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Educational, Scientific and
Cultural Organization

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(Paris, 9 – 14 June 2008)

REPORTS OF UNESCO CATEGORY 2 WATER-RELATED CENTRES (2006-2008)

SUMMARY

The following reports of the UNESCO category 2 water-related centres 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).

The texts reproduced herewith stand exactly as submitted by the centres. The contents of the reports have not been modified and remain the sole responsibility of the respective centres.

Reports by UNESCO's Water-related Centres (category 1 and 2) on activities related to the IHP in the period July 2006 – May 2008

1. Basic information on the centre

Name of the Centre		Water Center for Arid and Semi-Arid Zones of Latin America and the Caribbean (Cazalac)
Name of Director		Guido Soto
Name and title of contact person (for cooperation)		Guido Soto, Executive Director
E-mail		gsoto@cazalac.org
Address		Benavente 980
Website		www.cazalac.org
Location of centre		city/town: La Serena country: Chile
Geographic orientation *		☐ global ☒ regional
Year of establishment		2003
Themes	Focal Areas ♦	☒ groundwater ☐ urban water ☒ arid / semi-arid zones ☐ humid tropics ☒ droughts and floods ☐ sediment transport and management ☒ water and environment ☐ ecohydrology ☒ water law and policy ☐ transboundary river basins/ aquifers ☒ IWRM ☒ global and climate change ☒ mathematical modelling ☒ social and cultural dimensions of water ☒ water education ☒ other: (please specify) Data bases on arid zones
	Scope of Activities ♦	☐ vocational training ☐ postgraduate education ☐ continuing education ☒ research ☒ institutional capacity-building ☐ advising/ consulting ☐ software development ☐ other: (please specify) _____
Support bodies [1]		Water Directorate (Chile) Regional Government of Coquimbo (Chile) University of La Serena (Chile)
Hosting organization [2]		
Sources of financial support [3]		Government of Flanders (UNESCO-Flanders Fust) Water Directorate (Chile) Gender Water Alliance - GWA (Netherlands) European Union (CAMINAR Project)
Existing networks and cooperation [4]		GWADI Network United Nations Convention to Combat Desertification - UNCCD University of Bochum (Germany)

* check on appropriate box
♦ check all that apply

[1] please specify bodies that cover the operational costs of the centre, and other essential costs such as salaries and utility bills, and that provide institutional support to ensure centre's sustainability
[2] if different from support bodies
[3] please specify sources of main budgetary and extrabudgetary funds to implement projects
[4] please write international networks, consortiums or projects that the centre is part of, or any other close links that the centre has with international organizations or programmes, which are not already mentioned above

	Ben-Gurion University and Institute for Water Sciences and Technologies (IWST), (Israel) University of Ghent (Belgium) Instituto Mexicano de Tecnología del Agua, IMTA (México) Instituto Argentino de Investigaciones de las Zonas Áridas - IADIZA Institute for Water Resources (IWR) US Army Corps of Engineers (USA). International Research Institute for Climate and Society (IRI) - University of Columbia (USA) Newcastle University (England) Postgrade College (México) Central Universtity of Venezuela National Experimental University "Francisco de Miranda", (Venezuela) National University of the Central Region of the Province of Buenos Aires (Argentina) University of Talca (Chile) Catholic University of Valparaiso (Chile) University of Chile (Chile) University of Concepción (Chile) National Copper Corporation– CODELCO (Chile) National Forestry Corporation - CONAF (Chile) Centro de Estudios Avanzados en Zonas Áridas, CEAZA (Chile)
	☒ director and governing board ☐ other: (please specify) _____ Link to election of board members to the IHP IGC and hosting country IHP National Committee _____ Frequency of meetings: once every _6_months_ ☐ Existence of UNESCO presence at meetings **Note:** Every year CAZALAC has a Steering Committee Meeting with the presence of the UNESCO Regional Hydrologist
Institutional affiliation of director	Employed
Number of staff and types of staff	total number of staff (full-time, or equivalent) : _Five_____ number of staff who are water experts: _Four_____ number of visiting scientists and postgraduate students: _Four_____
Annual turnover budget in USD	360,000

2. Activities undertaken in the framework of IHP in the period July 2006 – May 2008

2.2 Research activities that directly contributed to the IHP-VI and activities by WWAP

Please include research/applied projects outputs such as publications that directly contributed to the IHP-VI and WWAP objectives

- Map of Arid Zones of Latin America and the Caribbean (27 countries of LAC).
- CAZALAC-IWR Drought Atlas (Pilot areas in Argentina, Peru and Chile)
- Climate variability in water resources and Droughts Forecast (CAZALAC-IRI)

- Studies on vulnerability to soil erosion in arid zones.
  - PhD thesis
  - Pre-graduation student internships – Coquimbo Region. Field experimentation development and data gathering for drafting of theses
- Map of Climatic Aggressivity in LAC (on development)
- CAMINAR Project – Management of Basins with Mining Activities in Arid and Semi-arid Regions of South America.
- Project on "protection and sustainable management of the American Puna Wetlands (WETPUNA)". (Argentina, Bolivia, Chile and Peru)
- Oasification – Hydrologic Forestry Restoration. INFOR-U.Talca-CAZALAC

2.3 Training activities that directly contributed to the IHP-VI and WWAP objectives

- International Course on Applied Hydrogeology, Underground Water Management in Arid Zones (Sept. 2006).
- Course on Water and Soil Preservation in Andean Countries – COSWAND (Nov. 2006).
- IX Latin American Academy of Soils Physics – ELAFIS (Oct. 2007).
- Course-Workshop on the use of bioindicators in fresh water systems for the Caribbean (March, 2007). Co-organized with HELP
- International Meeting on Erosion and Sedimentation for Managers, Decision-makers, Technicians, and Communicators (October, 2007)
- Course-Workshop Blue Planet . Mar del Plata, Argentina (November, 2007)

3 Collaboration and linkages

3.2 Participation in major international networks, programmes, partnerships with other UN or other International Agencies, media and professional bodies

3.3 Participation in meetings related to the IHP and UNESCO (e.g., the UNESCO General Conference, the UNESCO Executive Board, the IHP Intergovernmental Council and/or other meetings organized by IHP)

- Water and Culture Workshops (Paraguay, Uruguay; Oct. 2006)
- UNESCO-WET Workshop (Aug. 2006).
- HELP – IRI / Climatic Variability – Cuenca Workshop (Nov. 2006)
- X Simposium of the International Hydrologic Program Chilean Committee (Oct. 2006)
- VII Regional Meeting of CONAPHIs Guatemala City (August, 2007).
- Sixth Inter-American Dialogue on Water Management. Guatemala City (August, 2007).
- UNCCD COP 8 (CAZALAC-UNCCD Agreement). (Sep. 2007)
- Workshop First Forum for Basin Management and Development in Arid and Semi-arid Zones (Córdoba, Argentina; Sep. 2007).
- Universal Forum of the Cultures. Monterrey, Mexico (Oct. 2007)
- GWADI Network Meeting. Santiago de Chile (Dec. 2007).
- International seminar on techniques for water augmentation in scarcity zones. Santiago de Chile, (Dec. 2007)
- International Conference on Fog. La Serena, Chile, (July 2007).
- Meeting to prepare the Project on "Protection and sustainable management of the American Puna Wetlands (WETPUNA)" (Oct. 2007).
- Snows and Glaciers in Arid Zones. Sixth Meeting of the Snows and Ices Work Group of the IHP-LAC and International Workshop on Geomatic Applied to the Study of Glaciers (Mexico City; May 2007)
- Workshop Water and Culture - San Lorenzo, Paraguay (March 2007).

3.5 Relationship with the UNESCO National Commission and the IHP National Committee in the country of location

- Co-Organization of the X Simposium of the International Hydrologic Program Chilean Committee (Oct. 2006)

4 Communication

4.2 Communication and knowledge dissemination activities undertaken in the framework of IHP

- Website / Electronic Newsletters / Publications
- Relational data base on LAC specialists and institutions
- Data base system for climate information on LAC
- Online publication of the Map of Arid Zones of LAC

5 Update on Centre Operations

5.2 Membership of the Board of Governors during designated period

President of Board:
Mr. Ricardo Cifuentes L., Regional Intendant.
Vice-President:
Mr. Rodrigo Weisner L., General Water Directorate
Secretary and financy areas:
Mr. Nibaldo Avilés P., Rector University of La Serena.
Directors:
Mr. Jorge Allende Rivera, University of Chile,
Mr. Manuel Cerda G., Catholic University of Valparaiso.
Mr. Roberto Pizarro T., University of Talca.
Mr. Jose Vargas Baecheler., University of Concepcion.

6 Annexes

6.2 List of publications released by the centre (there can be overlap with those listed in 2.2 above)

- Preliminary Report Data Preparation for the regional Aridity Map; Koen Verbist, Guido Soto, Manuel Soto, Fernando Santibáñez, Donal Gabriels; (2005)
- Evaluation of the infiltration process in water Harvesting systems in drylands of Chile; Marjolein DE WEIRDT; D. Gabriels; (2005)
- Evaluation of water erosion risks in drylands of Chile; Arne BAERT; Donald Gabriels; (2005)
- Evaluación de parámetros y procesos hidrológicos en el suelo. Compendio de trabajos presentados en la VII Escuela Latinoamericana de Física de Suelos.; Gabriels, Donald; Lobo, Deyanira; Soto, Guido (Editores); Programa Hidrológico Internacional PHI UNESCO (Editor); (2005)
- Evaluation of infiltration furrows for the captation of runoff water in a semiarid region in Chile; Katrijn Alaerts; D.Gabriels; W. Cornelis; (2006)
- Estimation of sediment transport in a watershed in an arid region of north Chile; Bram Vandekerckhove; D. Gabriels; W. Cornelis; (2006)
- Estimación de Parámetros de Erosión en Zonas Áridas de la IV Región Utilizando un Simulador de Lluvia; F. Nuñez; E. González; K. Verbist; (2006)
- Assessment of climate indices in drylands of Colombia; F. Neira; D. Gabriels; W. Cornelis; (2006)
- The effect of rock fragments on hydrophysical properties of a small watershed in north Chile; J Baetens; D. Gabriels; W. Cornelis; (2006)

- Estudio Aplicacion de Metodologias para determinar la eficiencia de uso del recurso hídrico. Estudio de caso en la Region de Coquimbo. (Informe final) .CAZALAC, Direccion General de Aguas (2006)
- Caracterización del proceso precipitación-escorrentía sólida utilizando un simulador de lluvia; Lagos, E.; Pizarro, R.; (2007)
- Sacle dependent influence of rock fragment cover on soil infiltration, runoff and sediment yield in arid zones of Chile; L. Loosvelt; D. Gbariels; W. Cornelis; (2007)
- Zonación de los regímenes hídricos de América latina y el Caribe desde una perspectiva climática; Programa Hidrológico Internacional de la UNESCO para América Latina y el Caribe, PHI-LAC:(Editor); Soto, Guido: Coordinador del proyecto (autor informe); Gabriels, Donald: Contraparte científica gobierno de Flandes (autor informe); Donoso, Mª Concepción: Hidróloga regional PHI- UNESCO; Santibáñez, Fernando: Responsable científico (autor informe); Verbist, Koen: Coordinador científico (autor informe); (2007)
- Zonation of water regimens in Latin America and the Caribbean from a climatic point of view, focusing on vulnerable areas ; Programa Hidrológico Internacional de la UNESCO para América Latina y el Caribe, PHI- LAC:(Editor); Soto, Guido: Coordinador del proyecto (autor informe); Gabriels, Donald: Contraparte científica gobierno de Flandes (autor informe); Donoso, Mª Concepción: Hidróloga regional PHI- UNESCO; Santibáñez, Fernando: Responsable científico (autor informe); Verbist, Koen: Coordinador científico (autor informe); (2007)

Government of Chile – UNESCO/Flanders Agreement:

ACTIVITY REPORT FOR THE PERIOD JULY 2006 – MARCH 2008 FROM THE WATER CENTER FOR ARID AND SEMI-ARID ZONES OF LATIN AMERICA AND THE CARIBBEAN (CAZALAC)

INTRODUCTION

The Water Center has been conceived as an organization responsible for coordinating /articulating scientific- and technologic actions aimed at the sustainable management of water resources in arid, semi-arid and subhumid zones of Latin America and the Caribbean.

CAZALAC is currently working on 5 specific action lines. Such medium- and short-term strategic lines are:

- Water resources assessment;
- Efficient water development;
- Water management models;
- Environmental aspects, and
- Economic and social aspects.

In addition to such strategic action lines, the Center performs the following roles and tasks:

- Becoming a specialized dissemination Center.
- Being a node with other specialized centers.
- Being a database regional center.
- Becoming a center for cooperation and catalization of international programs of UNESCO; namely HELP, the Millenium Ecosystem Assessment, FRIENDS, WWAP, and international conventions on environment and development.
- Promoting the establishment of a strong link between the Center and the focal points of the IHP National Committees of the Region, so that they can achieve their objectives more effectively and efficiently.

General Objective:

- Strengthen the technical, social, and educational development of the Region through improved water resources development and management in the arid and semi-arid zones of Latin America and the Caribbean, and broaden the role of the communities in the development of a water culture through the establishment of an activity-, project- and program regional coordination center.

Specific objectives:

- Foster scientific research in water-related matters and issues of arid- and semi-arid zone management in Latin America and the Caribbean.

- Promote closer contacts among the researchers who work in the realm of water resources of the Region.

- Disseminate the outcomes of the research activities pursued in connection with water resources in the Region's arid and semi-arid zones.

- Provide education and training on sound management of water resources and foster better regional researchers' capacities.

TECHNICAL TEAM:

The Center team includes:

- Three regular staff members (an Executive Director, an Engineer responsible for the Technical Areas, and an Administrative Secretary). As provided in the agreement, another professional is yet to be integrated (because of insufficient budgetary resources); the integration will take place in April, 2008.
- Two professionals for special projects (a Belgian engineer doing his Doctorate thesis, and a part-time engineer financed by a project of the European Union.
- Other professionals connected with projects developed by the Center are:

    - Donald Gabriels, University of Ghent, Belgium
    - Koen Verbist, University of Ghent, Belgium
    - Damaris Orphanopoulos, MSc, Civil Eng. Rhodos Consultants.
    - Deyanira Lobo L., Dr. in Agricultural Sciences, Central University of Venezuela
    - Edmundo González, Civil Eng., University of La Serena
    - James Wallis, IWR Consultant, Yale Univ, United States.
    - Jason Giovannettone. Civil Eng, , IWR Consultant
    - Manuel Cerda G, Civil Eng, Academic School of Engineering, Catholic University of Valparaiso.
    - Ricardo Oyarzún L., Dr. in Hydrology, University of La Serena.
    - Roberto Pizarro T., Dr. in Hydrology, University of Talca.
    - Walter Baethgen. Agricultural Eng. IRI, Columbia University, United States.
    - Wilfredo Alfaro C., MSc,, Forestal Engineer, National Forestal Corporation, Chile.
    - Viviana Jofré. Civil Eng, (E), University of La Serena

FOUNDING INSTITUTIONS

Government of Chile:

- General Waters Directorate
- Regional Government of Coquimbo
- University of La Serena

CENTER PARTNER INSTITUTIONS

- University of Talca
- Catholic University of Valparaiso
- University of Chile
- University of Concepción

INTERNATIONAL SUPPORT

- UNESCO-IHP
- Government of Flanders (Belgium)

Agreements signed with:

- University of Ghent, Flanders, Belgium.
- University of Bochum, Germany.
- Gender Water Alliance (GWA)
- Newcastle University, England
- Ben-Gurion University and Institute for Water Sciences and Technologies (IWST), Israel
- National Experimental University “Francisco de Miranda”, Venezuela.
- National University of the Central Region of the Province of Buenos Aires, Argentina.
- Postgrade College, Mexico.
- Instituto Argentino of Investigaciones de las Zonas Áridas-IADIZA
- International Research Institute for Climate and Society (IRI), University of Columbia
- Institute for Water Resources (IWR) US Army Corps of Engineers.
- Valparaiso Catholic University, Chile
- United Nations Convention to Combat Desertification (UNCCD)
- National Copper Corporation, Chile – CODELCO (being developed)
- National Forestal Corporation, Chile - CONAF (being developed)

ACTIVITY REPORT

RESEARCH

• Map of Arid Zones of Latin America and the Caribbean

CAZALAC has a regional version of the map. However, a process of adjustment of the national maps was launched in January 2007, as requested by the project's participating countries. The April, 2007 coordination meeting was followed by activities aimed at improving the national versions. This effort was conducted through planning of workshop development activities involving institutions and experts from each country, so as to prepare a consensus final version.

