 pp (in Russian)

A.N. Pavlov Ecological culture origin. – St Petersburg, RSHMU Press, 2006 (in Russian)

A.V. Sikan Statistical technique for hydrometeorological information (in Russian)

N.L. Frolova River hydrology (anthropogenic runoff change) (Educational supply), 2006 (in Russian)

5. Participation in international scientific meetings

5.1 Meetings hosted by the country

- International conference on the problems of hydrometeorological safety (prediction and adaptation of the society to extreme climate changes). 26-29 September 2006, Moscow, ROSHYDROMET.
- International scientific conference "Extreme hydrological events in the Aral-Caspian Region", to be supported by the International Association of Hydrological Sciences, Moscow, October 2006.
- IVth International conference "Ecological and hydrometeorological problems of large cities and industrial zones", 25-27 October 2006, St Petersburg, RSHMU.
- Preparation for the Tenth International Symposium on River Sediments "Impact of river sediments and channel processes on social, economic and ecological safety", 1-4 August 2007, Moscow, MSU.
- Advanced course for hydrologists "Expertise of hydrological computations for construction, including preparation of technical regulations on hydrometeorological safety of structures", 2007, St Petersburg, SHI.
- International workshop on preparation of the UNEP/GEF project "Climate change accounting in management of water resources, water and ice regime of large Arctic rivers, including development of strategy for adaptation of water economy system", 29 May 2006
- International congress "Great Rivers,2006", 26-29 May 2006, Nizhny Novgorod
- International workshop conference "Preserving biodiversity of wetlands and sustainable use of biologic resources in steppe zones"
- XXI Plenary interuniversity coordination meeting on erosion, channel and estuary processes, 6-8 October 2006, Tcheboksary, Russia
- XXII International coastal conference "Problems of coastal management and sustainable development of coastal zone", 16-20 May 2007, Gelendzhyk, Russia
- All-Russia conference "Ice processes on water objects of Russia" 28-31 August 2007, Arkhangelsk, Russia
- XXI Plenary interuniversity coordination meeting on erosion, channel and estuary processes, 2-4 October 2007, Novotcherkassk, Russia

5.2 Participation in meetings abroad

The members of the Russian NC for the IHP participated in the following meetings abroad:

- ISPRS Commission VII Mid-Term Symposium "Remote Sensing: From pixels to processes", 8-11 May 2006, The Netherlands, Enschdele
- XXIII Conference on Danube Countries on the Hydrological Forecasting and Hydrological Bases of Water Management, 28 August-01 September 2006, Serbia, Belgrade
- Second Scientific and Technical Conference "Навколищнє прродне середовище-2007: актуальні проблеми екологіі та гідрометеорологіі; інтеграція освіти науки", dedicated to the 75th Anniversary

of the Odessa State Environmental University (the former OHMI), 26-28 September 2007, Odessa, the Ukraine

6. Other activities at regional level

In 2006-2008, 12 interdepartamental research workshops on "Global environmental changes" have been held (supervisor- R.K.Klige)

Completed and ongoing scientific projects (Russia and other countries).

6.1 Completed projects

- Geoecological characteristics of water objects and their basins for pipeline transport safety evaluation in the north of the European part of Russia
- Characteristics of current channel forming processes in the Kuban river delta and development of recommendations on monitoring water object in its territory
- Assessment of energy and substance flow transformation in the Kuban and the Don river deltas
- Evaluation of the ecological state of the lake Senezh
- Development of scenarios of intergrated use and water resources conservation in the river Terek basin
- Geoecological state of the Arctic coast of Russia and nature management safety

6.2 Ongoing projects

- Climatic changes of hazardous hydrological processes
- Assessment of possible river water consumption in various seasons on acquired river sites of small and medium rivers of the European part of Russia
- INCO Project "International water resources control: to sustainable future of the Aral Sea basin"; implemented at the support of the European Commission and participation of the Hannover University, 2006-2008.

7. Future activities

7.1 Activities planned until December 2008

The following activities are planned:

- Advanced course on hydrology "Hydrological computations" (Spatial-temporal generalization of hydrological characteristics), 23 June-5 July 2008, St Petersburg, SHI.
- International conference "Water resource systems management in extreme situations", 4-5 June 2008, Moscow, Crocus Expo Exhibition Centre. Organizers: the Federal agency for water Resources of the Russian Federation and the Netherlands Water Partnership under the patronage of World Water Council (WWC), Russia
- Meeting of CIS countries NC IHP responsible representatives, October, 2008, St Petersburg

- Conference dedicated to the Centenary of V.A. Uryvaev, November,2008, Valdai branch of the SHI, Valdai, Russia

7.2 Activities foreseen for 2009-2011

These activities will be considered at the meetings of the NC of Russia for the IHP in 2008, at the preparation of programmes on research in hydrology and water management in different agencies and organizations of Russia for 2009-2011.

It is assumed to organize the next VIIth All-Russia Hydrological Congress in 2010-2011.

- Events in the framework of the 175th Anniversary of the Russian Hydrometeorological Service, October, 2009.
- Events in the framework of the 90th Anniversary of the SHI, October, 2009.

NATIONAL REPORT OF THE SLOVAK REPUBLIC

1. Activities undertaken in the period July 2006 - May 2008

1.1 Meetings of the IHP National Committee

The Slovak Committee for Hydrology represents the Slovak NC IHP UNESCO. It was established in 1993 with the support of the Slovak Commission for UNESCO. The committee consists of the Executive Committee and the Plenum. The current business is handled by the secretariat associated with the Institute of Hydrology of the Slovak Academy of Sciences in Bratislava.
The Plenum meets once a year, usually in the first half of the year. The Executive Committee meets at need. There were 2 meetings of the Plenum and 2 meetings of the Executive Committee during the period under consideration.

1.1.1 Decisions regarding the composition of the IHP National Committee

There were few changes in the composition of the IHP National Committee during the period. The Plenum has 23 members and 9 of them form the Executive Committee. All the main research institutes, universities and ministries related to hydrology are represented in the committee.
The present composition of the IHP NC of Slovakia is as follows:

Executive Committee:

Chairman:
MIKLÁNEK Pavol, Institute of Hydrology, Slovak Academy of Sciences, Bratislava
Vice-chairman
SZOLGAY Ján, Slovak University of Technology, Bratislava
Scientific secretary
HALMOVÁ Dana, Institute of Hydrology, Slovak Academy of Sciences, Bratislava
Members
FENDEKOVÁ Miriam, Comenius University, Bratislava
HOLUBOVÁ Katarína, Water Research Institute, Bratislava
MAJERČÁKOVÁ Oľga, Slovak Hydrometeorological Institute, Bratislava
MATUŠKA Milan, Global Water Partnership, Bratislava
MINÁRIK Boris, Slovak Hydrometeorological Institute, Bratislava
SUPEK Marián, Danube River Basin Authority, Bratislava

Plenum:
BABIAKOVÁ Gabriela, Slovak Hydrometeorological Institute, Bratislava
BODIŠ Dušan, State Geological Institute of Dionýz Štúr, Bratislava
ELIÁŠ Pavol, Slovak Agricultural University, Nitra
HLAVČOVÁ Kamila, Slovak University of Technology, Bratislava
HOLČÍK Vladimír, Water Engineering Construction, Bratislava
HOLKO Ladislav, Institute of Hydrology, Slovak Academy of Sciences, Bratislava
LAPIN Milan, Comenius University, Bratislava
LICHNER Ľubomír, Institute of Hydrology, Slovak Academy of Sciences, Bratislava
NOVÁK Viliam, Institute of Hydrology, Slovak Academy of Sciences, Bratislava
POÓROVÁ Jana, Slovak Hydrometeorological Institute, Bratislava
RONČÁK Peter, Slovak Hydrometeorological Institute, Bratislava
ŠKULEC Štefan, retired
ŠOLTÉSZ Andrej, Slovak University of Technology, Bratislava
ŠÚTOR Július, Institute of Hydrology, Slovak Academy of Sciences, Bratislava

1.1.2 Status of IHP-VI activities

The activities of the Slovak institutions were concentrated on the following IHP-VI projects:
CCPC Flow Regimes from International Experimental and Network Data (FRIEND)
2.1 Extreme events in land and water resources management
2.2 International river basins and aquifers
2.4 Methodologies for integrated river basin management
3.3 Land Habitat Hydrology – Mountains.

Pavol Miklánek was elected member of the *Theme Advisory Board* of the IHP UNESCO for Theme II representing the UNESCO Electoral group II.
Slovak representative Dr. Holko was the international coordinator of FRIEND Northern and Western Europe Working group 5 *Hydrological and biogeochemical processes in changing environment* since 1998 till September 2006.
Slovak representative Dr. Fendeková was elected the international coordinator of FRIEND Northern and Western Europe Working group 2 *Low flows and droughts* 2007.
Slovak representative Dr. Petrovič was the international coordinator of *Water Balance of the Danube River Basin* project of the Regional co-operation of the Danube countries in frame of IHP UNESCO (Focal Area 2.2 International river basins and aquifers).
Water Research Institute, Bratislava published the final report of the project *Basin-wide water balance in the Danube river basin,* co-ordinated by Dr. Petrovič. The project was finalized in collaboration with the ICPDR (International Commission for Protection of the Danube River) and UNESCO Venice Office (UVO-ROSTE).
Slovak representative Dr. Pekárová was elected the international coordinator of *Flood regimes of the Danube river basin* project of the Regional co-operation of the Danube countries in frame of IHP UNESCO (Focal Area 2.2 International river basins and aquifers).

Three international meetings were organised in Slovakia:
UNESCO workshop and meeting of working group on *Climate variability and land cover change impact on flooding and low flows* was organised on 27-28 April 2006 in Bratislava.
13th meeting of experts in snow hydrology was organized on 26–28 March 2008 in Chopok-Kosodrevina in the Low Tatras.
UNESCO Workshop and meeting of working group on *Comparative analysis of floods and droughts - Catchment and aquifer typology* was organised on 20-23 April 2008 in Smolenice.

The Slovak NC participated in organisation of the following international conferences:
23rd Conference of Danubian countries on the Hydrological Forecasting and Hydrological Bases of Water Management. (Focal Area 2.2 International river basins and aquifers.) Beograd, Serbia, 2006.
ERB conference 2006, Uncertainties in the "monitoring-conceptualization-modelling" sequence of catchment research, Luxembourg, 2006.
24th Conference of Danubian countries on the Hydrological Forecasting and Hydrological Bases of Water Management. (National contribution to Focal Area 2.2 International river basins and aquifers.) Bled, Slovenia, 2008.
ERB conference 2008, Hydrological extremes in small basins, Cracow, Poland, 2008.