Brazil - Workshop on Arid Areas Map (May 22- 23)

The first national workshop was held, on the map of Brazil's arid and semi-arid zones, in order that the institutions connected with water resources, meteorology and natural resources got to know the first map developed by CAZALAC.

It was agreed that the Water Resources Secretariat coordinated its actions with the other institutions to complete the meteorological information needed to supplement the meteorological information in existence for some areas, and finally produce the definitive version of the Brazil map during a second workshop that would take place at a date pending determination.

Workshop on a National Arid Areas Map of Mexico

The workshop was developed in the Mexican Institute of Water Technology – IMTA Mexico, October 9-10, 2007.

Workshop participants included representatives of CAZALAC, specialists and representatives of Mexican institutions connected with water resource management in arid zones. Its objective consisted of effecting corrections and validating the first version of the arid-zones map developed for Mexico in consensus with the specialists and representatives of information-using institutions.

The introduction of the map and its progress was followed by a demonstration of the operation of the CIRH program, so as to define agro-climatic indicators and finally agree on the procedures to be followed for the completion of the final version of the map.

Workshop on National Maps of Arid Zones in the Caribbean

An evaluation workshop for the national maps of the Caribbean took place in the Bahamas on 16th and 17th October, with the participation of the Regional Hydrologist, Dr. María Concepción Donoso, four representatives of the Bahamas, as well as representatives of Antigua and Barbuda, Barbados, Saint Lucia, and Jamaica.

The presentation of the project was followed by a training session for the participants, on use of the CIRH software for the development of agro-climatic indicators. Work was also conducted with the national representatives on the amendment of the maps of the Caribbean, by using additional climatic data and with knowledge support from the attendant experts. Results: After the ensuing information sharing period the final version of the national maps was completed.

Enlargement of the Arid Zone Map to cover the USA (joint effort with the IWR)

Under the agreement with the IWR of the US Army Corps of Engineers the first steps were taken to enlarge the arid, semi-arid and subhumid zones to cover the US territory, by expanding the methodology used in Latin America and the Caribbean. With the tutoring of Koen Verbist, Diplomated Civil Engineer, Pilar Rojo Castillo (ULS) collected and systematized the (freely accessible) information on over 5000 climate stations for the USA. The data are being analyzed, and the calculations developed on the aridity indexes with the CIRH software developed by UChile/CAZALAC for such purposes. A first preliminary version of the map for the United States is expected by mid-2008.
As an additional result, the registries of the United States stations will be made available in the CAZALAC web site.

- **CAZALAC-IWR Drought Atlas**

This project is a supplementary work line of the LAC arid zone project largely using the data developed for the previous project. However, the deliverable is another product that can be used to improve the secano lands in arid zones of the participant countries –in principle, Chile, Argentina, and Peru. The purpose is to extend this project to all LAC countries with drought-affected zones, once the first experiences and products are available.

This activity is a joint effort with the Institute for Water Resources (IWR) of the US Army Corps of Engineers, with which an agreement was signed by CAZALAC in 2006. Involved in the activity are an IWR professional and a Yale professor, Dr. James Wallis, who was a member of the group of experts who developed the US Drought Atlas: (http://workshop.iwr.usace.army.mil/iwr/atlas/Atlasintro.htm). Both experts were specially retained by the IWR for this initiative.

The project goal consists of analyzing precipitation data from the countries involved and developing a statistic analysis for three pilot zones of Argentina, Peru, and Chile, so as to find answers to questions such as:
How frequent are drought episodes?
What is the probability that the current drought ends in X months?
How persistent will be the drought for which we must prepare?
What is the frequency of the maximum-intensity drought observed?

The answers to such questions are an input for planning and laying the basis for a decision-making system on the drought issue.

A training workshop is being planned and would take place in Santiago (March 25-26). The methodology-training workshop participant researchers are:
Argentina: Cristina Moyano, Meteorologist, National Water Institute; Raúl Díaz, Hydrologist, National Water Institute.
Peru: Julia Ignacia Acuña Azarte, National Service for Meteorology and Hydrology, SENAMHI; Oscar Gustavo Felipe Obando, National Service for Meteorology and Hydrology, SENAMHI.
Chile: Alejandro León, University of Chile; Paula Uribe, Meteorological Service; Representative of the Waters General Directorate.
CAZALAC representatives.

- **Climate variability in water resources (NASA, IRI)**

Thanks to the cooperation of UNESCO IHP-LAC, contact was established with the International Research Institute (IRI) of Columbia University, New York, United States, in order to develop a research project on extreme events (droughts/floods) and climate variability forecasting for the Coquimbo Region. This initiative, which has important projections, is led by Engineer Koen Verbist, of Ghent University, seconded to CAZALAC.

The work being developed focuses on statistic evaluation of the link between the ENSO phenomenon and the precipitations in the Coquimbo Region. Such link, in turn, affects the water volumes. An assessment is being done on the efficiency of models using statistic downscaling techniques for the Climatic Global Climatic Models (GCM), to forecast droughts and water volumes in the Region. The preliminary results show that the Coquimbo Region droughts and water volumes are to some extent predictable in the medium range (3-6 months) if ENSO information is included, and that the statistic models could be the basis for a drought early warning system in such region.

A workshop is scheduled for March, 2008, to include other national institutions active in the areas of volume-forecasting and reservoirs management, impacts on irrigation zones, and drought early warning systems for the secano area.

Other activities performed follow:

Training Course in Statistical Downscaling of Climatic Forecasting Models GSA

In the context of this project four professionals paid a one-month visit to the United States to be trained in the IRI on models of downscaling of climatic forecasting (May 19-June 19). The professionals belong to CAZALAC, the University of La Serena, CEAZA, and the Choapa River Surveillance Council.

Development of a Drought Early Warning System in the IV Region of Coquimbo

During 2007 a study was performed on the feasibility of using the statistical downscaling techniques for drought forecasting and to lay the basis for the implementation of an early warning system. With the help of the DGA Waters Bank the region's data base for 44 climatic stations was developed, including daily data for the 1930-2007 period. Such data were used to build a climate forecasting model for the zone, including world climatic data. The study was performed by Diplomated Civil Engineer Viviana Jofré (ULS), tutored by Koen Verbist

Koen Verbist also made several presentations on the same issue, including those delivered in the:
I. "International Seminar on Climatic Change and its Effects on the Agricultural Production", La Serena, October 2-3, 2007.
II. "Seminar – Irrigation Act and Sustainability of the Resource Water for a Region that is Positioning itself as an Agrifood Power", Ovalle, December, 2007
III. "International Conference on Desertification", Ghent, Belgium, January 23, 2008.

- **Studies on vulnerability to soil erosion in arid zones.**

The main objective of this study series is to ascertain the behavior of the arid- and semi-arid soils faced with extreme precipitation events, identifying the zones more susceptible to erosion, establish the behavior of humidity in the soils and assess the socioeconomic effect of the establishment of soil-conservation techniques. The development of maps for the various sectors studied is also being considered.

With the support of CAZALAC and the University of Ghent, a Belgian candidate to Doctorate has performed a series of research activities, data gathering and registration on edaphic and hydrologic parameters of the soils of the region of Coquimbo (Chile). Pre- and post-Doctorate students have also developed studies on erosion-risk evaluation in the zone.

Since 2005 surface runoff-measurements and subsurface soil humidity measurements are being performed in order to implement models on water behavior on hillsides without plant coverage, in soils of the IV Region.

The main activities being developed in the framework of this study series include:

- Development of controlled field tests using a rain simulator built and operated in CAZALAC
- Measurement of the various physical and chemical soil parameters and monitoring of the dynamics of their state variables all along the experimentation period.
- Simulation-model generation to forecast the effect of land use in the degradation of the water, soil, and vegetation natural resources.
- Formulation of recommendations and indications from the results of the experiences gathered.
- Implementation of a demonstration area for course- and workshop implementation for professionals, producers, and students.

Numerous pre- and post grade student theses have already been developed under the tutorship of Professor Dr. Eng. D. Gabriels and the responsibility of Eng. Koen Verbist. The following ones can be highlighted:

- Evaluation of the infiltration process in water harvesting systems in dry lands of Chile. Marjolein DE WEIRDT; D. Gabriels - (2005)
- Evaluation of water erosion risks in dry lands of Chile. Arne BAERT; Donald Gabriels - (2005)
- Estimation of sediment transport in a watershed in an arid region of Northern Chile. Bram Vandekerckhove; D. Gabriels; W. Cornelis - (2006)
- Evaluation of infiltration furrows for runoff water catchment in a semi-arid region in Chile. Katrijn Alaerts; D.Gabriels; W. Cornelis - (2006)
- Characterization of the precipitation-solid runoff process through a rain simulator. Lagos, E.; Pizarro, R. (2007)
- Scale-dependent influence of rock fragment cover on soil infiltration, runoff and sediment yield in arid zones of Chile. L. Loosvelt; D. Gabriels; W. Cornelis -(2007)

- **Pre-graduation student internships – Coquimbo Region. Field experimentation development and data gathering for drafting of theses**

  The Center hosted the pre-graduation internship activities (August, September, and October, 2007) to develop grade theses on the issues of soil erodability in the Coquimbo Region, and study the variables and parameters governing soil-humidity exchanges.

  The framework of this activity is a series of research efforts on semi-arid soil degradation, and evaluation of water- and soil catching techniques to combat desertification that have been developed during the last few years, which will be included in the Doctorate curriculum of Koen Verbist in the Ghent University.

Participant Students, 2007:
Pre-graduation students or graduated participants:
Rodrigo Carvajal Ortíz - University of La Serena – Ovalle, Chile
Isella Tello - University of La Serena – Ovalle, Chile
Victor Fredes Aredondo - University of La Serena – Ovalle, Chile
Eva Gheselle - University of Ghent – Ghent, Belgium
Sabine Torfs - University of Ghent – Ghent, Belgium

Expected Results:
The measurement results are being processed to be presented as theses during the April-September, 2008 period. The results will also be published in a scientific journal by end-2008.

- **Map of Climatic Aggresivity**

This activity was not performed in 2007, since completion of arid-zone national maps was given priority to the start of new projects in the framework of the map project. This has led to a proposal for the postponing of this activity. The latter would be implemented in 2008 as a joint effort with the University of Ghent, which has the relevant experience in ascertaining climatic aggresivity for Europe.

RESEARCH NOT CONNECTED WITH THE UNESCO/FLANDERS FUND

• CAMINAR Project – Management of Basins with Mining Activities in Arid and Semi-arid Regions of South America.

A three-year project financed by the European Economic Community, with an approved amount of €1.799.645. Its general objective is to help establish policies, management strategies and technologies for sustainable management of the ecosystems of those hydrographic basins of the arid and semi-arid zones of South America that are vulnerable to the impact of mining activities.

Participants:

- University of Newcastle; England (project leader)
- University of Oviedo; Spain.
- Higher Technical Institute; Portugal.
- National University of San Agustín, Arequipa; Peru.
- LABOR Civil Association; Peru.
- Center for Ecological and Integral Development Studies (Bolivia) – CEEDI
- CAZALAC; Chile.
- University of La Serena; Chile.
- CEAZA; Chile.
- Water Management Consultants; Chile.

CAZALAC participates in the general coordination of the Chile Group, the international relations of the project with foreign agencies, the definition of the information sharing strategy, and its implementation through electronic media (Bulletin, Web page) and papers. The in-country project participants are Water Management Consultants and the Center for Advanced Studies in Arid Zones– CEAZA, and the Department of Mining Engineering of the University of La Serena (ULS).

The Basin to be assessed in Chile is that of the Elqui River, in the Coquimbo Region, with an area of 9,422 km2.

Main activities in Chile in 2007:

Information gathering

Environmental sampling drives, particularly focused on the effects of the mining activities

Inclusion of the biological components as indicators of water quality.

Participation activities of the key stakeholders of the basin.

Support for the development of two pre-graduation thesis on issues connected with the project

Cooperation in the development of a decision-support system.

Launching of the CAMINAR-UE Project

Development of the first dissemination workshop for the project named CAMINAR – “Elqui Basin Case”, “Updating and Socialization of the oriented to Basin Management-oriented Information on Elqui”, La Serena, July 13, 2007.

The Project and its goals were introduced during the workshop. The workshop was also an instance for public agencies, representatives of the Legislative Power, private organizations and the public at large to externalize their vision on the issue being considered and elicit recommendations and orientations for the work to be developed during the project period.

The workshop was attended by over 50 relevant protagonists, congressmen, regional ministries’ secretaries, and other representatives of public and governmental agencies, representatives of mining companies and other production business firms, universities, research centers, surveillance councils, academic consultants, and students.

First National Workshop on the CAMINAR-UE Project

The main objective of the national workshop was to make the project known by the national-scope institutions and organizations and have the participants identify the leading issues of interest in the area of integral management of basin running involving mining activities. The main issues selected were those aimed at:

- Developing an integrated basin management plan by means of a broad invitation sent through the water tables, by integrating and recognizing the existing achievements.
- Collecting the information available and providing the interested parties with the existing knowledge on the natural resources of the basin.
- Enhancing the surveillance and control systems of the basin management.
- Educating and creating basin-awareness, where the decisions are interrelated at all levels.
- Gathering the basin information, where decisions are interrelated at all levels.
- Making explicit and set the basin management goals so as to coalesce the wills of the parties.
- Knowing and making known the value of the water resource and other relevant resources for purposes of transparence of the markets, or the market at large.
- Improving the legislation on integrated management of the water resource at superficial and subsoil levels.

Second Regional Workshop on the Elqui Basin and Second Meeting of the Participants' Consortium on the CAMINAR-UE Project.

During the 6th-9th November, 2007 period there took place the second meeting of the Elqui basin and the Second International Meeting of the Group of the member institutions of the project executing consortium.

The objective of such activities was to review the Project progress, coordinate activities and receive ideas and contributions for the development of the activities remaining for the next 2 years.

- **Project on "protection and sustainable management of the American puna wetlands (WETPUNA)"**

Development of the proposal for the Project on "protection and sustainable management of the American puna wetlands (WETPUNA)" to be submitted for the project contest of the 7th Framework Program of the European Union, with the participation of Argentina, Bolivia, Chile, Peru, Italy, Spain, Portugal, and Belgium.

The emphasis of the study is to generate knowledge on the structure and functioning of the wetlands of the American Puna from the viewpoint of the physical system connected with the social and economic dimension. The main outcome desired is to develop a model for integral management of the American puna wetlands (Decision Support System – DSS) and develop proposals on rules and measures for better managing of such ecosystems.

- **Oasification – Hydrologic Forestal Restoration. INFOR-U.Talca-CAZALAC**

CAZALAC cooperated with the experiences developed by the University of Talca in the Project financed by the Government of Chile through CONICYT-INNOVA, named "Hydrological-Forestal Restoration and Oasification: Key tools for greater productivity of degraded soils of the Coquimbo region".

As subcontractor, CAZALAC performed a series of measurements with the rain simulator in 15 places of the secano lands in the Coquimbo Region, to supplement the data needed for the optimization of hydrologic models and the optimization of rain-catching techniques, which are the final objectives of the project. Besides, land samples were taken (soil losses) and subjected to laboratory analysis, before analyzing and processing the data obtained for later use in hydrological models.

The objectives of this work mainly include determination of the erodability of the soils of the secano lands of the Region and the comparison of measurements performed with

the rain simulator with data obtained with natural rain. Information was also gathered on infiltration in the secano land soils –a fundamental aspect in the development of these hydrological models.

Project start (CAZALAC's part): November 1, 2007; final report due on 17th January, 2008.

TRAINING COURSES

- **International Course on Applied Hydrogeology, Underground Water Management in Arid Zones**

A total of 27 Chilean students – professionals from the private and public sectors, teachers and students - who wanted to update and deepen their knowledge regarding theoretical and practical work on assessing basic hydrogeological parameters, attended this course. In addition, 15 pre-grade students of the Ruhr-University of Bochum and the Technical University of Darmstadt came from Germany.

The main purpose of this course was to develop an introduction to field methods in underground water resources and to assess the basic hydrogeological parameters required to predict underground water flows, as well as the transportation of soluble constituents.

Contents:
- Introduction to underground water systems
- Quantitative hydrogeology
- Hydrochemistry
- Underground water management
- Field practical classes

Coordinators:
- Guido Soto, CAZALAC.'s Executive Director
- Edmundo González, Teacher at University of La Serena.