1.1.3 Decisions regarding contribution to/participation in IHP-VII

The IHP National Committee will participate in IHP-VII. The national activities as contribution to IHP-VII Implementation Plan were prepared and submitted to IHP.

1.2 Activities at a national level in the framework of the IHP

1.2.1 National/local scientific and technical meetings

The 18th Conference of Young Slovak and Czech Hydrologists was organised in November 2006 in Bratislava and the conference proceedings were published. Following three papers were awarded:

Daňhelka Jan – The use of Schaake shuffle approach and stochastic weather generator for middle range probabilistic stream flow forecasting.

Horvát Oliver – Interpretation of the rainfall-runoff model FRIER.

Psotová Martina, Sokolová Lucia – Assessment of the water level forecast for Streda nad Bodrogom station by forecasting system MIKE11.

The 19th Conference of Young Slovak and Czech Hydrologists was organised in November 2007 in Bratislava and the conference proceedings were published. Following three papers were awarded:

Bulantová Marcela – Agressive properties of the ground waters in the High Tatras and in the quarternary sediments of their region.

Fiala Theodor – Trends of the mean discharges of the Czech rivers in 1961-2005.

Gregor Miloš – ARC 1.0 – program application for complex analysis of the springs recession curves.

Orfánus Tomáš – Modeling of deterministic and stochastic variability of soil moisture in lowland areas.

1.2.2 Participation in IHP Steering Committees/Working Groups

Representatives of the NC took part at the 17th Intergovernmental Council of IHP UNESCO in Paris in 2006 as members of the IHP Intergovernmental Council.
The Slovak NC is member of the Steering Committee of the CCPC FRIEND - Western and Northern Europe and Slovak experts participate in its Working Groups. Dr. Holko was the international coordinator of the WG 5 of the project since 1998 till 2006 and Dr. Fendeková is the international coordinator of the WG 2 of the project since 2007.
Representatives of the NC took part at following FRIEND meetings:
NE FRIEND SC meeting in Havana, Cuba in 2006
NE FRIEND WG 2 meetings in Havana, Cuba in 2006 and Perugia, Italy in 2007
NE FRIEND WG 5 meetings in Luxembourg in 2006 and in Brno, Czechia in 2007.

FRIEND NWE WG 5 closely collaborates with the European Reference Basins (ERB) project including parallel meetings and common conferences. The Slovak NC participated in the ERB Steering Committee meeting and 11th ERB conference in Luxembourg in 2006 and took part at the ERB Steering Committee meeting in Brno in 2007.

The delegates of the committee participate regularly at the meetings of the NC representatives of the Danube countries and Slovak experts co-ordinate or actively participate in different projects within this regional co-operation. There were 2 meetings of the representatives and experts of the Danube countries during the period (2006 Beograd, Serbia, 2007 Novi Sad, Serbia).

1.2.3 Research/applied projects supported or sponsored

The Slovak IHP NC has no possibility to support or sponsor any research/applied projects, but it is supporting co-operation and participation in IHP UNESCO projects.

1.2.4 Collaboration with other national and international organizations/programmes

The Slovak Committee for Hydrology is a joint IHP/IAHS national committee, in fact. The national representative of IAHS prof. Szolgay is the vice-chairman of the committee and the

IAHS national correspondents are members of the committee. The WMO OHP is also represented in the committee. Most of the activities within these three programmes are organised jointly.
The NC is collaborating also with other programmes like IGBP/BAHC, IAH, etc.
The representative of the Slovak NC was the international coordinator of the project 5.3 Update of the Danube water balance of the Regional co-operation of the Danube countries within the IHP. The project is agreed as a common interest project with the International Commission for Protection of the Danube River (ICPDR) in Vienna.

1.2.5 Other initiatives

Except the IHP projects, the IHP National Committee is traditionally organizing three national activities. The NC has its own library of UNESCO and other international publications that is used by the hydrological community; it is organizing the Conferences of Young Hydrologists and publishing series of SVH Publications (Publications of the Slovak Committee for Hydrology).

1.3 Educational and training courses

1.3.1 Contribution to IHP courses

There was no contribution to IHP courses during the period of interest.

1.3.2 Organization of specific courses

The NC did not organize any training seminar during the period of interest.

1.3.3 Participation in IHP courses

Slovak professors were giving lectures and Slovak participants used to attend the IHP courses in Prague and Budapest. Unfortunately both courses were stopped due to financial reasons.

1.4 Cooperation with the UNESCO/IHE Institute for Water Education and/or international/regional water centers under the auspices of UNESCO

There is no specific cooperation between Slovak NC and UNESCO/IHE.

1.5 Publications

The Slovak NC is supporting publications in three main groups:
– SVH Publications (Publications of the Slovak Committee for Hydrology).
These are monographs summarizing results of the IHP projects. The series started in 1997 and eight volumes were published till now. Two of them were published within the period of this report.

Kohnová, S., Szolgay, J., Solín, Ľ., Hlavčová, K. 2006: *Regional Methods For Prediction In Ungauged Basins – Case Studies*“ (SVH Publication 7) as National report for the IHP UNESCO FA 2.4 *Methodologies for integrated river basin management* in collaboration with IAHS PUB (Prediction in ungauged basins).

Szolgay, J., Hlavčová, K., Kohnová, S., et al. 2006: „*Climate and land cover impact on runoff in the Hron river basin*“ (SVH Publication 8) as National report for the IHP UNESCO FA 2.4 *Methodologies for integrated river basin management*.

– UNESCO and IHP publications, mainly proceedings of international conferences.
Unfortunately, none of them was published within the period of this report.

– Proceedings of the conferences organised in Slovakia related to IHP:
Proceedings from 12th meeting of experts in snow hydrology, Telgárt, 2006, www.ih.savba.sk
Proceedings from 13th meeting of experts in snow hydrology, Chopok-Kosodrevina, 2008, www.ih.savba.sk
Transport of water, chemicals and energy in the system soil-plant-atmosphere. Proceedings of the XIVth poster day. (IHP-VI project 2.4) CD ROM, UH SAV-GfU SAV, Bratislava, Slovakia, 2006.
Transport of water, chemicals and energy in the system soil-plant-atmosphere. Proceedings of the XVth poster day. (IHP-V project 2.4) CD ROM, GfU SAV-UH SAV, Bratislava, Slovakia, 2007.
18th Conference of the Young Hydrologists – Proceedings. CD ROM, SHMI, Bratislava, Slovakia, 2006.
19th Conference of the Young Hydrologists – Proceedings. CD ROM of Hydrological Days conference, SHMI, Bratislava, Slovakia, 2007.

1.6 Participation in international scientific meetings

1.6.1 Meetings hosted by the country

13th meeting of experts in snow hydrology 26–28 March 2008 in Chopok-Kosodrevina, Slovakia. (Participants from Slovakia, Czech republic and Poland).
Transport of water, chemicals and energy in the system soil-plant-atmosphere. XIVth poster day. (National contribution to IHP-VI Focal Area project 2.4 Methodologies for integrated river basin management.) Bratislava, Slovakia, 2006.
Transport of water, chemicals and energy in the system soil-plant-atmosphere. XVth poster day. (National contribution to IHP-VI Focal Area project 2.4 Methodologies for integrated river basin management.) Bratislava, Slovakia, 2007.
18th Conference of the Young Hydrologists. Bratislava, Slovakia, 2006.
19th Conference of the Young Hydrologists. Bratislava, Slovakia, 2007.
UNESCO Workshop and meeting of working group on *Comparative analysis of floods and droughts - Catchment and aquifer typology* was organised on 20-23 April 2008 in Smolenice.

1.6.2 Participation in meetings abroad

17th Session of the Intergovernmental Council of the IHP UNESCO, Paris, 2006: Miklánek, P., Halmová, D.
Regional Intergovernmental Council of the IHP UNESCO of the Electoral group I, Istanbul, 19-22 September 2007: Miklánek, P., Halmová, D.
UNESCO Workshop and meeting of working group on *Climatic variability and land cover change impact on high and low flows - at what scales?*, Newcastle, 13-14 September 2007: Szolgay
FRIEND SC meeting in Havana, Cuba in 2006: Miklánek, P.
NE FRIEND WG 2 meeting in Havana, Cuba in 2006: Fendeková, M.
NE FRIEND WG 2 meeting in Perugia, Italy in 2007: Fendeková, M.
NE FRIEND WG 5 meeting, Luxembourg, 2006: Miklánek, P., Holko, L., Pekárová, P.
NE FRIEND WG 5 meeting, Brno, 2007: Holko, L.
ERB (*European Network of Experimental and Representative Basins*) Steering Committee meeting, Luxembourg, 2006: Miklánek, P., Holko, L.
XIth ERB Conference and General Assembly, (Conference: *Uncertainties in the "monitoring-conceptualization-modelling" sequence of catchment research)*, Luxembourg, 2006: 4 papers and 6 participants.
ERB (*European Network of Experimental and Representative Basins*) Steering Committee meeting, Brno, 2007: Holko, L.

20th Working Session of the Danube countries representatives, Beograd, 2006: Miklánek, P., Petrovič, P., Pekárová, P.
23rd Hydrological conference of the Danubian countries, Beograd, 2006: 12 papers and 20 participants.
21st Working Session of the Danube countries representatives, Novi Sad, 2007: Miklánek, P., Halmová, D., Poórová, J., Pekárová, P.

1.7 Other activities at a regional level

1.7.1 Institutional relations/co/operation

The Slovak IHP NC does not have institutional relations/co/operation at a regional level except the IHP UNESCO projects.
In capacity of the Chair Working Group of the collaborating Danubian IHP National Committees and the coordinator of the project *Water Balance of the Danube River Basin* the Slovak IHP NC collaborated with the International Commission for Protection of the Danube River (ICPDR) in Vienna.

1.7.2 Completed and ongoing scientific projects

The Slovak IHP NC did not organise or participate in any projects out of IHP UNESCO except the collaboration with ICPDR (see para 1.7.1) on *Water Balance of the Danube River Basin*.

2. Future Activities

2.1 Activities foreseen until December 2009

The NC intends to continue in all the main ongoing activities mentioned in the report. Activities within the IHP projects and participation at the meetings depend on their working plans, but most of the activities will be oriented on following projects of IHP-VII:
FA 1.2 - Climate change impacts on the hydrological cycle and consequent impact on water resources
FA 1.3 - Hydro-hazards, hydrological extremes and water-related disasters
FA 2.4 - Managing water as a shared responsibility across geographical & social boundaries
FA 2.5 - Addressing the water-energy nexus in basin-wide water resources
FA 5.1: - Tertiary water education and professional development
FA 5.3: - Water education in schools
FRIEND, HELP
Associated programmes: International Flood Initiative (IFI), International Sediment Initiative (ISI)

Focal area 1.2	2008: Publishing of the monograph on *Hydrology of Danube in Bratislava*
Focal area 1.3	2008: Organization of the UNESCO workshop on *Comparative analysis of floods and droughts – Catchment and Aquifer typology* in Smolenice (Slovakia) 2008 – 2009: Co-ordination of Project 9 Flood regime of the Danube river in the Regional co-operation of the Danube countries; 2007 – 2009: Participation in Project 13 Low flow and hydrological drought in Danube basin in the Regional co-operation of the Danube countries
Focal area 2.4	2008 – 2009: Participation in Regional co-operation of the Danube countries in the framework of IHP UNESCO
Focal area 2.5	2008 – 2009: Organization of the annual Poster day on Transport of water, chemicals and energy in the system soil - crop canopy - atmosphere 2008: Publishing of the monograph on *SOLEI Model for estimation of radiation income and evapotranspiration in mountainous basins*
Focal area 5.1	2008 – 2009: Organization of the annual Conferences of young hydrologists

Focal area 5.3	2008 – 2009: Annual Award for the Best diploma work in hydrology at the Slovak Technical University

Cross-cutting programmes:

FRIEND	2008 – 2009: Co-ordination of and participation in the NE FRIEND Working group 2 *Low flows and droughts* 2008 – 2009: Participation in the NE FRIEND Working group 5 *Catchment hydrological and hydrobiogeochemical processes in changing environment* 2008 – 2009: Cooperation with European Network of Experimental and representative basins (ERB) project
International Flood Initiative (IFI)	2007 – 2009: Co-ordination of Project 9 Flood regime of the Danube river in the Regional co-operation of the Danube countries;
International Sediment Initiative (ISI)	2007 – 2009: Participation in Project 12 *Roadmap towards an advice of the implementation of sediment management in the Danube WFD River Basin Management Plan* in the Regional co-operation of the Danube countries

2.2 Activities planned for 2010-2011

The continuation in all the main ongoing activities is foreseen (see para 2.1.). Their inclusion into the VII phase of IHP depends on final structure of the VII phase.

- Continuation in Regional co-operation of the Danube countries in hydrology.
- Participation at the regular bi-annual hydrological Conferences of the Danube countries.

- Continuation in organisation of the Poster days Transport of water, chemicals and energy in the system soil-plant-atmosphere.
- Publication of SVH Publications

- Participation in European Reference Basins project.

CCPC FRIEND (Flow Regimes from International Experimental and Network Data)
- Participation in NE FRIEND working groups 2 and 5
- Collaboration and co-ordination of activities with other international programs and projects as European Reference Basins, and others.

CCPC HELP (Hydrology for the Environment, Life and Policy)
- Maintenance and promotion of research in experimental and representative basins.

2.3 Activities envisaged in the long term

Continuation in active participation in the IHP UNESCO. No specific activities planned at the moment.

Slovak Committee for Hydrology
National Committee for IHP UNESCO
Institute of Hydrology SAS
tel. & fax +421 2 44259311
831 02 Bratislava 3 ncihp@uh.savba.sk
Slovak Republic
Slovak NC IHP - Homepage http://www.ih.savba.sk/ihp/

NATIONAL REPORT OF SWEDEN

1. Activities undertaken in the period July 2006 – May 2008

1.1 Meetings of the IHP National Committee

1.1.1 Decisions regarding the composition of the IHP National Committee

The Swedish IHP-IOC Program Committee, established in 2003 had its final meeting the 9th May in 2006. After that, a revision of the organization of UNESCO's scientific programs has been undertaken. It was decided to establish a working committee for collaboration between agencies (Agency Working Committee, AWC). Represented authorities include Swedish Meteorological and Hydrological Institute (SMHI), Swedish International Development Agency (SIDA), the Swedish Environmental Protection Board (NV), the Swedish Research Council for Environment, Agricultural Sciences and Spatial Planning (Formas) and the Swedish Research Council (VR) which also host the committee. The committee held its first meeting in March 2008. SMHI has since 2003 hosted the Swedish IHP secretariat, and will continue with this responsibility. In addition Berit Arheimer, who represents SMHI in the AWC, and Lotta Andersson, who is responsible for the Swedish IHP secretariat, has got the mandate to establish a new Swedish IHP-committee, based on cooperation with already established Swedish networks, such as the Swedish Hydrological Council (SHR) and the Swedish Water Houlse (SWH) and representatives from the two Swedish HELP basins (Motala Ström and Emån). It will also be assessed how cooperation can be organized between Swedish IHP and IOC activities related to coastal zone management.

1.1.2 Status of IHP-VI activities

Sweden has continued to be actively involved in HELP (Hydrology for the Environment, Life and Policy), with two Swedish HELP basins (Emån and Motala Strom) as well as within the Thukela basin, South Africa in a joint project with University of Natal. This activity includes contributions towards the interaction between science and policy, as well as other interactions, such as water bodies and aquatic systems, and also coastal zone issues. The work in the Thukela basin is focused on climate and water.

1.1.3 Decisions regarding contribution to/participation in IHP-VII

The already initiated work within the cross cutting Programme HELP will be continued, with activities both in the Swedish basins Eman and Motala Strom, as well as in South Africa. Decisions about further contributions/participation in IHP-VII will be based on discussions in the new Swedish IHP committee that will be established in autumn 2008.

1.2 Activities at national level in the framework of the IHP

1.2.1 National/local scientific and technical meetings

14-15 December 2006, the Swedish IHP-IOC committee arranged the Workshop "*Natural" as the goal for water management: Problematizing a paradigm*". The workshop resulted in a paper, submitted to Ambio about the difficulties posed by having the concept of "natural" as the goal of water management and the implications for policy and decision making.

1.2.2 Participation in IHP Steering Committees/Working Groups

No activities 2006-2008

1.2.3 Research/applied projects supported or sponsored

No activities 2006-2008

1.2.4 Collaboration with other national and international organizations and/or programmes

As mentioned above, the new Swedish IHP committee will be based on cooperation with already established Swedish networks, such as the Swedish Hydrological Council (SR) and the Swedish Water House (SWH) and the two Swedish HELP basins (Emån, Motala Ström). Berit Arheimer is the Swedish rapporteur to IAHS (International Association Hydrological Sciences) which will provide possibilities for identifying issues relevant to both IHP and IAHS and organize joint actions. SMHI represents Sweden in WMO, including work in the hydrological commission (CHy) which will be considered by the IHP secretariat, located at SMHI.

1.2.5 Other initiatives

No activities 2006-2008

1.3 Educational and training courses

No activities 2006-2008

1.4 Cooperation with the UNESCO-IHE Institute for Water Education and/or international/regional water centers under the auspices of UNESCO

No activities 2006-2008

1.5 Publications

No publications 2006-2008

1.6 Participation in international scientific meetings

1.6.1 Meetings hosted by the country

1.6.2 Participation in meetings abroad

The Future of Rural Land and Water Management – Research Strategies to Underpin Integrated Decision Making. September 2006, Workshop arranged by UNESCO-HELP, The Environment Agency of England and Wales and the CHASM Team, University of Newcastle-on-Tyne.

HELP in Action – Local Solutions to Global Water Problems. Johannesburg, South Africa, November 2007.

UNESCO Workshop – Comparative analysis of floods and droughts – Catchment and aquifer typology. April 2008, Smolenice, Slovakia.

1.7 Other activities at regional level

No activities 2006-2008

2. Future activities

2.1 Activities planned until December 2009

- A “Global Forum” for dialogues between Swedish organizations and authorities in Sweden working with global issues in line with the Swedish UNESCO Strategy will be held in late October 2008. The suggested theme is “People, resources and environment”.
- Continued participation in HELP with focus on dialogues between stakeholders, decision makers and experts.
- Establishment of a new Swedish IHP committee with the following main tasks
    - Take initiatives towards dialogues between authorities and researchers in various fields, related to the work of IHP. When such a field has been

identified and agreed upon in cooperation with the Swedish AWC, a working group with representatives from authorities, researchers and other relevant groups will be established. The group should decide on a specific task, which has to be fulfilled in a limited time period.

- Getting Swedish researchers and other professionals in the water sector involved in IHP-VII activities.
- Suggesting field for local, national and international scientific and technical IHP meetings to the Swedish AWC.
- On request from the AWC, suggest participants in IHP Steering Committees/Working Groups
- Suggest fields for local, international and national IHP educational and training courses to the AWC
- Promote cooperation with the UNESCO-IHE Institute for Water Education and/or international/regional water centers under the auspices of UNESCO
- On request from AWC suggest participants in international and national IHP meetings
- Cooperate with the Swedish IOC about issues related to coastal zone management

2.2 Activities foreseen for 2010-2011

Activities for 2010-2011 will be planned after the new Swedish IHP committee has started its work in September 2008

2.3 Activities envisaged in the long term

Activities in the long term will be planned after the new Swedish IHP committee has started its work in September 2008

Swedish Secretariat for IHP
Swedish Meteorological and Hydrological Institute
601 76 Sweden
Tel +46 11 495 81 44
Fax +46 11 495 80 01
Email: lotta.andersson@smhi.se

NATIONAL REPORT ON IHP RELATED ACTIVITIES

THAILAND

1. ACTIVITIES UNDERTAKEN IN THE PERIOD July 2006-May 2008

1.1 Meeting of the IHP National Committee

- 1.1.1 Decision regarding the composition of the IHP National Committee
- 1.1.2 Status of IHP-VI activities
- 1.1.3 Decisions regarding contribution to/participation in IHP-VII

1.2 Activities at national level in the framework of the IHP

- 1.2.1 National/local scientific and technical meetings
- 1.2.2 Participation in IHP Steering Committees/Working Groups
- 1.2.3 Research/applied projects supported or sponsored
- 1.2.4 Collaboration with other national and international organizations and/or programmes
- 1.2.5 Other initiatives