Teachers:
- Prof. Dr. Stefan Wohnlich, Ruhr-University of Bochum, Germany (Hydrogeology)
- PD Dr. Frank Wisotzky, Ruhr-University of Bochum, Germany (Hydrochemistry)
- PD Dr. Steffen Bender, Ruhr-University of Bochum, Germany (Groundwater Hydraulics, Decision Support Systems)
- Prof. Dr. Ingo Sass Technical University of Darmstadt, Germany (Well Construction and Hydraulics)

- **COSWAND course**

As part of CAZALAC's 2006 programe, a course on water and soil preservation in Andean countries was developed on November 27 - 29, 2006. The course was addressed to local farmers and family members of the community of Namza, Huigra, Alausí (Ecuador).

Among the main contents imparted in the course, the following can be mentioned:
- o Formation and types of soils
- o Composition and physical and mechanical properties of soil, soil water content, soil impairment, soil protection
- o Field demonstrations: (rain simulator, rain distribution; double ring infiltration)
- o Soil fertility
- o Organic materials and comported materials
- o Irrigation and drainage management
- o Field demonstrations (Different irrigation systems, compost preparation)
- o Degradation process control and water and soil preservation
- o Field demonstrations with different plows

This course was coordinated by Dr. Donald Gabriels, from the University of Ghent, Belgium, and Pedro Cisneros, PROMAS (Water and Soil Management Program), Cuenca, Ecuador. The following teachers participated in the course: Deyanira Lobo, Universidad Central de Venezuela; Felipe Cisneros, Director of PROMAS and University of Cuenca, Ecuador; and Esteban Pacheco, PROMAS, Cuenca, Ecuador.

60 participants (farmers and their family members) belonging to the community of Namza Huigra, Alausí (Ecuador) attended the course.

- **IX ELAFIS 2007**

Support for the organization of the IX Latin American Academy of Soils Physics, in Cuenca, Ecuador (01-10 October, 2007).

Subject: "Soil physics and land- and water management in slope zones". The course took place in the premises of the Cuenca University, with the support of the PROMAS, and was delivered by Professor Felipe Cisnero, with direct cooperation from Dr. Devanira Lobo, of the Central University of Venezuela, and Dr. Donald Gabriels, of Ghent University.

The course was based on theoretical classes and a final field trip which included visits to slope-soils management experiences.

The course participants were 28 professional students from 9 different countries: 3 from Mexico, 5 from Colombia, 6 from Venezuela, 2 from Chile, 1 from Brazil, 1 from Peru, 2 from Spain, 1 from Argentina and 7 from Ecuador; as well as twelve professors from five countries: 2 from Belgium, 2 from Spain, 1 from Mexico, 2 from Venezuela and 5 from Ecuador.

• Course-Workshop on the use of bioindicators in fresh water systems for the Caribbean (N. of Pauw) 2007, Jamaica (February 28 – March 6, 2007). Co-organized with HELP

Workshop's objectives:

- Promoting the use of framework benthonic invertebrates as a common tool for water quality monitoring to make possible the comparison of the results along the region.
- Promoting information exchange and a joint effort among the researchers of the LAC region, particularly for the exchange of information among the countries on river biological monitoring.

Course professors: Mr. Daniel Buss (Brazil); and Mrs. Simone Benassi (Brazil).
Participant students: 19 professionals and students (hydrologists, hydrogeologists, environment scientists, environment monitors) from public sector agencies and nongovernmental organizations, academic institutions (University of the Western Indies, and the University of Haiti).

• International Meeting on Erosion and Sedimentation for Managers, Decision-makers, Technicians, and Communicators (October, 2007)

This meeting took place in the School of Technology, UnB, – UnB, Brasilia, on 29th and 30th October, 2007.
Objectives:

- Furthering awareness on the technical, economic, social, and environmental aspects of erosion and sedimentation in Brazil and in Latin America.
- Identification of alternatives for soil- and sediment sustainable management
- Enhancing information sharing on the meeting's issue among technicians, managers, decision-makers, and communicators, for more efficient actions in management and control of both processes.

The meeting's structure was based on 4 panels with 4-5 presentations each. The matters addressed mainly included economic and social losses from erosion and sedimentation in the various sectors (Agriculture, Energy, Transport, and Sanitation), legislation and action implementation, research and erosion- and sedimentation control. New erosion-control strategies were also introduced, such as payment for environmental services.

This activity was attended by about 160 participants, including students, academicians, environmental experts, environment managers, representatives of the Energy, Agriculture, and Transport sectors, nongovernmental organizations, etc.

- **Course-Workshop Blue Planet . Mar del Plata, Argentina (November, 2007)**

A workshop developed by the Blue Planet project (Mrs. Orit Ben Zvi and Mr. Nir Orion), from the Ben Gurion University and the National Committee of Israel of the IHP, and supported by the UNESCO-IHP-LAC and CAZALAC. It was attended by 55 participants from Argentina, Uruguay, Chile, Saint Lucia, and Mexico.

2,000 books in Spanish were printed and began to be distributed in connection with the workshop, in addition to a CD that can be downloaded for free.

The workshop considered the geologic aspect of the matter and the connection among the Earth systems. A field trip was made to Sierra of los Padres, Laguna of los Padres and Mar del Plata.

On the Blue Planet Program

The objective of the Blue Planet program is to change the educational paradigms by promoting outdoor education, teaching of sciences, and thought systems. Originally written in Hebrew, the program has been translated into Spanish and Arabic. A version in Chinese is being developed. In Israel the reach-out program has been limited by the implementation of educational rules that leave scarce margin for outdoor education.

Since Blue Planet is mainly designed for the secondary school- and Science teachers, it can supplement the Water and Education program, which is very different in scope, themes, and objectives. The issues that matter for the LAC region, such as health, waterborne diseases, water recourse integrated management, floods, droughts, social and cultural matters, are not addressed in Blue Planet.

MEETINGS AND WORKSHOPS

- **Water and Culture Workshops**

Two national workshops were developed in the cities of Montevideo, Uruguay and Asuncion, Paraguay on October 9 -10 and 12-13, 2006 within the framework of the International Hydrologic Program for Latin America and The Caribbean – IHP-LAC – of UNESCO, as part of the Water and Culture Regional Program 2006-2007 component and with the support of CAZALAC.

These workshops were aimed at presenting the IHP-LAC Water and Culture Program to the workgroups in Uruguay and Paraguay and to train them on the methodologies to develop the Water Culture Atlas in their countries.

A total of 26 people attended the workshop in both countries (14 in Montevideo and 12 in Asuncion).

In both countries, workgroups reviewed the Water Culture Project objectives, and the guidelines to select information, extending them according to their relevant needs and the individual goals of each country. In addition, the need was identified of explicitly showing the importance of obtaining a friendly interactive Water Culture Atlas by country, addressed to a wide user diversity and with diverse research and management effects. Finally, the need of extending the theoretical framework suggested by the Water Culture Project was recognized.

- **UNESCO-WET Workshop**

This workshop to select educational proposals within the Water and Education Program was developed in Jiutepec, Morelos, Mexico on August 28, 29 and 30, 2006.

Teachers and water managers from Argentina, Chile, Costa Rica, United States, Israel, Mexico, and Dominican Republic attended the workshop. Its main objective was to select the educational material proposals that will eventually be included in the General Guide for Educators of the Americas and the Caribbean of the Education and Water UNESCO/IHP-ALC – joint Project WET.

CAZALAC colaborated with the meeting development and the participation of a specialist from the General Water Directoriate Study Department, Chile.

- **HELP – IRI / Climatic Variability – Cuenca Workshop**

Efforts to include the Elqui Basin in UNESCO's HELP Program were begun in 2006. A workshop was developed on November 27-28 with the purpose of analyzing possible colaboration areas with the several institutions and organizations related to the Elqui

basin.

This activity was coordinated by CAZALAC and was attended by the experts Mrs. Pilar Cornejo, Coordinator of the HELP Program for Latin America and The Caribbean; and representatives from the International Research Institute for Climate and Society (IRI), of the University of Columbia, Nueva York, Dr Walter E. Baethgen, Research Scientist, Director, Latin America and Caribbean Regional Program; Dr Casey Brown, Associate Research Scientist, Water Resources; and Dr Francisco de Assis de Souza (Assis), Visiting Research Scientist, Hydrology and Water Resources; in addition to the participation of regional and local institutions related to the use of the basin's water resources.

Activities developed included a field trip to the medium and low sector of the Elqui Basin and a meeting with local representatives related to the use of the basin's watrer resources, among others: the General Water Directoriate, the Hydraulic Works Office, the National Environmental Commission, the Elqui River Surveillance Board, the National Irrigation Commission and CEAZA-U.Serena.

As a result of the workshop, the following main collaboration issues were agreed upon:

- Weather Information. Development of forecasting and analyzing models.
- Water management decision making.
- Agriculture under dry conditions

Main agreements:

- Start actions to implement an institutional coordination system in the Elqui basin, on GIRH.

  In conformance with the actions priorly taken by the General Water Directoriate to create a Board of Directors for the Elqui basin, on GIRH, it was agreed that any initiatives to be implemented from now on will be included within this action framework in order to involve all the actors who are interested in participating.

  This purpose is also aimed at starting a process to include the Elqui Basin in UNESCO's HELP Program.

  The action framework to be defined shall include the following:
  - Objectives
  - Components / participating Institutions
  - Roles
  - Guidelines / Work projection along time

  In this respect, the Public Works Ministry has a previous study prepared in the year 2000, on a Water Resources Management Program agreed with the World Bank through an advice requested by the Hydraulic Works Office, which was aimed at identifying any problems and limitations that the current institucional regulations represent for water management and preparing an institutional

coordination and integration proposal that will make it possible to improve water management in the basins of the Elqui, Mataquito and Itata rivers. The operation of this program was interrupted in late 2000.

Carlos Galleguillos, Regional Director of the General Water Directoriate, expressed that this institution desires to continue colaborating with this issue.

o Cooperation areas proposed by the IRI

- Weather information, weather forecasts, historical analysis and water resources decision making

Internship in the IRI. In conformance with information forwarded by W. Baethgen the following was agreed upon:
- To accept Dr. Baethgen's proposal to start taking steps to visit the IRI regarding the "downscaling" issue, in the same period that delegates from The Caribbean will visit the place (April 16 – May 11, 2007).
- Possible delegates from Chile: 1 - 3 people to be confirmed, depending on the available funds. Edmundo González, Orlando Astudillo have applied for the trip, and a third individual is considered.
Financing: In the meeting, it was reported that the following is available:
- Tickets for one attendant (financed by University of La Serena) and one month lodging for one person (funded by CAZALAC (US$ 3,000).
Additional sources will continue to be searched for, so that three people can travel.
Historical data. Participants report that the following information is available.
- Flow and temperature data.
- Data on the droughts occurred in 1983, 1991 and 1996.
- Degree report on Climatic Change and Catastrophic Events (floods): Analysis of actions in these extreme events:

o Agriculture in dry conditions.

It is agreed upon that this activity will be coordinated by Ricardo Oyarzun from the CEAZA, in addition to a professional from the INIA (Raul Meneses?), for which purpose the INIA Regional Director must be contacted. Raquel Oyarzun or Guido Soto are in charge of establishing this contact.
In addition, it is suggested that the dry condition should be analized through a degree report prepared by at least two students, one to deal with natural resources (water, soil, vegetation) and the other with the social-economic area (business administrator?). As was discussed in previous meetings, the main issue is to assess the damages caused by droughts in dry territories in the region of Coquimbo, analyze the government's social assistance actions and the chances of implementing an insurance for families that are vulnerable to droughts occurring in the dry territory.

The IRI offers the chance to obtain satellite historic data on soil water content and vegetation productivity. (for example, on the droughts occured in 1983, 1991 and 1996)

- **X Simposium of the International Hydrologic Program Chilean Committee.**

The X Simposium of the International Hydrologic Program Chilean Committee was carried out on October 26 and 27, 2006 in the University of Talca, Santiago office. CAZALAC was in charge of coordinating the preparation of this simposium in colaboration with the several institutions that form up the IHP Nacional Committe in Chile.

The core element of this X Simposium was the issue: “Water in Arid and Semi-Arid Zones: Anticipating the Crisis”.

The X Simposium had the following objectives:

- Increase awareness of the importance of water resources for the development of arid and semi-arid zones in the country, both in the scientific world and in the national community.
- Propose innovative action strategies to improve water manegement in arid and semi-arid zones.

The event was developed through 5 discussion pannels, plus a debate, where outstanding professionals, politicians and teachers participated, who, from their perspective, contributed with their visions and experiences regarding different issues.

Pannel 1: Agriculture in arid zones: Innovations to optimize the use of water resources
Pannel 2: The experience of the mining industry in Chile: Facing new challenges on water use
Pannel 3: Water utilities and water sustainability regarding the population’s future water requirements
Pannel 4: Technological research and innovation: The scientific drive to reverse shortage.
Pannel 5: Key elements for an integrated water management in arid and semi-arid zones
Debate: Economic growth and water resources in Chile

Four institutions related to the activities of the IHP in Chile were in charge of the event organization:

- International Hydrologic Program Chilean Committee, CONAPHI-Chile.
- Water Center for Arid and Semi-Arid Zones in LAC
- University of Talca
- General Water Directoriate

A total of 92 participants belonging to the public sector (DGA, DOH, SISS, CNR, CONAF, INIA, SAG, FONDEF), universities, private sector (surveillance unions, mining

companies, water utilities, consultants), and renown politicians linked to water management in arid zones attended the X Simposium.

The 2006 IHP National Committee – Chile awards were granted in the event, to recognize the contribution made by specialists and institutions due to their commitment to the environment in the 2005-2006 period.

- CONAPHI-Chile 2006 Award, Outstanding Scientist: Dr. Eduardo Holzapfel, Teacher at the University of Concepcion.
- CONAPHI-Chile 2006 Award, Outstanding Medium: Radio Bio-Bío.
- CONAPHI-Chile 2006 Award, Outstanding Politician: Senator Mr. Eduardo Frei Ruiz-Tagle, President of the Senate.

- **VII Regional Meeting of CONAPHIs Guatemala City (August, 2007).**

CAZALAC participated in the en la VII Meeting of National Committees and Focal Points of the UNESCO International Hydrologic Programme (IHP) for Latin America and the Caribbean, which took place in Guatemala City during 12-17 August, 2007.

As a Category II Regional Center under the auspices of UNESCO, CAZALAC had the opportunity to report on the activities performed during the 2006-2007 biennium, the activities programmed for the 2008-2009 biennium, and the presentation of the implementation, on the Mapserver platform, of the first version of the Map of Arid and Semi-arid Zones of Latin America and the Caribbean, in the Center's website.

A point to be highlighted is the great importance given by the country representatives to this project, particularly as regards the implementation of the first version of the Map of Arid and Semi-arid Zones of Latin America and the Caribbean, in the Center's website.

New opportunities were also identified for using the Mapserver platform implemented in the CAZALAC server, The platform will enable the various IHP-LAC programs to display information on the map about their respective projects (such as those for transboundary aquifers, and glacier location)

- **Sixth Inter-American Dialogue on Water Management**

This meeting, held in Guatemala City during the August 12-17, 2007 period, was organized by the OAS-connected Inter-American Water Resources Network. The UNESCO IHP-LAC and CAZALAC were among the organizations that provided cooperation.

In such context, CAZALAC participated in the

-Thematic Group 2: Water, the Environment and Climatic Change, Thematic Session TP-2: Water Resources Management in Arid and Semi-arid Zones, with the Executive

Director, Guido Soto, participating as a panelist with the presentation on “Integral Management of Water Resources in Arid and Semi-arid Zones and the Fight against Desertification”.

-Thematic Group 2: Sustainable Uses of Water: infrastructure, technology, and services. Thematic Session TP4-3: Appropriate technologies and alternate sources in scarcity regions, with the Executive Director participating as a Moderator, and the representative of the Technical Area of CAZALAC, Manuel Soto B., as a panelist, with the presentation on “Appropriate technologies and alternate supply sources in scarcity regions”.

- **UNCCD COP 8 (CAZALAC-UNCCD Agreement)**

CAZALAC participated in the eighth session of the Conference of the Parties of the United Nations Convention to Combat Desertification (COP 8), held in Madrid, Spain, from 3rd to 14th September, 2007.