1.3 Educational and training courses

- 1.3.1 Contribution to IHP courses
- 1.3.2 Organization of specific courses
- 1.3.3 Participation in IHP courses

1.4 Publications

1.5 Participation in international scientific meeting

- 1.5.1 Meetings hosted by the country
- 1.5.2 Participation in meetings abroad

1.6 Other activities at regional level

- 1.6.1 Institutional relations/co-operation
- 1.6.2 Completed and ongoing scientific projects

2. FUTURE ACTIVITIES

2.1 Activities planned until December 2007
2.2 Activities foreseen for 2008-2009
2.3 Activities envisaged in the long term

National Report on IHP Related Activities
Thailand

1. Activities undertaken in the period of July 2006- May 2008

1.1 Meeting of the IHP National Committee

1.1.1 Decision regarding the composition of the IHP National Committee

According to the reshuffle of Director-General of the Department of Water Resources in late 2007, Thailand National Committee for IHP (TNC-IHP) is now having Mr. Adisak Thongkhaimook, Director-General of the Department of Water Resources served as a Chairman of this committee. The present composition of TNC-IHP consists of 22 members as follows:

Chairman: Mr. Adisak Thongkhaimook, Director-General of the Department of Water Resources

Vice Chairmen: 1. Professor Kasem Chunkao, Environmental College, Kasetsart University
2. Deputy Director-General of the Department of Water Resources

Secretary: Mr.Boontham Sirichai, Director of Bureau of Research, Development and Hydrology, Department of Water Resources

Members: Representatives from concerning agencies and individuals are as follows:

1. Bureau of Royal Rainmaking and Agricultural Aviation
2. Royal Irrigation Department
3. National Park, Wildlife and Plant Conservation Department
4. Hydrographic Department
5. Meteorological Department
6. Marine Department
7. National Research Council of Thailand
8. The Thailand Research Fund
9. Secretarial of the Thai National Commission for UNESCO
10. Department of Ground Water Resources
11. Electricity Generating Authority of Thailand
12. Mrs. Wajee Ramnarong
13. Mr. Thawatchai Tingsanyacharee
14. Associate Professor Suravuth Pratishthananda
15. Mr. Satcha Sethabutra
16. Mr. Veeraphol Taesombat
17. Ms. Sukontha Aekaraj
18. Mrs. Poonsook Vimukatayon

The mailing address are as follow:
Thailand National Committee for the IHP
Department of Water Resources
180/3 Rama 6 Road, Samsennai,
Phayathai, Bangkok, 10400, Thailand
Tel : +66-22986604 Fax: +66-22986604
Email : sukonth_a@mnre.go.th

During this period, Thailand National Committee for IHP (TNC-IHP) held the meeting to revise and review all activities to conduct the new appropriate National Policy and Master Plan on Hydrology.

1.1.2 Status of IHP-VI activities

a) Implementation of the Integrated Water Resources Management in 29 small sub-basins out of 25 major river basins.
b) Organization of the Training on Information, Education and Communication to the stakeholder and local communities in the river basins.
c) Flood Forecasting and Management in Upper Mun-Chi River Basin
d) Continuing installation of Flood and Landslide Early warning System : Public Participatory Approach and Community Based in Upland Risk Area
e) Continuing construction of the water supply systems to provide clean water and consumption targeting for all villages of the whole country.

1.1.3 Decisions regarding contribution to/participation in IHP-VII

Thailand National Committee for the IHP presents its support to the proposal framework for IHP-VII. Some specific issues that should be highlighted are

- Methodologies for integrated river basin management
- Promotion of public awareness raising on water management
- Institutional development and networking for WET
- Guidelines on the sustainable and integrated water management with due consideration to public's living quality and participation
- Increasing the available sources water by improving both of existing natural and man-made sources
- Flood and Drought Management

1.2 Activities at national level in the framework of the IHP

1.2.1 National/local scientific and technical meetings

- Workshop on Hi-tech in Meteorological and Hydrological Data, on 24 February 2006, Bangkok, Thailand
- National Workshop on Increasing Efficiency in Integrated Water Resources Management on 4-5 May 2006, Nakhon Pathom Province
- Workshop on Water Resources Management Strategy in Thailand on 21-22 June 2006, Bangkok, Thailand
- National Workshop on Impact of Climate Change on Water Resources Engineering on 30-31 Aug 2007, Bangkok, Thailand

1.2.2 Participation in IHP Steering Committees/Working Groups

a) Meeting and Discuss Initiatives possible grounds for cooperation around the International Flood Initiative and International Sediment Initiative with Sustainable Water Management Section Division of Water Sciences UNESCO on 31 January 2006, Bangkok, Thailand
b) UNESCO PCCP-South & Southeast Asia Brainstorming on 21 April 2006, Bangkok, Thailand
c) The representatives from TNC-INP attended the 14th Regional Steering Committee Meeting for the IHP in Southeast Asia and the Pacific and International Symposium on Managing Water Supply for Growing Demand on 16-20 October 2006, Bangkok, Thailand
d) The representatives from TNC-INP attended the 15th Regional Steering Committee Meeting for the IHP in Southeast Asia and the Pacific and International Symposium on Hydrology and Water Resources Management for Hazard Reduction and Sustainable Development (HRSD 2007) on 19-23 November 2007, Manila, Philippines

1.2.3 Research/applied projects supported or sponsored

a) Study on Antecedent Precipitation Index for Flood and Landslide Early Warning System.
b) Study on the Impact of Tsunami on Inland Water Resources
c) Area-based Water Resources Management System Development along with Decision Support System and Social Process in Rayong Province Area
d) Study on Develop and Management in Inundate Area for Flood Mitigation in Chao Phraya river basin by Royal Initiative Project
e) Water Resources Management by Local Community
f) Decision Support System in land use planning as a tool for river basin management in eastern Thailand
g) Delineation of river basin boundaries (25 major river basins including 254 sub-river basins)
h) Integrated Water Resources Management: Case study in Lower Loei basin
i) Integrated Water Resources Management in Yom river basin
j) Study on Social Model for Water Conflict in Bangpakong river basin
k) NDVI (Normalize Differential Vegetable Index) for Drought Forecasting
l) API Application in Flash Flood and Landslide
m) Application of Local Wisdom in Water Resources Management
n) The Development of participatory process to empower local community in water resources management: Case Study in Mun river basin
o) Study on the Risk Factors and Community Livelihood in Flood and Landslide Hazard Area: Case Study in Upper Ping river basin

1.2.4 Collaboration with other national and international organizations and/or programmes

a) Collaboration with Mekong River Commission in Appropriate Hydrological Network Improvement Project, Basin Development Plan, Water Utilization Programme, Environment Programme, Flood Mitigation Management Programme and Drought management Programme, Mekong HYCOS and start up Integrated Knowledge Management Programme
b) Collaboration with Typhoon Steering Committee
c) Collaboration with APN Inter-Government on Global Change
d) Collaboration in the Convention on Climate Change
e) Collaboration with ASEM Waternet
f) Collaboration with NARBO (Network of Asian River Basin Organization)
g) Collaboration with ASIAN Working Group on Water Resources Management

1.2.5 Other initiatives

- Study on Integrated Water Resources Management in Nam Yom Basin Project in collaboration with ADB
- Study on Social Model for Water Conflict in Bangpakong Basin Project in collaboration with ADB
- Thai-New Zealand Partnership in Exchange of Research on Water Allocation

1.3 Educational and training courses

1.3.1 Contribution to IHP courses

-

1.3.2 Organization of specific courses

- Training for Trainer on the Integrated Water Resources Management on 12-14 July 2006, Bangkok
- Training on Telemetry and MIKE II Model on 22-26 January 2007, Bangkok
- Training on Hydrology and Applied Hydrology on 14-18 May 2007, Kanchanaburi Province, Thailand
- Training on Decision Support Framework in Mae Kok Basin and Nam Songkhram Basin on 25-29 June 2007, Bangkok.
- Training on Applied GIS for Water Resources Management on 25-26 June 2007, Bangkok
- Training on Research Training for New Researcher on 30-31 August 2007, Bangkok.

1.3.3 Participation in IHP courses

- A representative from Thailand attended the training courses on Water and Carbon Cycles in Terrestrial Ecosystems on 26 February - 11 March 2006, Japan

1.4 Publications

- Hydrological and Meteorological Year Book
- Development of Master Plan for Management of Natural Disasters : Floods and Droughts
- Development of Master Plan for Management of Natural Disasters : Landslides
- Flood Early Warning Model

1.5 Participation in international scientific meeting

1.5.1 Meetings hosted by the country

- The 14th RSC Meeting for UNESCO-IHP Southeast Asia and the Pacific in conjunction with International Symposium on Management Water Supply for Growing Demand on 16-20 October 2006, Bangkok, Thailand
- Thematic Workshop on Water Allocation and Water Rights 1 in December 2006 for NARBO (Network of Asian River Basin Organization)
- The 1st Technical Seminar of ASEM Waternet on 23-25 April 2007 for ASEM Waternet
- The 4th Thematic Workshop on Sustainable Management for Water Resources Infrastructures on 4-7 February 2008 for NARBO

1.5.2 Participation in meetings abroad

A representative from Thailand participated in

- The 2nd and 3rd Thematic Workshop on Water Allocation organized by NARBO in Bangladesh and Sri Lanka
- The 4th World Water Forum on 16-22 March 2006, Mexico City

- The 6th, 7th and 8th Meeting of ASEAN Working Group on Water Resources Management in May 2006, Philippines, in July 2007, Malaysia and in June 2008, Singapore
- The 9th River Symposium on 4-7 September 2006, Brisbane, Australia
- The 40th Typhoon Steering Committee, Makao, China
- Study Tour on Flood Management on 14-17 March 2007, Japan
- Study Tour on Water Allocation on 11-15 June 2007, New Zealand
- Study Tour on Dam Management and Water Resources Conservation on 8-16 June 2007, China
- A Greater Mekong? Poverty, integration and Development on 26-27 September 2007, Sydney, Australia
- Study Tour on Watershed Management on 17-21 September 2007, Australia
- The 3rd Southeast Asia Water Forum (SEAWF) on 22-26 October 2007, Malaysia
- International Forum of Riverfront and Watershed Restoration "Urban River Restoration through Sustainable Development" on 29 November – 4 December 2007, Japan
- International Conference on Adaptive and Integrated Water Management (CAIWA) on 12-15 November 2007, Switzerland
- The 1st Asia Pacific Water Summit on 2-6 December 2007, Japan
- Network of Asian River Basin Organization: NARBO on 20-22 February 2008, Indonesia