The UNCCD-CAZALAC agreement was signed on 7th September, 2007. The UNCCD was represented by the Official in Charge of the Convention, Mr. Grégorie de Kalbermatten, and CAZALAC was represented by its Executive Director, Guido Soto. Participants in the ceremony included Messrs Luis Molinas, Focal Point of Paraguay and President of GRULAC for LAC; the Focal Point of Saint Lucia, representing the countries of the Caribbean; Mr. Wilfredo Alfaro, Focal Point of Chile and Pro-Tempore President of the Puna Americana Project; delegates of the National Forestal Corporation and the Agriculture and Livestock Service of Chile, and the UNCCD Officials Messrs. Sergio Zelaya, Heitor Matallo, and Richard Cox.

CAZALAC participated in two GRULAC meeting where information was provided on the agreement signed with the UNCCD, with the idea of developing a work plan and establishing closer relationships between the Focal Points of the Convention, and the IHP in each country. The first action lines were also established for the development of a proposal to be submitted to the European Union.

- **International Training Workshop on Groundwater Modeling in Arid and semi-Arid Areas. G-Wadi 2007 June, Lanzhou, China**

Engineer Ana María Gangas, Head, Modeling Area, Research Department of the DGA, participated in the “International Training Workshop on Groundwater Modeling in Arid and semi-arid Areas” held in June, 2007, in Lanzhou, China.

In such event, Mrs. Gangas made a presentation on Groundwater modeling and comprehensive modeling of the water resources in Chile. Cases of application in arid and semi-arid regions, and showed the Chilean experience in modeling of aquifer behavior in the arid region of Chile.

CAZALAC's contribution was limited to efforts to include a LAC participant in this activity so that the activities on this issue become known in the LAC Region. Engineer Gangas has been nominated as GWadi coordinator for LAC.

- **Workshop First Forum for Basin Management and Development in Arid and Semi-arid Zones (Córdoba, Argentina 6th-7th September).**

Participation in the "First Forum for Basin Management and Development in Arid and Semi-arid Zones", designed to establish a space for discussion, exchanges, and integration to analyze and discuss water management experiences on issues connected with Lakes Management, Water Quality, Wetlands, Biodiversity, Water Pollution, Monitoring and Sanitation.

The issues of mining impacts in arid and semi-arid basins were addressed by a representative of CAZALAC (Dr. Ricardo Oyarzún / ULS), who introduced the CAMINAR program (Catchment Management and Mining Impacts in Arid and Semi-Arid South America). Another representative of CAZALAC (Dr. Damaris Orphanopoulos /Rhodos) presented the theme of Methodologies to ascertain the efficiency of water use in the arid regions. Both presentations prompted high interest in the audience.

- **Universal Forum of the Cultures. Monterrey, Mexico (12th October, 2007)**

During the Universal Forum of the Cultures, the Executive Director of CAZALAC, and Koen Verbist presented the paper "Water in a Sustainable World" – an activity programmed for the week devoted to Natural Resources.

The presentation was delivered to an audience of about 120 people from various educational institutions, university professors and students, and intermediate education professors and students. The forum organizers were provided with the material of the paper, for further inclusion in the compilation of the Memories of the Forum. Participation in a press meeting was also included in the framework of this event.

- **GWADI Network Meeting. Santiago de Chile, December 16, 2007.**

The UNESCO-IHP-LAC Regional Office, the GWADI Network and the Center of Water for Arid and Semi-arid Zones of Latin America and the Caribbean joined efforts for the development of the international coordination meeting of the GWADI network, with the following objectives:

- Review the progress in the implementation of the actions performed by the network work group on strengthening of the global capacity for management of the water

resources of the Arid and Semi-arid Zones and promotion of international and regional cooperation.
- Start the activities of the network in Latin America and the Caribbean, with the incorporation of the Coordinator for LAC and the creation of a regional-level work group.
- Incorporate CAZALAC, in its capacity as regional center of UNESCO.

• **International seminar on techniques to augment the water supply in scarcity zones. Santiago de Chile, 17th-18th December, 2007**

Bearing in mind the presence of world-level specialists participating in the GWADI meeting, the UNESCO-IHP-LAC Regional Office, the GWADI Network and the Water Center for Arid and Semi-arid Zones of Latin America and the Caribbean organized an international seminar mainly aimed at establishing an instance for dissemination and experience-sharing of technologies oriented to increase the water supply in scarcity zones. Desalinization, water reutilization or reuse, harvesting or management of rain water runoffs, fog- and mist catching, and aquifer recharge were among the aspects addressed.

The seminar was attended by a total of 50 national and foreign persons, including professionals from the public and private sectors, academicians and students who wanted to update and deepen their knowledge on the issues of the event. If the 15 lecturers are added, a total of 65 individuals participated in the seminar. An important feature of the event was the participation of the Environment Affairs Manager of the Spanish firm INIMA, one of the world's largest companies in the area of desalinization.

• **Conference on Fog. La Serena, Chile, July 22- 27, 2007**

Support for the development of the Fourth World Conference on Fog and Mist – 2007, with the objective of updating the status of knowledge on fog and mist and its potential as a water resource in areas with pronounced water scarcity, and providing such areas with updated knowledge on environment management and recovery, development and acquisition of new water resources, and the natural resources for economic and social development and risk prevention.

134 essay requests were received for this conference -- 82 of them were presented orally, along with 31 posters. The event was attended by a total of 119 persons from 30 countries of Africa, America, Asia, Europe, and Oceania.

CAZALAC made a financial contribution to the conference and to participant attendance.

A 450-page publication was produced, with the contributions presented in scientific-paper format.

- **Meeting to prepare the Project on "protection and sustainable management of the American Puna Wetlands (WETPUNA)"**

Development of a meeting in San Pedro de Atacama, Chile, on 25th-26th October, 2007, on the "protection and sustainable management of the American Puna Wetlands" project. The event was held within the context of the Endorreic Basin program.
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The purpose of the meeting was to review and reach consensus with the potential partners on the project profile, and outline the first agreements needed to initiate the process of formulation of the proposal to be submitted to the project contest of the Seventh Framework Program of the European Union. The meeting was attended by delegates of Argentina, Peru and Chile.

- **Snows and Glaciers in Arid Zones. Sixth Meeting of the Snows and Ices Work Group of the IHP-LAC and International Workshop on Geomatic Applied to the Study of Glaciers (Mexico City, May, 2007).**

With the support provided by the IHP-LAC of UNESCO and CAZALAC there took place the Sixth Work Meeting of the GTNH IHP-LAC in the headquarters of the National Autonomous University of Mexico (UNAM)-Federal District, Mexico. Participants included representatives and specialists in glaciology of various Latin American countries. The following additional events were also held: (1) International Forum on Glaciology. (2) International Course-Workshop on Geomatics Applied to the Study of the Glaciers. (3) Conference on Glaciers of Latin America. (4) Fourth GTNH Work Meeting. (5) Field Visit to the Iztaccíhuatl Vulcano.

- **Workshop Water and Culture - San Lorenzo, Paraguay. 26th-27th March, 2007**

On the 26th and 27th March, 2007 the Workshop "Water and Culture" was held in the Aula Magna of the School of Architecture of the National University, in the University Campus of San Lorenzo City, Republic of Paraguay, in the framework of the visit to Paraguay of the Director-General of UNESCO, Ambassador Koichiro Matsura.

The event was attended by forty professionals, representatives of several State institutions, and students of various careers.

It included the presentation of the operational framework, the objective, the work program, an overview of the activities performed and an advance report of the activities in the framework of the Water and Culture program of Paraguay.

The above was followed by the development and validation of the summary information cards on the etnias of Paraguay and their water culture.

DISSEMINATION ACTIVITIES, WEBSITE AND CAZALAC DATA BASE

• Implementation of the Mapserver server in CAZALAC

A Pentium Dual Core, 2.8 Ghz, RAM 960MB server was configurated and commissioned, and the Slackware 11.0 /HostGIS Linux 4.0 operative system was installed on it. Additional applications installed were MapServer version 4.1; PostgreSQL 8.2; GDAL/OGR version 1.3.2; GEOS version 2.2.3; PDFlib version 7.0; GD version 2.0.33; Freetype version 9.7.3; PHP version 5.2., which make possible the online display of the information

Through these tools various data bases can be developed, and the geographic information from the implementation of various projects can be displayed online using the Mapserver Internet technology, to make this information accessible to the specialists of the Region.

• Website / Electronic Newsletters / Publications

The CAZALAC Newsletter was published. The Newsletter is distributed by e-mail to the subscribers of the Center throughout the region of Latin America and the Caribbean (2100 subscribers).

The contents of CAZALAC's Website, workshop.cazalac.org, are updated periodically.

CAZALAC has been performing the updating and maintenance of the Website of CONAIHP-Chile, workshop.IHP.cl, and the maintenance of the Website in Spanish of GWA (Gender Water Alliance), http://workshop.es.genderandwater.org

• The information on CAZALAC has been updated and new informative triptics have been printed, so as to made known the main action lines and objectives of the Center and the activities being performed, as well as the development and distribution of informative triptics on the CAMINAR Project – Management of Basins with Mining Activities in Arid and Semi-arid Regions of South America.

• Relational data base on LAC specialists and institutions

This activity involves the development of a relational data bases system of institutions, specialists, projects, and publications connected with the issues of water resource management in the region of Latin America and the Caribbean. Because of its free-use, soundness, efficiency and excellent performance features, the system is widely used throughout the world for this type of services.

The data base model used is the relational model, which enables the presentation of both objects and relations among the objects, which allows for the presentation of a set

of projects and their attributes (project name, thematic area, objectives, etc), and associate them through relations with a set of institutions and/or specialists who participate in these projects.

A graphic interface was also designed for information consultations through Internet in php language. It can be accessed from the Center's Website using the http://workshop.cazalac.org/datos link.

- **Data base system for climate information on LAC**

In parallel to the development of the aforementioned data base and the information gathered from the project of development of the Map of Arid Zones of LAC, a data base of climate information of the region was also developed. Its source is FAO 2001.

The system was implemented on a data base server Postgresql (Versión 8.2), and a graphic interface for information consultations through Internet in php language. It can be accessed from the Center's Website using the http://workshop.cazalac.org/datos link.

- **Online publication of the Map of Arid Zones of LAC**

The publication of the Map of Arid Zones of Latin America and the Caribbean was made in the Center's Website, in order to visualize, consult and analyze the information generated in the project through the network by means of the Map Server Internet technology, and make this information available to the specialists of the LAC Region; workshop.cazalac.org/mapa_za.php.

Reports by UNESCO's Water-related Centres (category 1 and 2) on activities related to the IHP in the period July 2006 – May 2008

1. Basic information on the centre

Name of the Centre		HTC Kuala Lumpur
Name of Director		Ir. Dr. Hj. Mohd Nor b. Hj. Mohd Desa
Name and title of contact person (for cooperation)		1. Norazizah bt. Abdul Kadir 2. Hezrin Haslinda bt. Hashim
E-mail		norazizah@water.gov.my/ hezrin@water.gov.my
Address		No. 2, Jalan Ledang, Off Jalan Duta, 50480 Kuala Lumpur, Malaysia.
Website		http://htckl.org.my
Location of centre		city/town : Kuala Lumpur country : Malaysia
Geographic orientation *		☐ global ☒ regional
Year of establishment		1999
Themes	Focal Areas ♦	☐ groundwater ☒ urban water ☐ arid / semi-arid zones ☒ humid tropics ☐ droughts and floods ☐ sediment transport and management ☒ water and environment ☒ ecohydrology ☐ water law and policy ☐ transboundary river basins/ aquifers ☒ IWRM ☐ global and climate change ☐ mathematical modelling ☐ social and cultural dimensions of water ☐ water education ☐ other: stormwater management, water hazard.
	Scope of Activities ♦	☐ vocational training ☒ postgraduate education ☐ continuing education ☒ research ☐ institutional capacity-building ☒ advising/ consulting ☐ software development ☐ other: (please specify) _____
Support bodies [1]		Department of Irrigation and Drainage Malaysia/ The Government of Malaysia
Hosting organization [2]		-
Sources of financial support [3]		The Government of Malaysia/ UNESCO
Existing networks and cooperation [4]		UNESCO/ICHARM/RSC for Southeast Asia and The Pasific/ Partner of the GWP/ IWA/ APAC Water-related Centre Category II

* check on appropriate box
♦ check all that apply

[1] please specify bodies that cover the operational costs of the centre, and other essential costs such as salaries and utility bills, and that provide institutional support to ensure centre's sustainability
[2] if different from support bodies
[3] please specify sources of main budgetary and extrabudgetary funds to implement projects
[4] please write international networks, consortiums or projects that the centre is part of, or any other close links that the centre has with international organizations or programmes, which are not already mentioned above

Governance	☒ director and governing board (Coordination Committee) ☐ other: (please specify) _____ Link to election of board members to the IHP IGC and hosting country IHP National Committee _____ Frequency of meetings: once every _1_ year(s) ☒ Existence of UNESCO presence at meetings (UNESCO Jakarta Office)
Institutional affiliation of director	IWA/IAHS/Partner of the GWP
Number of staff and types of staff	total number of staff (full-time, or equivalent) : 10 persons number of staff who are water experts: 1 person number of visiting scientists and postgraduate students: 1 person
Annual turnover budget in USD	Operational = USD 150,000.00 Programmes and Activities = USD 300,000.00

2. Activities undertaken in the framework of IHP in the period July 2006 – May 2008

2.1 Educational activities (i.e., those with accreditation) that directly contributed to the IHP-VI and WWAP
Please include here those activities which led to accreditation of degrees, or those held in formal school settings.

- Advisory to Open University Malaysia (OUM) for postgraduate programme

2.2 Research activities that directly contributed to the IHP-VI and activities by WWAP
Please include research/applied projects outputs such as publications that directly contributed to the IHP-VI and WWAP objectives

- National Level
  - Development of Temporal Pattern of Urban Areas and PMP Derivation for Peninsular Malaysia.
  - Development of Runoff Characteristics.
  - Detailed Hydrological Balance Study of Wetlands.
  - Development of Runoff Generation and Catchment Responses in Forested and Agricultural Sites.
  - Water Sensitive Urban Drainage Design – Local Scale

- Regional Level
  - Integrated and Multidisciplinary Research On Flood Hazard Assessment In Johor Malaysia.
    (HTCKL/ ICHARM-Japan)
  - Regional consultation on water education and training in Asia - development of a strategic framework (education)
    (HTC KL/ ICHARM-Japan/AIT-Thailand/ APCE-Indonesia)
  - Flood Forecasting and warning system for tropical regions (research)
    (HTC KL/ ICHARM-Japan/ APCE-Indonesia)
  - Compilation of major flood events in the region (outreach)
    (HTC KL/ ICHARM-Japan/ AIT-Thailand/ APCE-Indonesia)

2.3 Training activities that directly contributed to the IHP-VI and WWAP objectives

- International Seminar On Climate Variability, Change and Extreme Weather Events, National University of Malaysia, Bangi, Malaysia, February 2008.
- 2nd International Conference On Managing Rivers In the 21st Century : Solutions Towards Sustainable River Basin, Kuching Sarawak, 6th - 8th June 2007.
- The Regional Short Training Course on Stormwater Management , KL December 2007.
- Malaysia World Water Day 2007, Kuala Terengganu, Terengganu, Malaysia, 11-16 April 2007.
- National Conference on Water for Sustainable Development Towards a Developed Nation by 2020, Port Dickson, Negeri Sembilan, Malaysia, July 2006.

3. Collaboration and linkages

3.1 Participation in major international networks, programmes, partnerships with other UN or other International Agencies, media and professional bodies

- Networking/ Partnerships
  - UNESCO
  - ICHARM-Japan
  - RCUWM-Tehran
  - RCTWS-Egypt
  - AIT-Bangkok
  - UNESCO Jakarta Office
  - UNESCO Water Centers
  - Partner of the GWP
  - International Water Association (IWA)
  - Joint Committee on Urban Drainage (JCUD)
  - CapNet

- Trainings

  - 3rd SEA Water Forum, PWTC Kuala Lumpur, Malaysia, 22nd -27th October 2007.
  - East and Southeast Asia Regional Seminar on Flood Hazard Mapping, Kuala Lumpur, Malaysia, 7th - 9th February 2007

3.2 Participation in meetings related to the IHP and UNESCO (e.g., the UNESCO General Conference, the UNESCO Executive Board, the IHP Intergovernmental Council and/or other meetings organized by IHP)

- International/ Regional
  - Asia Pacific Category II Water-related Centres Meeting, 26th-27th September 2007, Bangkok, Thailand.
  - Directors of UNESCO's Water-related Centres Meeting, 11th-12th June 2007, Delft, the Netherlands.
  - IHP Regional Steering Committee Meeting for Southeast Asia and Pacific, 22-23 November 2007, Manila, Philippines.
  - Co-ordination Committee Meeting, 22 November 2007, Manila, Philippines.
  - AP FRIEND Meeting, 22 November 2007, Manila, Philippines.

- National
  - UNESCO Workshop; Proposed Positions and Strategic Planning by Ministry of Science, Technology and Innovation, Malaysia, 4-7 May 2008.

- Malaysia National Committee for International Hydrological Programme Meeting (MIHP), 2007.

3.3 Collaboration and networking with other UNESCO category 1 or 2 institutes/ centres

3.3.1 cross-appointment of directors of the category 1 or 2 institutes or centres on the governing board

-

3.3.2 exchange of information on activities such as training/educational materials, and funding opportunities

- Proceedings
  - National Conference on Water for Sustainable Development Towards a Developed Nation by 2020, Port Dickson, Negeri Sembilan, Malaysia, July 2006
  - The Regional Short Training Course on Stormwater Management (PP Grant – 2006/7), Kuala Lumpur, Dec 2007

- Publications/ Reports
  - Mohd Nor M.D. and P.R. Rakhecha (2006). Deriving the highest persisting monthly 24-hour dew points in Malaysia for the estimation of PMP. Climate Variability and Change: Hydrological Impacts (Proceeding of the Fifth FRIEND World Conference held at Havana, Cuba, November 2006), IAHS Publ. 308, 2006.
  - M.N. Desa M. and P.R. Rakhecha (2007). Probable Maximum Precipitation for 24-hr duration over and equatorial region : Part 2 - Johor, Malaysia. Jour. Atmospheric Research 84 (2007) 84-90.
  - Mohd. Nor, M. D. (2007). The reality of Integrated Flood Management : What needs to be done? Proceedings 3rd SEA Water Forum 2007.
  - Mohd Nor Mohd Desa (2008). Final Report, Development of Temporal Pattern of Urban Areas and PMP Derivation for Peninsular Malaysia submitted to Ministry of Science, Technology and Innovation, Malaysia, PN: 02-03-08-0002-EA002.
  - M.N. Desa M. and P.R. Rakhecha (2008). On Secular Changes In The Extreme Rainfalls Over Humid Tropical Region of Peninsular Malaysia submitted to Journal of Hydrologic Environment, International Hydrologic Environmental Society, 15 April 2008.

- Published activities conducted through HTC Kuala Lumpur website (http://htckl.org.my)

3.3.3 exchange of staff, most notably professionals and students

-

3.3.4 implementation of joint activities, such as workshops, conferences, training programmes, joint projects, field visits, software and data sharing, knowledge exchange and publications

- Research
  - Integrated and Multidisciplinary Research On Flood Hazard Assessment In Johor Malaysia.
    (HTCKL/ ICHARM-Japan).
  - Regional consultation on water education and training in Asia
    - development of a strategic framework (education)
    (HTC KL/ ICHARM-Japan/AIT-Thailand/ APCE-Indonesia).
  - Flood Forecasting and warning system for tropical regions (research)
    (HTC KL/ ICHARM-Japan/ APCE-Indonesia).

- Compilation of major flood events in the region (outreach) *(HTC KL/ ICHARM-Japan)*.

- Data Archive
  - Asia Pacific FRIEND - Asian Pacific Water Archive - Central Node : HTC KL (http://htckl.org.my/apfriend/wa/index.shtml)

- Trainings
  - The Regional Short Training Course on Stormwater Management, Kuala Lumpur, Dec 2007 - (HTC KL/ UNESCO Jakarta Office).

3.4 Relationships with the UNESCO field office whose jurisdiction covers the country of location

- Good relationship with UNESCO Jakarta Office

3.5 Relationship with the UNESCO National Commission and the IHP National Committee in the country of location

- Good relationship with:
  - Malaysian National Commission for UNESCO
  - Malaysia National Committee for International Hydrological Programme (MIHP)

3.6 Relationship with other UNESCO-related networks, such as UNESCO Clubs, ASPnet, and UNESCO chairs

- Intergovernmental Oceanographic Commission of UNESCO (IOC) through the Ministry of Science, Technology and Innovation, Malaysia
- National Oceanography Directorate (NOD) Malaysia through the Ministry of Science, Technology and Innovation, Malaysia
- International Science, Technology, Innovation Centre (ISTIC) for South-South Corporation, under the Auspices of UNESCO, Category II UNESCO Centre hosted by the Ministry of Science, Technology and Innovation, Malaysia
- National Point Contact Representative (NPCR) Man and Biosphere (MAB), National University of Malaysia

4. Communication

4.1 Communication and knowledge dissemination activities undertaken in the framework of IHP

- Trainings
  - National Conference on Water for Sustainable Development Towards a Developed Nation by 2020, Port Dickson, Negeri Sembilan, Malaysia, July 2006
  - East and Southeast Asia Regional Seminar on Flood Hazard Mapping, Kuala Lumpur, Malaysia, 7th - 9th February 2007.
  - 2nd International Conference On Managing Rivers In the 21st Century : Solutions Towards Sustainable River Basin, Kuching Sarawak, 6th - 8th June 2007.
  - 3rd SEA Water Forum, PWTC Kuala Lumpur, Malaysia, 22nd - 27th October 2007.
  - The Regional Short Training Course on Stormwater Management, Kuala Lumpur, 3rd – 7th December 2007 - (HTC KL/ UNESCO Jakarta Office).
  - International Seminar On Climate Variability, Change and Extreme Weather Events, National University of Malaysia, Bangi, Malaysia, 26th – 27th February 2008.

- Proceedings
  - National Conference on Water for Sustainable Development Towards a Developed Nation by 2020, Port Dickson, Negeri Sembilan, Malaysia, July 2006
  - The Regional Short Training Course on Stormwater Management (PP Grant – 2006/7), Kuala Lumpur Dec 2007

- Publications/ Reports
  - Mohd Nor M.D. and P.R. Rakhecha (2006). Deriving the highest persisting monthly 24-hour dew points in Malaysia for the estimation of PMP. Climate Variability and Change: Hydrological Impacts (Proceeding of the Fifth FRIEND World Conference held at Havana, Cuba, November 2006), IAHS Publ. 308,2006.
  - M.N. Desa M. and P.R. Rakhecha (2007). Probable Maximum Precipitation for 24-hr duration over and equatorial region : Part 2 - Johor, Malaysia. Jour. Atmospheric Research 84 (2007) 84-90.
  - Mohd. Nor, M. D. (2007). The reality of Integrated Flood Management : What needs to be done? Proceedings 3rd SEA Water Forum 2007.
  - Mohd Nor Mohd Desa (2008). Final Report, Development of Temporal Pattern of Urban Areas and PMP Derivation for Peninsular Malaysia submitted to Ministry of Science, Technology and Innovation, Malaysia, PN: 02-03-08-0002-EA002.
  - M.N. Desa M. and P.R. Rakhecha (2008). On Secular Changes In The Extreme Rainfalls Over Humid Tropical Region of Peninsular Malaysia submitted to Journal of Hydrologic Environment, International Hydrologic Environmental Society, 15 April 2008.

- Published activities conducted through HTC Kuala Lumpur website (http://htckl.org.my)

4.2 Policy documents and advice

- UNESCO Workshop; Proposed Positions and Strategic Planning by Ministry of Science, Technology and Innovation, Malaysia, 4-7 May 2008.

5. Update on Centre Operations

5.1 Membership of the Board of Governors during designated period

- IHP National Committee Chairman of Southeast Asia and Pacific
- Co-ordination Committee

5.2 Key decisions made (attach minutes of meetings)

- Meeting Report - Meeting of UNESCO's Asia-Pacific Category II Water–related Centres, Bangkok, Thailand, 26-27 September 2007 (Refer Attachment)
- Minute of Meeting - 11th Co-Ordination Committee Meeting of the Regional Humid Tropics Hydrology and Water Resources Centre for Southeast Asia and the Pacific, Intercontinental, Manila, Philippines, 22 November 2007 (Refer Attachment)

6. Assessment of the Centre's Impacts

6.1 Science Impacts (Major contributions to the science, technology, education, and regional and/or international cooperation in the field of water)

6.2 Knowledge Transfer Impacts (Major achievements in the dissemination of knowledge and technology transfer)

6.3 Policy Impacts (advice sought by government and other bodies and evidence of inputs into policy arena)

- No evaluation has been conducted so far but there is a plan for future.

7. Future activities that will contribute directly to IHP and/or to WWAP

7.1 Operational Plan (2008-2009) (attach operational plan for 2008-09 if available)

- Research (Regional)
  - Integrated and Multidisciplinary Research On Flood Hazard Assessment In Johor Malaysia. *(HTCKL/ ICHARM-Japan).*
  - Regional consultation on water education and training in Asia - development of a strategic framework (education) *(HTC KL/ ICHARM-Japan/AIT-Thailand/ APCE-Indonesia).*
  - Flood Forecasting and warning system for tropical regions (research) *(HTC KL/ ICHARM-Japan/ APCE-Indonesia).*
  - Compilation of major flood events in the region (outreach) *(HTC KL/ ICHARM-Japan).*

- Research (National)
  - Leachate Problem in Lanfills Area – Drainage System of Landfill
  - Roles of Constructed Wetlands for Stormwater Management
  - Threshold of Stormwater Parameters on Hillside Drainage System - Development of Mudflows Warning System
  - Event Mean Concentration (EMC)
  - Effectiveness of Erosion and Sediment Control Measures
  - Bio-Remediation Media for Stormwater Management
  - The Application of X-Moz Controlled Released Block In Drainage System Against Mosquito Breeding

- Data Archive
  - Asia Pacific FRIEND - Asian Pacific Water Archive - Central Node : HTC KL (http://htckl.org.my/apfriend/wa/index.shtml)

7.2 Strategic Plan linked with IHP-VII (attach strategic plan for 2008-11 if available)

To be formulated in the near future.

8. Annexes

8.1 List of publications released by the centre (there can be overlap with those listed in 2.2 above)

- Proceedings
  - National Conference on Water for Sustainable Development Towards a Developed Nation by 2020, Port Dickson, Negeri Sembilan, Malaysia, July 2006
  - The Regional Short Training Course on Stormwater Management (PP Grant – 2006/7), Kuala Lumpur, Dec 2007

- Publications/ Reports
  - Mohd Nor M.D. and P.R. Rakhecha (2006). Deriving the highest persisting monthly 24-hour dew points in Malaysia for the estimation of PMP. Climate Variability and Change: Hydrological Impacts (Proceeding of the Fifth FRIEND World Conference held at Havana, Cuba, November 2006), IAHS Publ. 308,2006.

- M.N. Desa M. and P.R. Rakhecha (2007). Probable Maximum Precipitation for 24-hr duration over and equatorial region : Part 2 - Johor, Malaysia. Jour. Atmospheric Research 84 (2007) 84-90.
- Mohd. Nor, M. D. (2007). The reality of Integrated Flood Management : What needs to be done? Proceedings 3rd SEA Water Forum 2007.
- Mohd Nor Mohd Desa (2008). Final Report, Development of Temporal Pattern of Urban Areas and PMP Derivation for Peninsular Malaysia submitted to Ministry of Science, Technology and Innovation, Malaysia, PN: 02-03-08-0002-EA002.
- M.N. Desa M. and P.R. Rakhecha (2008). On Secular Changes In The Extreme Rainfalls Over Humid Tropical Region of Peninsular Malaysia submitted to Journal of Hydrologic Environment, International Hydrologic Environmental Society, 15 April 2008.

8.2 List of training courses conducted (there can be overlap with those listed in 2.3 above)

- International Seminar On Climate Variability, Change and Extreme Weather Events, National University of Malaysia, Bangi, Malaysia, February 2008.
- 2nd International Conference On Managing Rivers In the 21st Century : Solutions Towards Sustainable River Basin, Kuching Sarawak, 6th - 8th June 2007.
- The Regional Short Training Course on Stormwater Management , KL December 2007.
- Malaysia World Water Day 2007, Kuala Terengganu, Terengganu, Malaysia, 11-16 April 2007.
- National Conference on Water for Sustainable Development Towards a Developed Nation by 2020, Port Dickson, Negeri Sembilan, Malaysia, July 2006.

MEETING REPORT

Meeting of UNESCO's Asia-Pacific Category II Water-Related Centres
Bangkok, Thailand, 26-27 September 2007

INTRODUCTION

The Meeting of Asia-Pacific Category II Water–Related Centers was held at UNESCO Bangkok Office, Thailand, from 26 to 27 September 2007. The aim of the meeting was to consider the role of category II centers and to enhance cooperation among UNESCO Category II water-related Centres in the Asian and Pacific Region.

The meeting was attended by twenty-five participants both from ASPAC Centres and ASPAC UNESCO Field Offices.

The UNESCO Category II Centres were represented by:

- Humid Tropics Centre (HTC), Malaysia,
- International Centre for Water Hazard and Risk Management (ICHARM), Japan,
- International Centre on Qanats & Historic Hydraulic Structures (ICQHS), Yazd, Iran, and the
- International Research and Training Centre on Erosion and Sedimentation (IRTCES), China.

The Regional Centre on Urban Water Management (RCUWM), Tehran could not attend but its activities were reported by UNESCO Tehran Office.

The establishing Asian Pacific Centre for Ecohydrology (APCE), Indonesia, and the International Centre of Water for Food Security (IC-WATER) Australia also attended as did delegates from WEM-AIT Bangkok (Water Engineering & Management, Asian Institute of Technology).

UNESCO Field Offices were represented by Apia, Beijing, Jakarta, New Delhi and Tehran. (Please see Annex III for complete list of participants).

The Japan Water Forum Secretariat was also invited to attend the meeting and to report on its activities.

SUMMARY

During the first day presentations were provided by representatives from the different centres and UNESCO Field Offices (FOs) including:

- a brief presentation of Mr. Mohammed Nor on the "Results of the meeting of the Directors of UNESCO's Water Related Centres", held in June 2007 in Delft,
- presentations of each centre on its activities and fields of application,
- presentations of FOs describing the activities implemented together with water centres,
- a report from the Japan Water Forum Secretariat, and
- a presentation by Mr. H. Gijzen on a possible SWITCH Asia project as an example for cooperation between centres and FOs.

Participants then agreed to increase cooperation and linkages between the Asia-Pacific Category II Water–Related Centers by addressing the priority follow-up actions decided at the global meeting held at IHE, Delft, the Netherlands, in June 2007.

Several participants recommended that the Directors of the centres should serve in the IHP National Committees in the countries where they are located, thereby strengthening the institutional ties between the centres and the IHP programme.

The meeting recognized the need to both link centres with each other, while also strengthening the connection between the centres and UNESCO Field Offices in the region.

As a major premise for effective cooperation and coordination, participants agreed to develop a joint mission statement and an effective communication strategy.

It was further decided not to primarily concern with sorting out the specific modalities of cooperation and communication, but rather focus on developing activities and project ideas and themes from which the cooperation modalities could then be worked out.

Participants agreed that activities and projects suggestions should not aim to include participation of all centres, but rather be designed for cooperation between two or more centres with focus on topics of particular thematic or geographical interests.

To further improve coordination and communication among the centres and between the centres and UNESCO Field Offices the importance to prepare for each centre a list of contact points, a 'roster of expertise' and a list of events was stressed.

For a better presentation of the "consortium" of centres it was recommended to develop a matrix of centre capacities to identify and showcase the centres capacities as well as to develop a shared, coherent package of training and capacity building courses offered by the same centres.

To efficiently discuss how cooperation among Category II water-related Centres as well as between the Centres and UNESCO should be designed, three clusters of discussion were agreed upon:

- 1st Cluster: Clarification of the contexts and conditions for cooperation
- 2nd Cluster: Identification and initiation of small-scale practically achievable cooperation projects/programmes
- 3rd Cluster: Identification of fields of broad centre-centre-UNESCO cooperation and cooperation modalities

1st CLUSTER: Clarification of the contexts and conditions for cooperation

1. Development of a joint mission statement
2. Development of a joint communication strategy
3. Development of a mechanism for cooperation between centers (and between centers and UNESCO) including identification of points of contact and matrix of capacities
4. Development of a joint roster of center capacities (which will include a list of expertise, trainings, events) for dissemination to donors and other partners
5. Identification of linkages and cooperative modalities between UNESCO field offices and centers (for 34C/5 work planning, communication, etc.)