1.6 Other activities at regional level

1.6.1 Institutional relations /co-operation

- TNC-IHP has remained close coordination and contacts with UNESCO Jakarta Office in many activities.
- Close coordination and contact with the United Nations Economic and Social Commission for Asia and the Pacific (UNESCAP) and World Meteorological Organization (WMO) as member of the Typhoon Committee

1.6.2 Completed and ongoing scientific projects

- Formulation on the Integrated Master Plan for Water Resources Management in 25 Major River Basin of Thailand
- Study on antecedent precipitation index for flood and landslide early warning system
- Study on the Impact of Tsunami toward Inland Water Resources
- Development and improvement in the hydrological and meteorological monitoring network in Bangpakong river basin and Prachup Khirikhan coastal basin for water resources management including flood forecasting and management
- Established telemetry hydro-meteorological stations in Mun and Chi river basins for flood forecasting and management.
- Continued to develop and set up a flood and landslide warning system in mountain and upland area
- Promote the Year of National Water Agenda in Various Campaign Weeks
- Preparation and promotion the master plan for national short and long term plan for flood mitigation

2 FUTURE ACTIVITIES

2.1 Activities planned until December 2008

- Strengthening cooperation with other countries in Lower Mekong river basin
- Raise public awareness and education in integrated water resources management
- Raise public participation in integrated water resources management
- Implementation on integrated water resources management in pilot river basin
- Promote the Year of National Water Agenda in Various Campaign Weeks
- Promotion the master plan for national short and long term plan for flood mitigation.

2.2 Activities foreseen for 2009-2010

- Continuation of Collaboration with RSC for Asia and Pacific
- Continuation of involvement in *Asian-Pacific FRIEND*
- Enhancing activities contributed to IHP-VII
- Enhancing activities in Flood and Drought Management
- Continuation of promotion on Integrated Water Resources Management
- Expansion of an Integrated Water Resources Management implementation to the rest of the country

2.3 Activities envisaged in the long term

- Enhancing activities contributed to IHP-VII
- Enhancing activities in Flood and Drought Management
- Expansion of an integrated water resources management implementation to the rest of the country
- Continuation of raising public awareness and education in water resources management
- Continuation of raising public awareness in efficient water resources management
- Continuation of raising public participation for better water resources management

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RAPPORT NATIONAL SUR LES ACTIVITES DU PHI

1. ACTIVITES ENTREPRISES PENDANT LA PERIODE JUILLET 2006 – MAI 2008

Au cours des deux dernières années le Comité National tunisien a organisé et/ou a pris part à plusieurs manifestations scientifiques touchant à plusieurs aspects de l'hydrologie, l'hydrogéologie et de l'éco-hydrologie cadrant avec les différents objectifs, projets et sous-projets du PHI-VI. Nous passons en revue dans ce rapport 1'essentiel de ces activités.

1.1 Réunions du Comité National du PHI

En marge des diverses manifestations scientifiques auxquelles le Comité National tunisien du PHI a contribué, des réunions ont été tenues au sein de la Direction Générale des ressources en Eau- DGRE, point focal du Comité National pour le PHI, essentiellement pour définir et mettre sur pied les programmes des diverses interventions ainsi que pour commenter les différentes étapes du projet du PHI VII,

1.1.1 **Décision sur la composition du Comité national du PHI**

La composition du Comité national a enregistré deux nouveaux membres de l'institut national agronomique de Tunis ; elle se présente actuellement comme suit :

Nom/Prénom(s)	**Activité au sein du Comité**	**Spécialité**
HAMZA Mekki	Président	Sciences de l'eau
Ghorbel Abdelmajid	Membre, Secrétaire du CN	Hydrologie
Bouzaiane Slaheddine	Membre	
Khanfir Rachid	Membre	Hydrogéologie
Ben Baccar Brahim	Membre	Hydrogéologie
Saadaoui Mustapha	Membre	Hydrologie
Abdelhedi Taoufik	Membre	Hydraulique
Mme Laâtiri Raqya	Membre	Génie rural
Hamdane Abdelkader	Membre	Génie rural
Djebali Ali	Membre	Génie rural
Farhat Habib	Membre	Conservation Eaus et Sols
Gaâloul Noureddine	Membre	Siences et Techniques de l'Eau
Zouari Kamel	Membre	Géologie Isotopique
Mme Bargaoui Zoubeida	Membre	Hydrologie
Mme Bouhlila Rachida	Membre	Hydrogéochimie
Maâlel Khalifa	Membre	Hydraulique
Lebdi Fethi	Membre	Hydrologie
Mme Tarhouni Fatma	Membre	Hydrogéologie

1.1.2 **Bilan des activités du PHI- VI**

Dans le cadre des activités programmées dans la sixième phase du PHI, nous relevons les activités suivantes :

- Mise en place de la Maison de l'Eau à l'INAT, qui regroupe les compétences nationales dans le domaine de la gestion des ressources en eau. Elle est coordonnée par M.Lebdi fethi, directeur du laboratoire sciences et techniques de l'eau à l'INAT.

- La participation de Messieurs Gaaloul N., Rekaya M. et Jelassi F. respectivement chercheur à l'INRGREF et hydrogéologues au commissariat régional au développement agricole de Nabeul, à un atelier organisé par l'Université d'Athènes (Grèce) et l'Université de Thrace (Xanthi-Grèce) du 16 au 23 octobre 2007.
- La participation de Mme Bouhlila R. (LMHE – ENIT) à la « 19th SWIM – 3rd SWICA Joint Salt Water Intrusion Conference » à Cagliari-Sardaigne (Italy) en 2006. Avec une présentation intitulée : Modeling Density Dependent Flow, Transport And Geochemical Processes In Porous Media**.**
- La participation de Mme Bouhlila R. (LMHE-ENIT) au XXXVième Congrès de l'IAH (International Association of Hydrogeologist) sur le thème « Groundwater and Ecosystems » en tant que membre du comité scientifique et avec 4 communications présentées en collaboration avec les doctorants du LMHE en 2007 à Lisbonne (Portugal)
- La participation de Mme Bouhlila R. (LMHE-ENIT) aux travaux de « International Conference ModelCARE 2007 : Calibration and Reliability in groundwater Modelling Credibility, Copenhagen (Danemark) September 9-13, 2007 » avec 3 communications présentées en collaboration avec des doctorants du LMHE et des collègues du LAMSIN-ENIT.
- La participation de Zoubeida Bargaoui au congrès UIGG 2007- Perrugia, juillet 2007- par une conférence intitulée « Rain gauge reinforcement by external drift kriging -for reducing predictive uncertainty of rainfall intensity of extreme events » en co-auteur avec Afef Chebbi.
- La désignation par le président de l'AISH, de Zoubeida Bargaoui, comme Point focal représentant l'AISH Association des Sciences Hydrologiques en Tunisie (depuis 2006)
- La publication des travaux suivants dans lesquels Zoubeida Bargaoui est co-auteur:
- Ellouze-Gargouri et Bargaoui Kebaili *Z.* (2006), Prédétermination des débits maximaux de crue par simulation de Monte Carlo de la pluie nette. Rev. Sci. Eau.19(4). 327 – 345.
- Kingumbi A., Bargaoui *Z.*, Ledoux E., Besbes M. and Hubert P. (2007). Modélisation hydrologique stochastique d'un bassin affecté par des changements d'occupation: cas du Merguellil en Tunisie Centrale. Hydrological Sciences Journal, 52(6): 1232-1253.
- Ouachani R., Bargaoui *Z.* et Ouarda T. (2007). Intégration d'un filtre de Kalman dans le modèle hydrologique HBV pour la prévision des débits. Hydrological Sciences Journal, 52(2):318-338.

- Chebbi A., M. Zammouri, M.C. Cunha, Y. Nazoumou, M. Besbes, Z. Bargaoui (2008). Optimization of withdrawals from an aquifer : a case study of Kairouan (Tunisia). Water International Vol 33 (1) :100-115.
- Bargaoui Z., Dakhlaoui H. Et Ahmed H. (2008). Modélisation pluie-débit et classification hydroclimatique. Revue des Sciences de l'eau. Numéro spécial. 20ième anniversaire. ISSN : 1718-8598.
- L'étude de la qualité des eaux souterraines et maîtrise des sources de pollution. continue à recevoir de la part du comité Tunisien du PHI une attention particulière traduite par une participation active à toutes les actions menées par la Direction Générale des Ressources dans le domaine des ressources en eau.

1.1.3 **Décisions sur la contribution ou la participation au PHI-VII**

Le comité national tunisien pour le PHI, a exprimé son interêt pour la participation aux activités suivantes:

- focal area 1-4 – managing grounwater sytems' response to global changes,
- focal area 2-2 - capacity development for improved governance; enhanced legislation for wise stewardship of water resources.
- focal area 2-4 – managing water as a sharing responsibility across geographical & social boundaries .

1.2 Activités nationales dans le cadre du PHI

1.2.1 Réunions scientifiques et techniques au niveau national et local

A l'échelle nationale les membres du Comité tunisien ont pris part activement aux différentes commissions de suivi du PISEAU (programme d'investissement dans le secteur de l'eau ; composante-gestion des ressources en eau souterraines-) groupant cinq projets pilotes issus de l'Etude du secteur de 1'eau en Tunisie menée par le Gouvernement tunisien dans le cadre des études stratégiques des ressources naturelles du pays. Ces cinq projets pilotes sont: i) Optimisation des réseaux de suivi des ressources en eau,ii) système d'information national des ressources en eau, iii) outils d'aide à la décision, iv) gestion participative pour la gestion des ressources en eau et v) recharge artificielle des nappes à partir des ressources en eau conventionnelles et des eaux usées traitées.

- Séminaire international sur la gestion de la sécheresse, dans le cadre d'un projet européen « Aquastress »
- Séminaire international sur le rôle des femmes dans la gestion de l'eau 'Water gender », avec la collaboration de l'ONG « kawthar » et le PNUD

.

- Participation active à la célébration de la Journée mondiale de 1'eau au cours des années 2007 et 2008 .

- Participation aux séminaires organisés à l'école supérieure d'ingénieurs de l'équipement rural ESIER en 2006 et 2007 sur la Medjerda.

- Participation au Salon Méditerranée de l'Eau « HYDROMED » organisé annuellement à Tunis durant la deuxième semaine du mois de Mars en marge de la Journée Mondiale de l'Eau avec la collaboration de I'IME (institut Méditerranéen de 1'eau).

1.2.2 Participation à des comités directeurs ou groupes de travail du PHI

1.2.3 Projets de recherche de base ou appliquée, aidés ou patronnés

Le comité tunisien du PHI a participé aux projets de recherches suivants :

- Projet Aquastress avec INAT partenaire d'un consortium Européen (CE-CIHEAM-IAMB-IRD)

- Projet SONEDE-INAT sur les règles de gestion des barrages et des réseaux d'eau potable

- Gestion des événements extrêmes (inondations et sécheresse) : Ministère de l'Agriculture et des Ressources Hydrauliques

- Project title : **Gestion durable des ressources en eaux souterraines côtières - Modélisation physique et probabiliste. Application à la côte orientale du Cap Bon, Tunisie (CAPBON)**

  Main applicant : Pierre Perrochet (CHYN, Suisse)
  Main foreign partner : Rachida Bouhlila (LMHE-ENIT, Tunisie)

  Le but de ce projet est d'analyser la situation actuelle des eaux souterraines et du problème de salinisation des eaux et des sols dans la région du Cap Bon et plus généralement de développer des outils et méthodes permettant d'améliorer la gestion des eaux dans ce type d'environnement

- Projet de recherche Tuniso-Marocain intitulé entre le LMHE-ENIT et l'Université de Kénitra intitulé ***:*** Modélisation de la contamination des nappes et des sols agricoles par les nitrates : Application à des cas d'études au Maroc et *en Tunisie.* Période 2007-2009.

1.2.4 Collaboration avec d'autres organismes ou programmes nationaux ou internationaux

- Etude INAT - FAO sur l'eau et l'énergie
- Etude INAT - DGETH sur la gestion des crues da la Mejerda

- Projet concernant la sauvegarde des ressources en eaux dans les zones marginales intitulé : Saving Freshwater Resources with Salt-tolerant Forage Production in Marginal Areas of the West Asia and North Africa (WANA).

Ce projet mené en partenariat entre l'Institut National des Recherches en Genie Rural, Eaux et Forets (INRGREF) , la Direction Générale des Ressources en Eau et les commissariats régionaux de développement agricole de Gabès, Tataouine et Mednine a été financé par le Centre International d'Agriculture Biosaline (ICBA). Les principaux objectifs la mise en valeur des eaux salées au Sud Tunisien pour renforcer la viabilité des moyens d'existence, et mettre au point des tactiques pour montrer aux agriculteurs comment les technologies d'agriculture biosaline développées par les scientifiques peuvent les aider dans leurs propres travaux agricoles.

- Projet d'utilisation des isotopes dans l'évaluation des ressources en eau du système aquifère du Sahara Septentrionnal : Ce projet qui s'étale sur trois ans (2003-2006), contribue à une connaissance approfondie du système aquifère saharien par l'utilisation des techniques isotopiques en se basant sur les données collectées au cours du projet S.A.S.S. Les objectifs du projet :

  - L'évaluation de la contribution de la recharge actuelle à partir de l'Atlas Saharien,
  - La drainance et l'inter-connexion entre les aquifères du continental intercalaire et du complexe terminal,
  - L'approche de l'étude des exutoires par les études isotopiques.

Ce projet est financé et coordonné par l'Agence Internationale de l'Energie Atomique (AIEA). Il interesse trois pays maghrébins : Algérie, Tunisie et Lybie.

Une réunion s'est tenue du 11 au 15 novembre 2006 à Alger au siège du commissariat d'énergie atomique pour valider et interpreter les résultats des analyses isotopiques et faires des recommandations applicables pour l'évaluation et la gestion des ressources en eau partagées. L'achèvement et la clôture du projet ont été fixés pour 2007

- Projet de recherche Tuniso-Marocain entre le LMHE-ENIT et l'Université de Kénitra intitulé ***:*** Modélisation de la contamination des nappes et des sols agricoles par les nitrates : Application à des cas d'études au M**aroc** et en Tunisie. Période 2007-2009.

1.2.5 Autres initiatives

Participation à la conférence internationale : Solidarité face au changement climatique- Tunis 18-20 novembre 2007

1.3 Cours d'éducation et de formation

Une filière d'ingénieurs en hydrométéorologie (2 ans d'instituts préparatoires suivie de trois années d'école d'ingénieurs) a été mise en place à l'Ecole Nationale d'Ingénieurs de Tunis depuis septembre 2005. La première promotion comptant 21 étudiants sortira en juin 2008. Ces ingénieurs ont suivi un cursus les habilitant à travailler sur les thématiques du PHI.

1.4 Coopération avec l'Institut UNESCO-IHE pour l'éducation relative à l'eau, et/ou avec d'autres centres internationaux/régionaux liés à l'eau, sous l'égide de l'UNESCO

1.5 Publications

Les documents concernant les différentes manifestations présentées ci-dessus ont été publiés, notamment :

- Gestion optimale des réseaux d'eau potable avec contraintes de qualité
- Gestion des barrages pour des événements secs
- Modélisation pluie-débit à base géomorphologique en milieu semi-aride rural tunisien
- Etude de l'érosion et de l'apport solide dans le barrage de sidi salem
- Gestion intégrée des ressources en eau dans les bassins miniers
- Bulletion N° 51 du Groupe Francophone d'Humidimtrie et des Transferts en milieux poreux. Milieux poreux et transferts hydriques, édité par le LMHE-ENIT (Rachida BOUHLILA et Lamia GUELLOUZ), 2007. 271p.
- Impacts of large dams on downstreamflow conditions of rivers : Aggravation and reduction of the medjerda channel capacity downstream of the Sidi Salem dam (Tunisia)
  Yadh Zahar , Abdelmajid Ghorbel, Jean Albergel
  JOURNAL OF HYDROLOGY
- Publication du 14ème et du 15ème numéro de la revue interne des ressources en eau.
- Rapport et CD-ROM de l'atelier Elaboration de modèles d'aide à la prévision hydrologique ; tenu à Tunis en mars 2005**.** élaboré par Assia Chebchoub .
  http://www.enit.rnu.tn/pdf/semhyd/colloque.pdf.

1.6 Participation aux réunions scientifiques internationales

1.6.1 Réunions tenues dans le pays

- Séminaire sur le système euro-méditerranéen d'information dans le domaine de l'eau – Tunis 22 novembre 2007

- Participation du Comité du PHI au séminaire organisé par l'Office National de l'Assainissement à l'occasion de la célébration de la journée mondiale de l'eau, le 22 mars 2008, Intitulé.

- Organisation d'un séminaire sur les valeurs extrêmes de pluie et débits (ENIT, mars 2008)

1.6.2 Participation à des réunions à l'étranger

Participation au 7ème séminaire de coordination des points focaux nationaux du SEMIDE- à Istambul, Turquie en septembre 2007

1.7 Autres activités au niveau régional

1.7.1 Coopération ou relations institutionnelles

1.7.2 Projets Scientifiques achevés ou en cours

● Projet achevé: Système aquifère du Sahara Septentrionnal (SASS) entre la Libye, la Tunisie et l'Algérie.

● Projet en cours: Etude du Système aquifère de la Djeffara entre la Tunisie et la Libye.

● Projet en cours " Modélisation du système aquifère et du biseau salin et outil d'aide à la décision pour la gestion durable de l'eau au Cap Bon au Nord de la Tunisie, **e**n collaboration entre l'I.N.R.G.R.E.F , la Direction Générale des Eaux et le commissariat régional de développement agricole de Nabeul et l'Université Suleyman Demirel - Water Resources Research Group - Isparta Turquie, Financé par le Ministère de l'Enseignement Supérieur et de la Recherche Scientifique.

2 ACTIVITES FUTURES

2.1 Activités planifiées avant décembre 2009

● Elaboration d'un programme de recherche sur les bassins non jaugés par l'ENIT et en collaboration avec le comité national du PHI. Une thèse est en cours de rédaction au sein de cette thématique

2.2 Activités prévues pour la période 2010-2011

● Recharge artificielle des nappes phréatiques à partir des eaux usées traitées

2.3 Activités envisagées à long terme

● Gestion durable et gouvernance locale des ressources en eau au cap bon (Tunisie)

NATIONAL REPORT ON IHP RELATED ACTIVITIES

United Arab Emirates (UAE)

1. ACTIVITIES UNDERTAKEN IN THE PERIOD JULY 2006 – MAY 2008

The National Committee of the UAE was established in February of 2007 by ministerial decree no. 1/85 for year 2007, issued by the Minister of Education. There are nine members representing different organizations in this committee. Since the time of the establishment, the committee is playing a vital role at the national level in connection with community and the water organizations in UAE. The importance of water resources in UAE and in the region has been emphasized through a number of related activities.

1.1 Meetings of the IHP National Committee

1.1.1 Decisions regarding the composition of the IHP National Committee

The National Committee of IHP met twice to discuss issues related to the activities of the committee and the effective implementation of the objectives of IHP. As a new committee, the meetings were devoted to discuss in details the publicity of committee and to establish internal rules and regulations of this committee to manage and distribute the work among the members of the committee. The committee emphasized active participating in regional and international meetings to represent the country and to be exposed to the experiences of the other national committees in the region. In addition, the committee recommended the effective participating in the local activity as one of the main objective of this committee to increase the level of awareness and knowledge about water.

1.1.2 Status of IHP-VI activities

The committee did not review the IHP-VI plans and did not conduct any related activities because of recent establishment of the committee.

1.1.3 Decisions regarding contribution to/participation in IHP-VII

Members of the committee have a great intention to actively participate in implementing IHP-VII. This intention was activated by selecting the UAE as a member of Intergovernmental Council of IHP during the 34th General Conference of UNESCO which was held in Paris in October of 2007. Therefore, members of IHP will participate in the coming 18th Session of the IHP Intergovernmental Council meeting which will be conducted in Paris from 9th of June to 14th of June 2008.

1.2 Activities at national level in the framework of the IHP

1.2.1 National/local scientific and technical meetings

Since the establishment, the UAE IHP National Committee organized the 12th Regional Meeting of the Arab IHP Committees which was held in Al Ain, United Arab Emirates from 6th to 8th of November 2007 with cooperation of the Regional UNESCO Office of Cairo and Ministry of Environment and Water of UAE. Also, the committee participated actively in the 34th General Conference of UNESCO which was held in Paris, France in October of 2007. The UAE became member of IHP Intergovernmental Council.