Participants declared the joint mission statement as follows:

"To provide leadership and promote excellence in research, education and training in Integrated Water Resources Management in the hearts, minds and action of the people".

The name for what had been called "the consortium" of Centres in Asia-Pacific will be

"Partnership for Sustainable Water Solutions for the Asia-Pacific Region".

As a basis to further develop the communication strategy, a document compiling all results of the questionnaires prepared by the ASPAC Centres in early 2007 will be circulated.

It was agreed to establish mechanisms for cooperation between centres as well as between centers and UNESCO Field Offices including nomination of points of contacts, matrix of capacities, list of expertise and trainings offered, and a calendar of events.

Participants highlighted already existing and ongoing cooperation activities between UNESCO field offices and centres. The importance of keeping a flexible and not too formal approach of cooperation was stressed.

2nd CLUSTER: Identification and initiation of small-scale practically achievable cooperation projects/programmes

1. Center-to-center exchanges (such as now exists between HTC and ICHARM)
2. Develop joint web presence (joint website or coordinated web links between center websites)
3. Define areas of common interest and synergy between a limited number of centers based on capacities and geographical coverage (rainwater harvesting, groundwater for emergencies, erosion & sedimentation relating to natural hazards) as a basis for cooperation projects.

The following projects were identified as cooperative activities between centres as well as between centres and UNESCO field offices:

a. Transboundary groundwater resources (research). Partners: UNESCO (Beijing, Jakarta, New Delhi)/AIT/IC-WATER

b. Regional consultation on water education and training in Asia - development of a strategic framework (education). Partners: AIT/IRTCES/HTC

c. Flexible learning programme – e-learning (education).Partners: UNESCO-IHE, AIT/IC-WATER

d. Flood forecasting & warning system for tropical regions (research). Partners: HTC/ICHARM-APCE. Beneficiary countries: Malaysia, Philippines, Thailand, Indonesia, Vietnam

e. Integrated and multi-disciplinary research on flood hazard assessment (research). Partners: HTC/ICHARM

f. Climate change impacts at river basin scale - surface and ground water (research). Partners: AIT/UNESCO New Delhi/IC-WATER

g. Compilation of major flood events in the region (outreach). Partners: ICHARM/AIT/APCE/HTC

The importance to define timelines, prepare more detailed descriptions and identify champions to transfer the ideas into action was stressed.

With regard to item f) above, the UNESCO New Delhi Office invited participants to a respective meeting and to the International Groundwater Conference on Groundwater Dynamics and Global Change, 11-14 March 2008, Jaipur, India.

Based on a common agreement, a one-page introductory webpage will be developed displaying a clear corporate identity of the *"Partnership for Sustainable Water Solutions for the Asia-Pacific Region"*. This webpage will be included in all relevant Centre and UNESCO websites and will contain the mission statement, logo and linkages to all participating centres and their respective contact persons.

3rd CLUSTER: Identification of fields of broad center-center-UNESCO cooperation and cooperation modalities

1. Agree on concepts and discuss project development on thematic areas for cooperation such as climate change, water & culture, disasters, water education, and the MDGs
2. Outline 3-4 project concepts (along the lines of SWITCH project)

For further detailed discussion and development of a possible joint programme of all UNESCO Category II Water-Related Centres and the UNESCO Field Offices in the region, it was agreed to develop a two-page concept paper of a possible *SWITCH Asia Project "Cities of the future"*. First ideas for pilot cities included Bandung and Surabaya, both in Indonesia. Further, the possibility to link the programme with HELP Basins was stressed, as those could provide crucial data and information. The meeting agreed that this project idea could be proposed to different donors and developed gradually over 3-4 years. The centres were suggested to consider their roles in such a project, as well as the IHP National committees in the region. To get further input ideas and start circulating the concepts among countries the two page concept paper on SWITCH Asia was proposed to be presented at the next 15th RSC Meeting in Manila, 22 and 23 November 2007.

Participants considered cross-cutting themes that the centres might seek to address through a common strategy – "water and climate change" and "water and culture" were raised as such possible themes both considering the topic of food security.

A brief statement draft specifically acknowledging the efforts made to develop and strengthen networking among Centers in the Asia-Pacific Region will be submitted to SC/HYD through DIR/JAK for inclusion in Mr. Matsuura speech at the Asia-Pacific Water Forum in Japan in December 2008.

Finally, participants agreed to utilize future IHP-related events in the region to discuss and advance the items above. The forthcoming Southeast Asia and the Pacific IHP Regional Steering Committee meeting in Manila in November 2007 would be the first opportunity.

An Action Plan was prepared compiling all follow-up tasks to be worked out after the meeting (see Annex I).

It was agreed to prepare and provide a meeting report including the Action Plan to all participants and that this report shall be made available on all centre websites.

ANNEX I: ACTION PLAN

ACTION ITEMS	BY WHOM
1. HTC will take responsibility for the development of a one-page website to embody the corporate id entity of the Centers Consortium	Mohd Nor Humid Tropics Centre (HTC), Malaysia
2. Prepare and circulate to all centres a two-page concept paper on SWITCH Asia	Hubert Gijzen UNESCO Office, Jakarta
3. Draft a brief statement specifically acknowledging the efforts made to develop and strengthen the networking among Centers in Asia-Pacific to be submitted to SC/HYD DIR/JAK for inclusion in Mr. Matsuura's speech at the Asia Pacific Water Forum in Japan in December 2008	Bhanu Neupane UNESCO Office, Delhi
4. Develop mechanisms for cooperation between centers as well as between centers and UNESCO including identification of points of contact and matrix of capacities	R. Jayakumar UNESCO Office, Beijing
5. Development of a joint roster of center capacities (list of expertise, trainings, calendar of events) for dissemination to donors and other partners.	Han Qunli UNESCO Office, Tehran
6. Send an overall version of the questionnaire compiled by the ASPAC Centres.	Giuseppe Arduino UNESCO Office, Jakarta
7. Report on the meeting and derived action points at the forthcoming RSC meeting. Provide final meeting report at UNESCO Jakarta's website and to all centres.	Giuseppe Arduino UNESCO Office, Jakarta

ANNEX II: MEETING AGENDA

Day 1, Wednesday 26 September 2007	
09:00-09:20	Introduction to the meeting by Mr. Hubert Gijzen, DIR UNESCO Office, Jakarta
09:20-09:25	Election of a chairperson, vice-chairperson and rapporteur of the meeting
09:25-09:35	Adoption of the Agenda
09:35-09:45	Results of the Meeting of the Directors of UNESCO's Water related Centres, Delft, 11-12 June 2007, HTC Kuala Lumpur, Mr. Mohd Nor
09:45-10:45	Presentation by the centres (12 minutes each): IRTCES China, HTC Malaysia, ICQHHS, Iran, ICHARM, Japan, RCUWM Iran (UNESCO Tehran Office)
10:45-11:00	Presentation by the Japan Water Forum
11:00-11:20	*Coffee break*
11:20-11:45	Presentation by the centres (12 minutes each): APCE Indonesia, SWEM Thailand, IHE the Netherlands (H. Gijzen)
11:45-12:30	Presentation of IHP activities in UNESCO Field Offices: Jakarta, Apia, Beijing, New Delhi, Teheran
12:30-14:00	*Lunch break*
14:00-14:05	Welcome address by Mr. Sheldon Schaeffer, DIR UNESCO Office, Bangkok
14:05-14:15	IHP Phase VII (2008-2013) and 34 C/5 priorities (2008-2009) Main Line of Action 1: "Water dependencies: systems under stress and societal responses", UNESCO Jakarta
14:15-14:45	SWITCH Asia Initiative (Sustainable Water Management Improves Tomorrow's Cities Health): an example of joint initiative between Water Centres and UNESCO field Offices, by Mr. Hubert Gijzen, DIR UNESCO Office, Jakarta
14:45-16:00	Discussion on "Recommendations and follow-up" from the Delft meeting; relations between water centres and UNESCO field offices workplans, opportunities for collaboration.
16:00-16:20	*Coffee break*
16:20-17:30	Continuation of the discussion
19:30-21:00	Dinner hosted by UNESCO

Day 2, Thursday 27 September 2007	
09:00-09:15	IC-WATER Australia
09:15-10:30	Workshop Session: define concrete opportunities for model projects to be developed in partnership with Category I and Category II Water Centres plus other partners
10:30-11:00	*Coffee break*
11:00-12:30	Plenary Session: define roles for each centre in such multidisciplinary projects
12:30-13:30	*Lunch*
13:30-15:00	Conclusions: plan of action and follow-up

ANNEX III: LIST OF PARTICIPANTS

NAME	INSTITUTION/COUNTRY	E-MAIL
Peter Hehanussa	APCE, Indonesia Asian Pacific Centre for Ecohydrology	phnussa@indosat.net.id
Mohd. Nor Mohd Desa	HTC KL, Malaysia Humid Tropics Centre	drmohdnor@water.gov.my
Norazizah Abdul Kadir	HTC KL, Malaysia Humid Tropics Centre	norazizah@water.gov.my
Akira Terakawa	ICHARM, Japan International Centre for Water Hazard and Risk Management	terakawa@pwri.go.jp
Katsuhito Miyake	ICHARM, Japan International Centre for Water Hazard and Risk Management	miyake@pwri.go.jp
Majid Labbaf Khaneiki	ICQHS, Tehran International Centre on Qanats & Historic Hydraulic Structures	labbaf_majid@yahoo.com
Shahbaz Khan	IC-WATER, Australia	shahbaz.khan@csiro.au
Hu Chun Hong	IRTCES, China International Research and Training Centre on Erosion and Sedimentation	huch@iwhr.com
Liu Cheng	IRTCES, China International Research and Training Centre on Erosion and Sedimentatio n	chliu@iwhr.com
Wang Yangui	IRTCES, China International Research and Training Centre on Erosion and Sedimentation	wangyg@iwhr.com
Chen Jianguo	IWHR, China Institute of Water Resources and	chenjg@iwhr.com

	Hydropower Research	
Noriko Yamaguchi	Japan Water Forum	yamaguchi@waterforum.jp
Khin Ni Ni Thein	A.I.T. Bangkok, Thailand Asian Institute of Technology	vp_dr@ait.ac.th knnthein@ait.ac.th
Mukand S Babel	A.I..TBangkok, Thailand Asian Institute of Technology	msbabel@ait.ac.th
Aldrin Rivas	WEM, A.I.T. Bangkok, Thailand Water Engineering & Management, Asian Institute of Technology	rivas@ait.ac.th
Roberto S. Clemente	WEM, A.I.T. Bangkok, Thailand Water Engineering & Management, Asian Institute of Technology	clemente@ait.ac.th
Wahid	WEM, A.I.T. Bangkok, Thailand Water Engineering & Management, Asian Institute of Technology	swahid@gmail.com
Hans D. Thulstrup	UNESCO Apia	h.thulstrup@unesco.org
Bhanu Neupane	UNESCO Delhi	b.neupane@unesco.org
Toshihiro Sonoda	UNESCO HQ Water Sciences Division	t.sonoda@unesco.org
Giuseppe Arduino	UNESCO Jakarta	g.arduino@unesco.org
Hubert Gijzen	UNESCO Jakarta	h.gijzen@unesco.org
R. Jayakumar	UNESCO Office Beijing	r.jayakumar@unesco.org
Niloofar Sadeghi	UNESCO Tehran	n.sadeghi@unesco.org
Han Qunli	UNESCO Tehran	q.han@unesco.org

11th CO-ORDINATION COMMITTEE MEETING OF THE REGIONAL HUMID TROPICS HYDROLOGY AND WATER RESOURCES CENTRE FOR SOUTHEAST ASIA AND THE PACIFIC

Intercontinental Manila
Manila, Philippines, 22nd November 2007

Minutes

Participants

NAME	COUNTRY
Ross JAMES	AUSTRALIA
Trevor DANIELL	AUSTRALIA
Monichoth So Im	CAMBODIA
Van-Thanh_Van NGUYEN	CANADA
ZHU Xiaoyuan	CHINA
LIU Heng	CHINA
Zongxue XU	CHINA
Hery HARJONO	INDONESIA
Hidayat PAWITAN	INDONESIA
Kaoru TAKARA	JAPAN
Yasuto TACHIKAWA	JAPAN
Hidetaka CHIKAMORI	JAPAN
Ali CHAVOSHBAN	JAPAN
A.W. JAYAWARDENA	JAPAN
Taboia METUTERA	KIRIBATIS (Pacific Islands)
Soontak LEE	Republic of KOREA
Vinliam BOUNLOM	LAO PDR
Dato Paduka Ir. Hj KEIZRUL Abdullah	MALAYSIA
Ir. Dr. Mohd Nor b. Mohd Desa	MALAYSIA
Norazizah bt Abdul Kadir	MALAYSIA
Muhammad Al Muzammil	MALAYSIA
D BASANDORJ	MONGOLIA
Gombo DAVAA	MONGOLIA
Dennis JAMIESON	NEW ZEALAND
Richard IBBITT	NEW ZEALAND
Maino VIRIBO	PAPUA NEW GUINEA
Leonardo LIONGSON	PHILIPPINES
Guillermo TABIOS	PHILIPPINES
Supranee RUNGHIRUNVIROS	THAILAND
TRAN Thuc	VIETNAM
Giuseppe ARDUINO	UNESCO - JAKARTA
Hans THULSTRUP R JAYAKUMAR	UNESCO - APIA UNESCO - BEIJING

1. Opening by the Chairperson

The Chairman Mr Keizrul Abdullah opened the meeting at 8:45am, welcomed the participants and referred the meeting participants to the Provisional Agenda in the booklet of documents distributed before the meeting.

2. Election of Rapporteur

Mr James was elected Rapporteur for the meeting.

3. Report of the 10th Coordination Committee meeting

The Chairman referred the meeting to the Minutes of the 9th Co-ordination Committee Meeting held in Bali, Indonesia reproduced in the booklet of documents and inquired if there were any comments or objections. No comments or objections were raised.

Mr Nor, Director of the HTC, informed the meeting of progress with the Action Items as follows.

10th CC Meeting Action Item	**Status**
1. Countries to identify any projects in 'Flood Forecasting' and 'Capacity Building in IWRM' that the HTC may be able to collaborate on or provide some support for and to submit project proposals to the HTC. (Was 9th Meeting recommendations 2 and 3)	No projects were received.
2. HTC to redistribute the latest IHP VII Strategic Plan and countries to respond by identifying Themes that are considered relevant to them.	The Strategic Plan was distributed and responses have been received from China and Malaysia. Still awaiting responses from other countries.
3. HTC to identify common Themes and request and/or propose collaborative activities.	After other country responses have been received activities will be planned and funding sources identified.
4. Countries provide feedback to the HTC on any issues to be raised at the meeting of Category II Centre Directors.	The details of the meeting is reported on in the Directors Report (Agenda Item 4).
5. Check how many river basins have data included in the Water Archive.	The introduction of a new server has resulted in a number of technical problems with the Water Archive. Some files need to be updated and this is in progress.

4. Report by the Director of HTC

The Chairman invited Mr Nor to present his report. Mr Nor highlighted a number of items contained in the report included in the meeting booklet during his presentation.

Support from UNESCO Jakarta was acknowledged which enabled participation and presentation of a paper at the 5th FRIEND conference in Havana, Cuba.

The discussions at the meeting of the Directors of UNESCO Water-related Centres in Delft (June 2007) and the follow-up meeting of the Asia Pacific Category II Water-related Centres held in Bangkok (September 2007) were summarised and the meeting was informed that the reports of these meeting were included in the meeting booklet. Mr Nor felt that both these meetings were successful and emphasised the UNESCO plan to review all Category II Centres on a 6 yearly cycle. He believes that HTC may be the first Centre to be reviewed.

Mr Nor described a range of research projects under the 8th Malaysian National Plan undertaken over the period 2005-2007. These projects were funded by the Malaysian government. Projects included in the 9th Malaysian National Plan were presented.

A table of future HTC activities was presented along with a brief description of the current status of some of the activities. Limits on funding will restrict attendance at the short training course on Urban Stormwater Management in December 2007. A number of activities include collaboration with ICHARM in Japan. The project to compile details of major flood events was an outcome of the meeting of regional Category II Centres held in Bangkok.

The problems with the operation of the Water Archive resulting from the introduction of a new server at the HTC were briefly described. The problems are being identified by a software consultant and changes will be made so the Water Archive is functional. Mr Nor referred to the possible need to design a "friendlier" system.

ACTION: HTC to ensure the Water Archive is functional on the new server.

The financial accounts for the last year were briefly presented along with a summary of staffing changes. The Chairman highlighted the improving gender balance with the Deputy Director and Assistant Director positions now being filled by women.

5. Future direction of HTC Kuala Lumpur

The importance of input from countries in the region to the future planning of the HTC was emphasised, in particular the need for responses to the Strategic Plan for IHP VII. The meeting of Category II Centres in Bangkok identified a program of activities and HTC will be seeking support from countries to progress this.

ACTION: Countries to advise HTC of IHP VII Themes that are relevant to them.

The Chairman reminded the meeting that HTC was set up as a result of a request from members of the RSC and requested that responses and requests can be sent to the HTC Director. Two areas in which the HTC will be increasingly active will be collaboration with other Category II Centres and in the Centre review process.

6. Other matters

Mr Takara strongly supported the collaboration between ICHARM and HTC as it will strengthen both Centres and requested that ICHARM be included in the regional consultation on water education and training. (Item 5 in Table 2 of the Directors report).

ACTION: HTC to include ICHARM in the activity:
Regional consultation on water education and training in Asia – development of a strategic framework (education)

7. Closure of the meeting

The Chairman thanked the meeting participants for their input and closed the meeting at 9:25 am.

8. Action Items

Action	**By whom**
1. Ensure the Water Archive is functional on the new server.	HTC
2. Countries to advise HTC of IHP VII Themes that are relevant to them	Each country
3. HTC to include ICHARM in the activity: Regional consultation on water education and training in Asia – development of a strategic framework (education)	HTC

Reports by UNESCO's Water-related Centres (category 1 and 2) on activities related to the IHP in the period July 2006 – May 2008

1. Basic information on the centre

Name of the Centre		ICHARM (International Centre for Water Hazard and Risk Management)
Name of Director		Kuniyoshi TAKEUCHI
Name and title of contact person (for cooperation)		Akira TERAKAWA, Deputy Director of ICHARM
E-mail		terakawa@pwri.go.jp
Address		1-6 Minamihara Tsukuba, Japan
Website		http://www.icharm.pwri.go.jp
Location of centre		city/town : Tsukuba country : Japan_
Geographic orientation *		☒ global ☐ regional
Year of establishment		March 2006
Themes	Focal Areas ♦	☐ groundwater ☐ urban water ☐ arid / semi-arid zones ☐ humid tropics ☒ drought and floods ☐ sediment transport and management ☐ water and environment ☐ ecohydrology ☐ water law and policy ☐ transboundary river basins/ aquifers ☐ IWRM ☐ global and climate change ☐ mathematical modelling ☐ social and cultural dimensions of water ☐ water education ☒ other: (please specify) water related disaster management
	Scope of Activities ♦	☐ vocational training ☐ postgraduate education ☐ continuing education ☒ research ☒ institutional capacity-building ☐ advising/ consulting ☐ software development ☒ other: (please specify) information networking
Support bodies [1]		Government of Japan
Hosting organization [2]		Public Works Research Institute (PWRI)
Sources of financial support [3]		Government of Japan (mostly)
Existing networks and cooperation [4]		International Flood Initiative (IFI)
Governance		☐ director and governing board ☒ other: (please specify) Chief Executive of PWRI Link to election of board members to the IHP IGC and hosting country IHP National Committee _____ Frequency of meetings: once every 2year(s) ☒ Existence of UNESCO presence at meetings
Institutional affiliation of director		Employee of PWRI

* check on appropriate box
♦ check all that apply

[1] please specify bodies that cover the operational costs of the centre, and other essential costs such as salaries and utility bills, and that provide institutional support to ensure centre's sustainability
[2] if different from support bodies
[3] please specify sources of main budgetary and extrabudgetary funds to implement projects
[4] please write international networks, consortiums or projects that the centre is part of, or any other close links that the centre has with international organizations or programmes, which are not already mentioned above

Number of staff and types of staff	total number of staff (full-time, or equivalent) :28 number of staff who are water experts: 20 number of visiting scientists and postgraduate students: 1
Annual turnover budget in USD	About 1.5mil.USD

2. Activities undertaken in the framework of IHP in the period July 2006 – May 2008

2.1 Educational activities (i.e., those with accreditation) that directly contributed to the IHP-VI and WWAP
Please include here those activities which led to accreditation of degrees, or those held in formal school settings.

Disaster Management Policy Programme – water related risk management course (1 yr master course jointly organized with Graduate Research Institute for Policy Studies (GRIPS))

2.2 Research activities that directly contributed to the IHP-VI and activities by WWAP
Please include research/applied projects outputs such as publications that directly contributed to the IHP-VI and WWAP objectives

World Water Development Report #2

2.3 Training activities that directly contributed to the IHP-VI and WWAP objectives

Flood Hazard Mapping training course
River and Dam Engineering course

3. Collaboration and linkages

3.1 Participation in major international networks, programmes, partnerships with other UN or other International Agencies, media and professional bodies

International Flood Initiative (IFI)
World Water Assessment Programme (WWAP)
Asian Pacific Water Hub Network
Network of Asian River Basin Organizations (NARBO)

3.2 Participation in meetings related to the IHP and UNESCO (e.g., the UNESCO General Conference, the UNESCO Executive Board, the IHP Intergovernmental Council and/or other meetings organized by IHP)

IHP Intergovernmental Council
WWAP Coordination meeting

3.3 Collaboration and networking with other UNESCO category 1 or 2 institutes/ centres

3.3.1 cross-appointment of directors of the category 1 or 2 institutes or centres on the governing board

No

3.3.2 exchange of information on activities such as training/educational materials, and funding opportunities

UNESCO-IHE, HTC, RCUWM

3.3.3 exchange of staff, most notably professionals and students

UNESCO-IHE

3.3.4 implementation of joint activities, such as workshops, conferences, training programmes, joint projects, field visits, software and data sharing, knowledge exchange and publications

Not yet

3.4 Relationships with the UNESCO field office whose jurisdiction covers the country of location

Participated in the meeting at the field office, but not yet started collaborative activities

3.5 Relationship with the UNESCO National Commission and the IHP National Committee in the country of location

The Director of ICHARM is serving as a chair person of IHP National Committee

3.6 Relationship with other UNESCO-related networks, such as UNESCO Clubs, ASPnet, and UNESCO chairs

No

4. Communication

4.1 Communication and knowledge dissemination activities undertaken in the framework of IHP

Training courses and following up seminars

4.2 Policy documents and advice

Not yet

5. Update on Centre Operations

5.1 Membership of the Advisory Board during designated period

Mr. Eugene Z. Stakhiv (Group1:USA)
International Water Advisor, Institute for Water Resources (IWR)
U.S. Army Corps of Engineers

Mr. Maciej Zalewski (Group2: Poland)
Director, International Centre for Ecology, Polish Academy of Sciences

Mr. Carlos EDUARDO Tucci (Group3: Brazil)
Professor, Federal University of Rio Grande do Sul

Mr. Muhammad Akram Kahlown (Group4: Pakistan)
Chairman, Pakistan Council of Research in Water Resources

Mr. Anwar George Hanna Jiries (Group5: Jordan)
Professor, Mu'tah University

Mr. Abou AMANI (Group6: Niger)
Scientific coordinator, AGRHYMET Regional Center

Mr. Andras Szollosi Nagy
Representative of the Director General, UNESCO

Mr. Avinash C. Tyagi
Representative of the Secretary General, WMO

Mr. Hans J.A. van Ginkel

Rector, United Nations University
Mr. Salvano Briceno
Director, UN/ISDR

Mr. Richard A. Meganck
Rector, UNESCO-IHE Institute for Water Education

Mr. Atsushi Hatakenaka
Senior Vice- President, Japan International Cooperation Agency (JICA)

Mr. Hiroaki Taniguchi
Vice-Minister for Engineering Affairs, Ministry of Land, Infrastructure and Transport

5.2 Key decisions made (attach minutes of meetings)

(Record of discussion is available for internal use)

6. Assessment of the Centre's Impacts

6.1 Science Impacts (Major contributions to the science, technology, education, and regional and/or international cooperation in the field of water)

Make contribution to the advancement of science and technology for preventing and mitigating water related disasters, through research activities including research collaboration with related organizations and programmes.

6.2 Knowledge Transfer Impacts (Major achievements in the dissemination of knowledge and technology transfer)

Make contribution for capacity development of responsible organizations for water related disaster management in the developing countries, through training courses mainly targeting practical engineers in the relevant field and following up activities of ex-trainees.

6.3 Policy Impacts (advice sought by government and other bodies and evidence of inputs into policy arena)

Make effort to work on policy makers for mainstreaming water related disaster management in the national and local development planning, by promoting the activities for sharing information and experiences and for stimulating discussions at various international occasions such as Asia Pacific Water Forum and World Water Forum.

7. Future activities that will contribute directly to IHP and/or to WWAP

7.1 Operational Plan (2008-2009) (attach operational plan for 2008-09 if available)

ICHARM conducts research, training and information networking activities in a combined manner to prevent and mitigate water related disasters, focusing on flood related disasters at the initial stage. Research projects include the following, which would contribute to IHP and WWAP activities;

-Case Studies on Strengthening of Flood Disaster Management Cycle
-Large Floods Report Project
-Development of a Satellite-based Rainfall Monitoring Technology for Flood Forecasting on a River Basin Scale
-Development of a basic Framework for Flood Forecasting and Warning using Satellite-based and GIS data
-Research on Flood Hazard Maps for Developing Countries
-Research on Flood Risk Assessment and Adaptation Measures to cope with possible future Global Climate Change

7.2 Strategic Plan linked with IHP-VII (attach strategic plan for 2008-11 if available)

In order to achieve its mission to function as the Centre of Excellence to provide and assist implementation of the best practicable strategies to localities, nations, regions and the globe to manage the risk of water related disasters, ICHARM promotes cooperation with related organizations and programmes, which include the following;

-Participating in international activities as a secretariat and/or a player, such as WWAP, IFI and Asia Pacific Water Forum
-Promoting joint projects in cooperation with existing UNESCO centres
-Maintaining and strengthening mutually cooperative partnerships with affiliate research institutes by exchanging personnel and conducting joint researches
-Building a close collaboration and appropriately sharing responsibilities with diverse related international programmes such as IF-Net, JWF and the Network of Asian River Basin Organizations (NARBO) to achieve synergy among the respective activities
-Planning and implementing research and training projects in cooperation with funding organizations such as the Japan International Cooperation Agency (JICA), Asia Development Bank (ADB) and World Bank (WB)

8. Annexes

8.1 List of publications released by the centre (there can be overlap with those listed in 2.2 above)

World Water Development Report #2 (Mar. 2006)
Technical Report on Global Trends of Water related Disasters (Oct. 2005)
Factor Analysis of Water-related Disasters in Bangladesh (June 2007)
Factor Analysis of Water-related Disasters in Sri Lanka (June 2007)
Factor Analysis of Water-related Disasters in the Philippines (June 2007)
Case Study on Risk Factor Analysis of 1991 Cyclone Disaster in Hatiya Island, Bangladesh (Feb. 2008)

8.2 List of training courses conducted (there can be overlap with those listed in 2.3 above)

Disaster Management Policy Programme – water related risk management course (1 yr master course jointly organized with Graduate Research Institute for Policy Studies (GRIPS), about 10 trainees)
Flood Hazard Mapping course (5 weeks, about 16 trainees)
River and Dam Engineering course (3 months, about 10 trainees)

Reports by UNESCO's Water-related Centres (category 1 and 2) on activities related to the IHP in the period July 2006 – May 2008

1. Basic information on the centre

Name of the Centre		International Centre on Qanats and Historic Hydraulic Structures (ICQHS)
Name of Director		Dr. Ali A. Semsar Yazdi
Name and title of contact person (for cooperation)		Mr. Majid Labbaf Khaneiki, Programme Specialist
E-mail		icqhs@yahoo.com
Address		Danesjoo Blvd., Yazd, Iran, POBox:89165-1553
Website		www.qanat.info
Location of centre		city/townYazdcountryIRAN_____
Geographic orientation *		☒global ☐ region
Year of establishment		2006
Themes	Focal Areas ♦	☒groundwater ☐ urban water ☒arid / semi-arid zones ☐ humid tropics ☐ droughts and floods ☐ sediment transport and management ☒ water and environment ☐ ecohydrology ☐ water law and policy ☐ transboundary river basins/ aquifers ☐ IWRM ☐ global and climate change ☐ mathematical modelling ☒ social and cultural dimensions of water ☒ water education ☐ other: (please specify) _____
	Scope of Activities ♦	☒ vocational training ☐ postgraduate education ☐ continuing education ☒research ☒ institutional capacity-building ☒ advising/ consulting ☐ software development ☐ other: (please specify) _____
Support bodies [1]		Ministry of Energy of the Islamic Republic of Iran (IRI)
Hosting organization [2]		
Sources of financial support [3]		IRI Ministry of Energy, IRI Ministry of Agriculture, IRI Budget & Planning Organization, UNESCO Tehran Cluster Office
Existing networks and cooperation [4]		G-wadi network, International Water History Association
Governance		☒ director and governing board ☐ other: (please specify) _____ Link to election of board members to the IHP IGC and hosting country IHP National Committee _____ Frequency of meetings: once every 1year(s)

* check on appropriate box
♦ check all that apply

[1] please specify bodies that cover the operational costs of the centre, and other essential costs such as salaries and utility bills, and that provide institutional support to ensure centre's sustainability
[2] if different from support bodies
[3] please specify sources of main budgetary and extrabudgetary funds to implement projects
[4] please write international networks, consortiums or projects that the centre is part of, or any other close links that the centre has with international organizations or programmes, which are not already mentioned above

	☒ Existence of UNESCO presence at meetings
Institutional affiliation of director	Ministry of Energy
Number of staff and types of staff	total number of staff (full-time, or equivalent) : ____10_____ number of staff who are water experts: _____5____ number of visiting scientists and postgraduate students: ____10_____
Annual turnover budget in USD	200,000 USD

2. Activities undertaken in the framework of IHP in the period July 2006 – May 2008

2.1 Educational activities (i.e., those with accreditation) that directly contributed to the IHP-VI and WWAP

One of the Educational activities of ICQHS which can be categorized under the topic of educational activities was the establishment of the Qanat training center. This training center which educates the technicians is situated in Taft a town near Yazd, Iran. The students of this collage can gain the skill of construction and rehabilitation of Qanat during a two year period. Actually there are 100 students busy studying there. This center is utilizing the experiences and knowledge of the traditional practitioners too. So this center bridges the gap between the modern sciences and indigenous know how. One of the problems that the Qanats are suffering from is the scarcity of skillful manpower to engage in Qanat-related activities. Thus, the main objective of this training center is to mitigate the present situation of Qanats by training some young experts who are equipped with both traditional knowledge and modern sciences.