Participation in IHP Steering Committees/Working Groups

1.2.2 Research/applied projects supported or sponsored

Because of recent establishment of the committee, there are no applied projects.

1.2.3 Collaboration with other national and international organizations and/or programmes

The National Committee cooperated with different national organizations in the country such as UAE University, Water and Energy Reseach Center of Abu Dhabi Electricity and Water Authority (ADWEA), Environment Agency-Abu Dhabi, Dubai Municipality, Sharjah Municipality, Ministry of Environment and Water. The committee has intention to build strong relationships with international organizations in near future.

1.2.4 Other initiatives

The committee worked with the National Committee of Eduction, Science & Culture to prepare the internal by-laws and regulations to manage the work and the activities of the committee. In addition, a website for the committee will be lanuched soon. The Secertery Office for the Committee is hosted by Water and Energy Research Center of ADWEA in Abu Dhabi.

1.3 Educational and training courses

1.3.1 Organization of specific courses

The committee organized two main workshops to enhance the awareness of water in the society. The first workshop was conducted in callobration with the Geology Department of UAE University and Spacemed, Germany about a new technology in the field of water treatment in February of 2008. The second workshop titled "Water Resources Exploration" was conducted in collaboration with the Geology Department of UAE University and Water and Energy Research Center of ADWEA in Al Ain in 20th of April 2008.

1.4 Participation in international scientific meetings

1.4.1 Meetings hosted by the country

- 12th Regional Meeting of Arab IHP National Committees from 6th to 8th of November, 2007.

1.4.2 Participation in meetings abroad

- 34th General Conference of UNESCO in Paris, France in October of 2007.

1.5 Other activities at regional level

1.5.1 Institutional relations/cooperation

The committee has established stong relationships with the following national organizations :-

- UAE University
- Abu Dhabi Electricity and Water Authority (ADWEA).
- Environment Agency- Abu Dhabi
- Ministry of Environment and Water
- Dubai Municipality
- Sharjah Municipality

2. FUTURE ACTIVITIES

2.1 Activities planned until December 2009

- Continue to increase the awareness of society about the importance of water.
- Participate in national and international meetings.
- Conduct series of lectures, workshops and panels.
- Publicise the vision and missions of UAE IHP National Committee among the society
- Publish articles and other relevant reports related to the activities of the committee.

2.2 Activities foreseen for 2010-2011

- Cooperation with the UNESCO-IHE Institute for Water Education and/or international/regional water centers under the auspices of UNESCO

- Support scientific projects in the fields related to water resources
- Participate in national and international meetings.

2.3 Activities envisaged in the long term

- Continue Cooperation with the UNESCO-IHPInstitute for Water Education and/or international/regional water centers under the auspices of UNESCO
- Support scientific projects in the field related to water resources
- Participate in national and international meetings.

UNITED KINGDOM
NATIONAL REPORT ON IHP RELATED ACTIVITIES

1. ACTIVITIES UNDERTAKEN IN THE PERIOD JULY 2006- MAY 2008

1.1 UK IHP National Committee

1.1.1 Decisions regarding the composition of the IHP National Committee

Two meetings of the UK-IHP Committee were held during the reporting period: on 6 February 2007 and 19 February 2008.The 2007 meeting was the first of the merged UK-IHP National Committee and the UK Interdepartmental Committee on Hydrology. It was agreed that the new committee be named the "UK Committee for National and International Hydrology" (UKCNIH). Membership of the committee has been expanded to include UK-based representatives of key IHP programmes (FRIEND, HELP, G-WADI, and ISI) and other organisations involved in national hydrology. A list of organisations represented on the committee is given in Table 1. Prof. Alan Jenkins, Science Director (Water) at the Centre for Ecology and Hydrology (CEH), Wallingford, remains Chairman of the Committee; Gwyn Rees (CEH) is its Secretary.

Organisation
Natural Environment Research Council (NERC)
Centre for Ecology and Hydrology (CEH)
British Geological Survey (BGS)
Met Office
Department of Agriculture and Rural Development, Northern Ireland (DARDNI)
Department of Environment (Northern Ireland)
Department of the Environment, Food and Rural Affairs (DEFRA)
Department for International Development (DFID)
Department of Transport
Scottish Executive
National Assembly for Wales (NAW)
Environment Agency (EA)
Scottish Environment Protection Agency (SEPA)
UK Committee for the International Association of Hydrological Sciences (IAHS)
British Hydrological Society (BHS)
Flow Regimes from International Experimental and Network Data (FRIEND)
Hydrology, Environment, Life and Policy (HELP)
Water and Development Information for Arid Lands (G-WADI)
International Sedimentation Initiative (ISI)
UNESCO Centre of Water Law, Policy and Science, Dundee
UK in UNESCO Ecohydrology projects
UK in WMO Commission for Hydrology (WMO-CHy)
British Water
Water UK
UK Water Industry Research (UKWIR)

Table 1. *Organisations represented on the UK Committee for National and International Hydrology (as of February 2008)*

1.1.2 Status of IHP activities

FRIEND (Contact: Gwyn Rees)
The UK was instrumental in the establishment of FRIEND in 1985 and its scientists continue to play a leading role in the project. UK interests are represented on the Steering Committees of Northern European FRIEND (NE-FRIEND) and Hindu Kush-Himalayan FRIEND by Gwyn Rees (CEH). Gwyn is also on the Steering Committee of the WMO Global Runoff Data Centre. David Hannah (University of Birmingham) is coordinator of the Project Group 3 (Large Scale Variations) of NE-FRIEND, one of the four sub-projects of NE-FRIEND. Helen Houghton-Carr (CEH) represents the UK on the Steering Committee of Southern Africa FRIEND. UK scientists have participated in many FRIEND activities, as follows:

- Several UK scientists attended the 5th FRIEND Conference, 26 November-1 December, 2006, Havana, Cuba. Of the 117 papers presented at the conference, 16 were by UK scientists. The papers were published in IAHS Publication No. 308, "Climate variability and Change – Hydrological Impacts". UK scientists also contributed to the report, "FRIEND- A Global Perspective" (Servat, E., Demuth, S. (Eds.)) which provides a review of research and capacity building in FRIEND.

- David Hannah attended the NE-FRIEND Database meeting, at the Federal Institute of Hydrology, Koblenz, Germany, on 5-6 March 2007.

- Several UK scientists attended the FRIEND-convened "Hydrological Extremes: control, spatial & temporal variability, and regional patterns", session at the European Geosciences Union, Vienna, Austria, 19 April 2007, and the Low Flow and Drought (Project Group 2) meeting that followed on 21 April 2007.

- UK FRIEND participants also attended "Climate change and hydrological extremes: floods and droughts", the Third International Conference on Climate and Water, in Helsinki, Finland, on 3-6 September 2007

- David Hannah convened a Project Group 3 workshop, "Large-scale hydrological variation and teleconnections", at the University of Birmingham, in November 2007

- Helen Houghton-Carr attended the Steering Committee of Southern Africa FRIEND in, Dar Es Salaam, Tanzania, in October 2007.

- Gwyn Rees and Alan Gustard attended the Steering Committee of Hindu Kush-Himalayan FRIEND in Kathmandu, Nepal, November 2007

Forthcoming FRIEND events include:

- Summer School on Hydrological Drought, Trieste, Italy, June 2008
- Climate change and disasters. XIIIth World Water Congress, Montpellier, France, 1-4 September 2008
- Low Flow and Drought meeting. Joint AMHY-NE-FRIEND, Bratislava, Slovakia, 10-12 September 2008
- Hydrological Extremes in a Small Basin. 12th Biennial Conference of the Euro-Mediterranean Network of Experimental and Representative Basins (ERB 2008), Cracow, Poland. 18-20 September, 2008. NE-FRIEND Project Group 5.
- 6th International FRIEND Conference, Marakech, Morocco, planned autumn 2010.

HELP (Contact: Pat Wouters)
The Dundee UNESCO Centre for Water Law, Science and Policy (see also 1.4), is the European Regional Coordinating Unit for the HELP programme. There are some 20 European HELP basins. Academic staff members (Alistair Rieu-Clarke and Mike Bonell) represented the Dundee HELP Centre at the South Africa Southern Symposium (November 2007), where HELP basins from around the world gathered to see what lessons could be learned from the South. Another member of staff, Sarah Hendry, went to the UNESCO-SILA technical workshop on wetlands at Annecy in January where she presented papers on the Tweed catchment. Sarah Hendry, with Professor Alan Werritty, Director of Research, attended a meeting of the Regional Coordinating Units for the HELP Programme in Paris in May.

Dr David Harper (University of Leicester) is joint coordinator of two HELP Basins in the Welland (UK) and Lake Naivasha (Kenya). In the Welland, research focuses on sources and effects of phosphorus from agriculture. In Naivasha, attention is paid to understanding the impact of alien species and direct human impact on the ecosystem. Dr Harper attended two HELP meetings to present details of these two basins: the first in Johannesburg ('Lessons from the Southern Hemisphere', November 2007); and the second Annecy ('International Workshop on Wetlands', January 2008).

G-WADI (Contact: Mike Edmunds)
UNESCO's programme for Water and Development Information for Arid Lands – a Global Network (G-WADI) has now been running for three years. The strategic objective of G-WADI is to strengthen the global capacity to manage the water resources of arid and semi-arid areas. While core funding has been provided by UNESCO, and substantial support has been provided by individuals, institutions and governments, this work has been facilitated and enhanced by grants from DFID, through HE the Ambassador to UNESCO, for the last 2 years. Principal achievements may be summarized as:

Web site. A web site has been developed with help from University of Arizona's NSF-funded SAHRA initiative. This is the main platform for dissemination and includes a global water News Watch in many languages, information resources, and the home for G-WADI network projects. The site also provides access to software and software libraries. **www.g-wadi.org**

Global rainfall data. Limitations of data are a major constraint for arid areas. G-WADI is promoting access to remotely sensed global data products, including near real-time rainfall distributions from University of California's PERSIANN system.

Hydrological modelling. At a workshop was in Roorkee, India, in 2005 world experts addressed the need for models to support water management in arid and semi arid areas and provided training to professionals from major arid regions of the world. Training material was provided through the web site, a book is in press, and software is available.

Chemical and isotopic tracers. Environmental tracers can be used to better understand water origins and movement, groundwater residence times, groundwater recharge, salinity and pollution. A workshop in Oxford in 2005 provided guidance on best practice; case studies are available through the web-site.

Water Harvesting. A workshop held in Aleppo, Syria in 2006 brought together experts from several countries (including India, Pakistan, Iran, Yemen, Syria) with long histories of traditional techniques of rainwater conservation, as well as International agencies. NGOs from India who are pioneering bottom up water harvesting schemes were also represented. This was probably the first time that experience had been shared across this region. Material will be available through the web-site and a series of regional training events is planned.

Groundwater modelling. A workshop was organized in Lanzhou, China, in June 2007 to review state of the art techniques for modelling groundwater. This was attended by global experts, who provided training to participants from 22 countries. The workshop aimed to further stimulate the G-WADI Asian network.

Development of regional networks and local collaboration. One of the prime achievements over the three years has been to stimulate networking across a number of regional (UNESCO) centres. Thus, the Roorkee workshop was a catalyst to setting up an Asian regional grouping (including India, Pakistan, Iran, China and the Central Asian republics), which has now established its own programme of activity, including training workshops and the sharing of data and local management experience.

ISI (Contact: Des Walling)
Des Walling is a member of the ISI Steering Committee and is actively involved in several ongoing ISI activities. No formal meetings of the ISI Steering Committee were held in 2007, but a meeting of part of the Committee will be held in Berne, Switzerland in April 2008 and a full Committee meeting is scheduled to be held in China in November 2008. A number of Training Workshops in Asia and Latin America are also being planned for 2008 and 2009.

Meetings held under the auspices of ISI during 2006-08 include:

- The 1st International Sediment Initiative Conference and Steering Committee meeting, Khartoum, Sudan, November, 2006.

- An International Conference on Erosion and Torrent Control as a Factor in Sustainable River Basin Management, Belgrade, Serbia, September, 2007.

- Training Workshops in Argentina and Mexico

Good Progress is being made with the River Basin Case Studies and it is hoped that several of these will be published in the near future. ISI is also currently involved in contributing to the UN World Water Assessment Program and the 3rd Edition of the World Water Development Report.

Ecohydrology (Contact: David M Harper)
Dr Harper has been working with local communities in the area of Lake Naivasha (Kenya) - an IHP Ecohydrology Demonstration Site - to restore riparian vegetation to mitigate high sediment input. Between 2006-7 he chaired the Task Force on Demonstration Sites, which met in Brazil (Parana river site) in December 2007. Dr Harper is also coming to the end of a Darwin Initiative-funded project on the ecology & conservation of East African soda lakes and lesser flamingos. In November 2007, he led an expedition to the south Rift of Kenya, to investigate the Ewaso Njiro river system which forms 50% of the inflow to lake Natron, the only breeding site in East Africa for lesser flamingos and which is under threat by major proposals to build a soda ash extraction plant.

1.2 Activities at national level in the framework of the IHP

1.2.1 National/local scientific and technical meetings

The British Hydrological Society (BHS) organises many technical meetings and workshops at national and regional level in the UK, which attract contributions from both the academic (universities and research institutes) and operational sectors. Recent events have included: River restoration and naturalisation (24 Jan 2008); Climate change: scenarios, impacts and adaptation (20 Feb 2008); Urban Flood Risk (13 Mar 2008); Weather radar rainfall (19 Mar 2008); Flood Risk Issues in Northern Scotland (25 Mar 2008).

1.2.2 Participation in IHP Steering Committees/Working Groups

Prof Alan Jenkins represents the UK-IHP Committee on the UK National Commission for UNESCO Natural Sciences Committee and is member of two working groups it has set-up: WG1, Input to the UNESCO Natural Sciences Programme; and WG4, Increased Cooperation and Coordination amongst International Science Programme Chairs in the UK.

UK nominated scientists were elected to the following boards/committees of the IHP in 2006: Des Walling elected to governing board IRCTES; David M Harper was elected to governing board for ERCE; Alan Jenkins was elected to the IHP Bureau elected from Region 1.

1.2.3 Research/applied projects supported or sponsored

The EU is an increasingly important source of the funding of UK IHP activity. For example, an EU-FPVI project called WATCH (Water and Global Change) helps UK scientists contribute to FRIEND, and the EU Twinn-bas initiative facilitates activity in South America, Asia and Africa.

NERC, the Economic & Social Research Council (ESRC) and the UK Department for International Development (DFID) have joined forces to establish the "Ecosystem services & poverty alleviation" (ESPA) research programme - a multi-disciplinary research programme that addresses how to achieve sustainably managed ecosystems contributing to poverty reduction and wellbeing improvements in developing countries. Details of the programme can be found at: **http://www.nerc.ac.uk/research/programmes/espa/**

1.2.4 Collaboration with other national and international organizations/programmes

Close links are maintained by the UKCNIH to many international organizations and programmes. The UK representative on the **WMO** Commission for Hydrology , Dr Ann Calver (CEH), is a member of the UKCINH, as is the Chair (Prof. Ian Cluckie) of the UK national committee for **IAHS**. Prof. Pat Wouters has been appointed to the **Global Water Partnership** Experts Group. She recently returned from Bahrain, where meetings were held on GWP Strategy 2009-2013.

1.2.5 Other initiatives

The UK plays a leading role in **SPLASH** - the European Union Water Initiative European Research Area Network (EUWI Era-Net) - a consortium of 15 ministries, funding agencies and national research authorities from 11 European countries. SPLASH aims to improve the effectiveness of European funded research on water for development and to develop the capacity of local organizations to coordinate and communicate research activities and thus contribute to achieving the Millennium Development Goals (MDGs). Areas of potential research collaboration include water supply, sanitation, integrated water resource management including transboundary issues, water and food, environment, health, gender etc. For more details see: **http://www.splash-era.net/**

African Water (**www.africanwater.net**), another EUWI project involving the UK (CEH), aims to raise awareness in Africa and Europe of the opportunities for collaboration in research. Encouraging African involvement in research projects of EU-FPVII will hopefully benefit IHP initiatives, such as Southern African FRIEND.

1.3 Educational and training courses

1.3.1 Contribution to IHP courses
1.3.2 Organization of specific courses
1.3.3 Participation in IHP courses
See above/below

1.4 Cooperation with the UNESCO-IHE Institute for Water Education and/or other UNESCO centres

Dundee UNESCO Centre for Water Law, Science and Policy (see also 1.1.2 HELP)
The Dundee UNESCO Centre for Water Law, Science and Policy was officially launched as an IHP-HELP Centre in November 2006. The Centre aims to become a world leader in integrating law, policy and science to address water challenges of the 21st century. Academic staff include: Professor Patricia Wouters, Director; Professor Alan Werritty, Director of Research; Professor David Livingstone; Professor Mike Bonell; Dr Alistair Rieu-Clark; Andrew Allan; Dr Michael Hankte-Domas; Sarah Hendry; and Dr Tom Ball. The Centre's activities fall within three main areas:

Promoting excellence in research in water in Scotland. Professor Werritty and Dr Ball have expertise in flooding in Scotland, with projects covering Coastal Flooding, Flood Warning Benefits, and the Flood Damage Insurance Database. Professor Wouters participated with a Scottish-wide group of Higher Education Institutions working on water/development.

The Millennium Development Goals and Global Change. The Centre works on ways to assist with the realisation of the MDGs for water, both water resources and water services. Professor Wouters has been named to the Global Water Partnership Experts Group. Professor Werritty has been appointed to the UN experts' group on floods and hazards and recently attended their meeting in Seoul. Professors Wouters and Werritty attended the UNESCO Centres meeting in Delft (June 2007) and will take forward collaboration with other Centres.

The Centre also contributes to two projects under the EU Twinn-Bas initiative: "Brahmatwinn" and "STRIVER". These projects involve research in Cambodia, Vietnam, India, Norway, Spain, Portugal, South Africa, Costa Rica, Bhutan with the Dundee Centre responsible primarily for the water law aspects. Both are transboundary projects involving IWRM, and best practice in governance.

HELP Programme. See Section 1.1.2

Future Plans
The Centre should now be in a position to take forward its agenda of research excellence in all of these areas, and provide international leadership not just in the disciplinary areas but in interdisciplinary research and the integration of the best science with the development of sound policy and good legal frameworks. The Centre will be responsible for the Scottish coordination of international symposia on water security jointly with American Water Resources Association, European Water Partnership, and Global Water Partnership- Brussels in September 2008. Professor Wouters is also coordinating the Water Law input of the World Water Assessment Programme for the World Water Development Report 3. Dr Hantke-Domas Dr Hantke-Domas leads the SUEZ Research Contract which examines transparency in water services contracts; the preliminary findings from this work will be presented at the 5th World Water Forum (Istanbul, March 2009).

The Dundee HELP Centre and the IHE Delft UNESCO Centre and the UNESCO PCCP have a tri-partite agreement to implement the first collaborative graduate degree programme in Water Conflict Prevention (first intake 2008). Students will study at both Delft and Dundee

and the programme will start to run in the autumn. The Dundee Centre is currently also developing an innovative executive style LLM in Water Law to begin in January 2009**.** These programmes are of course squarely within the aims and objectives of the IHP.

1.5 Publications
No list is maintained of IHP-related publications.

1.6 Participation in international scientific meetings
1.6.1 Meetings hosted by the country
1.6.2 Participation in meetings abroad
See above

1.7 Other activities at regional level

1.7.1 Institutional relations/cooperation

The UK-IHP Committee and Turkish IHP National Committee jointly convened a **Regional Meeting of Electoral Group I** of the IHP in Istanbul on 20-21 September, 2007. The meeting attracted 28 participants from 15 countries. Minutes of the meeting can be obtained from the Secretary of the UK-IHP Committee.

1.7.2 Completed and ongoing scientific projects
See above

2. FUTURE ACTIVITIES

2.1 Activities planned until December 2009
See above. UK scientists are very much involved in preparations for "Water: A vital Resource under Stress – How Science can help.", the 8th IAHS Scientific Assembly, Hyderabad, India, 7-12 September 2009.

2.2 Activities foreseen for 2010-2011
UK scientists intend to continue their participation in various IHP initiatives, including FRIEND, HELP, ISI and G-WADI, as resources permit.

2.3 Activities envisaged in the long term
Future UK activity within the IHP will conform to UKNCIH long-term priorities: the advancement of knowledge and understanding through hydrological research; the development of tools and methods to improve the assessment and management of water resources in gauged and ungauged catchments; and the education and training of young hydrologists, both in developing countries and in the UK.