2.2 Research activities that directly contributed to the IHP-VI and activities by WWAP

ICQHS has conducted some research projects in line with IHP-VI, whose results have been published as books or papers.

a. *The book Qanat from Practitioners' Point of View was compiled and published by ICQHS. This book contains some interviews with 16 traditional masters out of whom 4 masters unfortunately passed away just during this short time. The interviews are focused on the indigenous knowledge of Qanat construction and rehabilitation. This book is an attempt to preserve the human legacy of the ancient system of Qanat, which reflects the harmony the local people used to live in with nature. This book has been translated into English and the publishing of its English version is under way.*

b. *With UNESCO Tehran Cluster Office's support and advice, the book A Survey on the Qanats of Bam from Engineering Point of View which is a part of the project conducted by the above mentioned office was published. This book examines the impact of the 2003 earth quake on the Qanats in the region of Bam.*

c. *In cooperation with UNESCO Tehran Cluster Office, ICQHS succeeded in preparing the country report of qanats of Afghanistan, Iran and Pakistan. To preserve the ancient heritage of Qanat systems, UNESCO Tehran Cluster Office and ICQHS took the initiative to compile and produce a state-of-the-art report on Qanats of Afghanistan, Iran and Pakistan, within the framework of UNESCO's International Hydrological Programme (IHP) and UNESCO Tehran Cluster Office activities, focusing on IHP's main line of action "Mitigating water-related risks and facing social challenges". ICQHS took the lead to review, compile, make coherent and finalize the three reports into this report*

which gives a good insight into the status of Qanat systems in these three countries.

d. *The book "Qanat of Zarch" is a monographic study which has been done by ICQHS. This comprehensive study encompasses a large variety of subjects revolving around a particular Qanat from technical to cultural issues.*

e. *ICQHS has also presented some papers at international conferences as follows:*

●*Assessment of the Contribution of Traditional Qanats in Sustainable Water Resources Management, International Journal of Water Resources Development, Volume 22, Number 4, December 2006*

●*A survey on the Historical Evolution of Qanats in Iran, UNESCO, ICARDA G-wadi meeting on water harvesting, Aleppo, Syria, November 20-22, 2006*

●*The Drought of 2001; And the Measures Taken by Yazd Regional Water Authority, International Workshop on Groundwater for Emergency Situations, RCUWM, October 29-30, 2006, Tehran, Iran*

●*Effect of Water Pricing on Water Consumption, International Conference on Economic Incentives & Water Demand Management, Sultan Qaboos University, Collage of Agriculture and Marine Sciences, Oman, March 2006*

●*Ownership, Operation & Management Systems of the Qanat of Zarch, Fourth International Conference on Ains (Qanats), King Abdul Aziz University, Saudi Arabia, Jeddah, 2006*

●*A Comprehensive Survey on the Conferences on Qanats Held from 1980 to 2005, Fourth International Conference on Ains (Qanats), King Abdul Aziz University, Saudi Arabia, Jeddah, 2006*

●*Special Methods to Economize on Water; Some Lessons from Traditional Irrigation in Central Iran, International Workshop on Innovations in Water Conservation, RCUWM, Tehran, February 2006*

●*Experiences of the Yazd Regional Water Authority on Promoting the Public Awareness Concerning Groundwater Management and its Preservation, International Workshop on Public Participation, Awareness and Information Exchange for Water Resources Development and Management, Muscat, Sultanate of Oman, September 2005*

●*Optimizing the quality of water in qanat, international conference on qanat, Kerman, Iran, 2005*

●*Water distribution system, exploitation and management of the qanat of Zarch, international conference on qanat, Kerman, Iran, 2005*

●*Moving toward a sustainable management system to run water resources with the aid of the traditional management of qanats, international conference on qanat, Kerman, Iran, 2005*

●*Necessity of storm water drainages due to rapid extension of cities, case study: storm water drainage of Tehran, 5th international conference in sustainable techniques and strategies in urban water management (NOVATEC), June. 2004, LYON, FRANCE*

●*An introduction to Qanat as a traditional and sustainable system for underground water resources exploitation in central part of Iran, International scientific conference: The rational use and conservation of water resources in a changing environment, 10-15 July. 2003, Armenia, YEREVAN*

●*The impact of geological formations on the water quality in the Qanats of Enayat Abad and Fazeliyeh, national conference on qanat, Gonabad, Iran, 2003*

●*The methodology of compiling the qanat practitioners' indigenous knowledge, national conference on qanat, Gonabad, Iran, 2003*

●*Depletion of aquifer and struggle for extending qanats; an unfair competition, case study: the qanat of Zarch, national conference on qanat, Gonabad, Iran, 2003*

●*Interactions between city and qanat; a review on the qanats of Yazd, national conference on qanat, Gonabad, Iran, 2003*

●*Technical & historical aspects of "Vaqf abad" Qanat, Oman international conference on the development and management of water conveyance systems, 18-20 May. 2002, Muscat*

●*A survey on the structural and architectural aspects of the water reservoir of Amir Chakhmagh, international conference of water and human being, Ramsar, Iran, 2002*

●*Etude dune partie de Qanat de Zarch qui passé sous la ville de Yazd, Conference scientifique sure las galleries de captage, 5-7 June. 2001 MADRID*

●*A survey on the reasons of the deterioration of the qanats in the plains of Yazd, and some suggestions to stop that, International Conference on Qanat, Yazd, Iran, 2000*

●*The analysis of the functions of the qanats in Ebrahim Abad plain – Mehriz, International Conference on Qanat, Yazd, Iran, 2000*

●*The analysis of the present situation of the qanats in Yazd, International Conference on Qanat, Yazd, Iran, 2000*

●*The necessity of legislation and frameworks of the water exploitation to protect the water resources, Conference on Water Resources, Exploitation, and Optimum Consumption, Tabriz, Iran, 1997*

●*"Operation and Water Distribution of Qanats", International training course on Qanat; A Multidisciplinary Approach to Integrating Traditional Knowledge with Modern Development, 1-4 July 2007, Yazd, Iran, International Center on Qanats and Historic Hydraulic Structures, UNESCO*

●*"Exploitation of Groundwater in Iran from the Last Century to the Present", Pasts and Futures of Water, 5th IWHA Conference, 14-17 June 2007, Tampere, Finland, IWHA (International Water History Association)*

●*"Traditional Water Management; an Inspiration for Sustainable Irrigated Agriculture in Central Iran", International History Seminar on Irrigation and Drainage, 2 – 5 May 2007, Tehran, Iran, Iranian National Committee on Irrigation and Drainage (IRNCID), International Commission on Irrigation and Drainage (ICID)*

●*"The Effects of Land Reform on Qanats in Iran", Fourth International Conference on Ains (Qanats), April 2-4, 2006, King Abdul aziz University, Jeddah, Saudi Arabia*

●*"Full Exploitation of Groundwater and its Economical-Social Backlashes", International Conference on Hydrogeological Transboundary Problems, November 22-26, 2004, Polish Geological Institute, Warsaw, Poland*

●*"The Techniques of Digging and Repairing of Qanats and the Common Barriers", National Conference on Qanat, 2004, Gonabad, Iran*

●*"The Role of Qanat in the Formation of a Civilization", International Conference on the Cultural Approach in Geography, May 15-17, 2000, Ferdowsi University, Mashhad, Iran*

●*"Qanat-related Civilization", International Symposium on Qanat, 2000, UNESCO & Regional Water Authority of Yazd, Yazd, Iran*

2.3 Training activities that directly contributed to the IHP-VI and WWAP objectives

● *In line with Theme 5 - Water Education and Training of IHP-VI, ICQHS has so far held two international workshops on the subject of qanat, groundwater and sustainability. One of these events was the workshop on Groundwater Artificial Recharge and Rainwater Harvesting in Arid and Semi – Arid Regions of Asia which was held in Yazd in cooperation with UNESCO Tehran Cluster Office, G-wadi and ISESCO. This workshop could bring together many scholars from the neighboring countries and provided them with an opportunity to exchange their ideas which led to some fruitful results. The final statement of this workshop is known as Yazd declaration and the experts usually make reference to it. A complete report has been submitted to UNESCO and the other relevant authorities. The proceedings of this training workshop was published under the title "Proceedings of Regional Workshop on Management of Aquifer Recharge and Water Harvesting in Arid and Semi-arid Regions of Asia", and sent out to the different scientific centers.*

● *Next event was the first international training course on Qanat; A Multidisciplinary Approach to Integrating Traditional Knowledge with Modern Development. This course which was supported by UTCO was aimed at developing the knowledge and technology of qanat. This event was scheduled to be hold during 4 days with about 30 hours course. The lecturers of this training course were ranked among the most outstanding researchers in the field of qanat. The main objectives of this training course were to:*

a. Disseminate world experiences on various aspects of Qanats;

b. Incorporate the indigenous knowledge into the new methods of construction, preservation, rehabilitation and operation of Qanat systems;

c. Turn Qanats into an interdisciplinary tool where the traditional know - how and the modern techniques work together;

d. Familiarize experts with the importance of cultural and technical aspects of Qanat systems as well as the community life linked to these systems.

This training course brought together the resource persons and trainees from ten countries of the world. The participants came almost from the cluster countries, Iraq, Japan and Oman.

3. Collaboration and linkages

3.1 Participation in major international networks, programmes, partnerships with other UN or other International Agencies, media and professional bodies

ICQHS is an official member of the International Water History Association, and has a close cooperation with them. An agreement between ICQHS and IWHA is under way and will be exchanged soon.

3.2 Participation in meetings related to the IHP and UNESCO (e.g., the UNESCO General Conference, the UNESCO Executive Board, the IHP Intergovernmental Council and/or other meetings organized by IHP)

To date ICQHS has participated in two meetings of this kind:

a. *Meeting of the Directors of Water Related Centers (Category I and Category II Centers) in Delft, the Netherlands, IHE-UNESCO Venue,11-12 June 2007*
b. *Meeting of Asia-Pacific Category II Water–Related Centers, Bangkok, Thailand, UNESCO, 26-27 September 2007*

3.3 Collaboration and networking with other UNESCO category 1 or 2 institutes/ centres

3.3.1 cross-appointment of directors of the category 1 or 2 institutes or centres on the governing board

The Director of the Regional Center on Urban water Management (RCUWM) is a member of the Governing Board of ICQHS.

3.3.2 exchange of information on activities such as training/educational materials, and funding opportunities

3.3.3 exchange of staff, most notably professionals and students

The Director of ICQHS is going to give some lectures at a course entitled Traditional Water Supplying Systems which is to take place at IHE-UNESCO in September 2008.

3.3.4 implementation of joint activities, such as workshops, conferences, training programmes, joint projects, field visits, software and data sharing, knowledge exchange and publications

3.4 Relationships with the UNESCO field office whose jurisdiction covers the country of location

ICQHS is in close relationship with UNESCO Tehran Cluster Office (UTCO). Most of our research and training activities are done under the supervision of this office such as:

a. *Publishing the book A Survey on the Qanats of Bam from Engineering Point of View*
b. *Preparing the country report of Qanats of Afghanistan, Iran and Pakistan*
c. *Holding the workshop on Groundwater Artificial Recharge and Rainwater Harvesting in Arid and Semi – Arid Regions of Asia*
d. *Holding the first international training course on Qanat; A Multidisciplinary Approach to Integrating Traditional Knowledge with Modern Development*

3.5 Relationship with the UNESCO National Commission and the IHP National Committee in the country of location

Director of ICQHS is member of IHP National Committee and regularly attends its meetings which are held every month in Tehran.

3.6 Relationship with other UNESCO-related networks, such as UNESCO Clubs, ASPnet, and UNESCO chairs

Some cooperation between ICQHS and UNESCO Iraq Office has just started in the field of training. Also, upon their recommendation we are in the process of translating some books for Iraqi experts.

4. Communication

4.1 Communication and knowledge dissemination activities undertaken in the framework of IHP

Herein ICQHS has taken some measures as follows:

a. *Putting forward a proposal on adding some information on Qanat to the primary schools textbooks*
b. *Getting on Iranian TV programs to describe the importance of Qanats and historic hydraulic structures in order to enhance the public awareness about the role of traditional water harvesting systems in sustainable development.*
c. *Teaming up with some directors in making some documentary movies about Qanats and historic hydraulic structures*

4.2 Policy documents and advice

5. Update on Centre Operations

5.1 Membership of the Board of Governors during designated period

The International center is administered by a Governing Board composed of:
a. A representative of the Iranian Government.
b. A representative of each of the other Member States that have sent the Director General of UNESCO notification, and make a substantial contribution to the operating budget or running of the international center, and are thus accorded a seat by a decision of the Governing Board.
c. A representative of the Director- General of UNESCO.
d. The Director of the Regional center on Urban water Management (RCUWM) Tehran.
e. A representative of any other intergovernmental organization or international non governmental organization making a substantial contribution to the operating budget or running of the international center and accorded a seat by a decision of the Governing Board.
f. The Minister of Energy (Minister in change of water affairs) of the Islamic Republic of Iran or the person he designates.

The I.R. of Iran's minister of energy has designated deputy minister in water and wastewater affairs as the chairman of the governing board and has also invited the water-related ministers of the countries Pakistan, Afghanistan, Egypt, Oman, Italy, Spain, China, Iraq, and Germany to join the governing board. Fortunately, the minister's proposal was hailed by the countries Pakistan, Afghanistan, China, Italy and Iraq. Thus the first governing board meeting is going to take place in July 2008, with the presence of Dr. Nagy UNESCO's representative and the representatives of the countries China, Afghanistan, Pakistan, ….

** The governments of these countries have hailed having delegate in the governing board, but they have not nominated their representatives yet.*

5.2 Key decisions made (attach minutes of meetings)

Given that the governing board meeting of ICQHS has not still been held, there is no minutes of meeting available.

6. Assessment of the Centre's Impacts

6.1 Science Impacts (Major contributions to the science, technology, education, and regional and/or international cooperation in the field of water)

Taking into account that ICQHS has not long been established, it seems early to judge its impacts on sciences.

6.2 Knowledge Transfer Impacts (Major achievements in the dissemination of knowledge and technology transfer)

Although ICQHS has been established recently, to date it could have made some progresses in disseminating knowledge and transferring technology through the following activities:

- *Training students: ICQHS set up the training center of Qanat where the traditional methods are handed down to tens of students learning how to protect and develop the system of Qanat.*
- *Documenting indigenous know how: ICQHS has sent out expeditions to gather traditional knowledge on Qanat through interviewing the elderly Qanat masters*

the last generation who are vanishing. The book Qanat from Practitioners' Point of View contains some of that information.

● Holding technical workshops: ICQHS periodically holds technical workshops for those who are involved in groundwater or Qanat-related issues. These events are aimed at incorporating the indigenous knowledge into the new methods of construction, preservation, rehabilitation and operation of Qanat systems. Through such workshops the participants can get familiar with the significant role the Qanats can play in sustainable groundwater exploitation, and also with the cultural and technical values the system of Qanat carries.

6.3 Policy Impacts (advice sought by government and other bodies and evidence of inputs into policy arena)

ICQHS started some negotiations at governmental level which eventually led to an official agreement between the Iranian Ministry of Energy and Ministry of Agriculture. This agreement emphasizes the necessity of training on Qanat technology that the experts of both ministries should receive from ICQHS. Also this agreement stipulates that both ministries should allocate a fund to research projects on different aspects of Qanats, which would be done by ICQHS.

7. uture activities that will contribute directly to IHP and/or to WWAP

7.1 Operational Plan (2008-2009) (attach operational plan for 2008-09 if available)

ICQHS's future activities mostly pertain to research and training as follows:
a. future training activities: ICQHS is in the process of organizing a technical training course on Qanat for Iraqi experts, which will be held from 28 June to 11 July 2008. UNESCO Office for Iraq has recommended us to foresee such a training course to update the Iraqi experts on the methods of rehabilitating and repairing Qanat systems, in order to better preserve this technique in Iraq. The main objectives of the course are to:
– incorporate the indigenous knowledge into the new methods of construction, preservation, rehabilitation and operation of Qanat systems.
– get familiar the Iraqi experts with the significant role the Qanats in Iraq can play in sustainable groundwater exploitation.
– get familiar the Iraqi experts with the cultural and technical values the system of Qanat carries.
Another training activity which is under way is an annual international workshop on Qanat. This program is now on the agenda of the upcoming governing board meeting.

b. future research activities:
● Preparation of the Methodology of the Atlas of: in case this project would be successfully finished, we can make use of this methodology in extending the work to other areas in order to prepare the world atlas of Qanats.
● A survey on the negative impacts of the developmental projects on Qanats and the ways to prevent the further destructions: This project is being done with the support of the Iranian ministry of energy (WRMO).
● 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.
● Groundwater Management in the Arid Regions; Some Lessons from Indigenous Knowledge: This project examines 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.
● A Survey on the Possibility of Generating Electricity out of the System of Qanat: this project takes up the interface of the renewable energy and sustainable exploitation of groundwater.
● A Survey on the Historical Effect of Qanat on the Scio-Political structures in Central Plateau of Iran
● A Survey on the Utilization of Qanat Water in Domestic Sector in Urban Societies (Case Study: Qanat of Dowlat Abad, Yazd and Qanats of Emamiye and Qasem Abad, Mashhad)

● *The Role of Qanat in Settling the Human Communities and Creating the Agricultural Civilizations in Northern Khorasan*
● *History of Water and Irrigation in Northern Khorasan*
● *Traditional Water Management Systems in Northern Khorasan*

7.2 Strategic Plan linked with IHP-VII (attach strategic plan for 2008-11 if available)

Taking into account that the governing board meeting will take place next month, we are in the process of preparing the ICQHS's strategic plan in line with IHP-VII to put it on the agenda of the governing board. A copy of the strategic plan would be submitted to you, as soon as it would be finalized.

8. Annexes

8.1 List of publications released by the centre (there can be overlap with those listed in 2.2 above)

●*The book Qanat from Practitioners' Point of View*
●*The book A Survey on the Qanats of Bam from Engineering Point of View*
●*English version of the book A Survey on the Qanats of Bam from Engineering Point of View*
●*Country report of Qanats of Afghanistan, Iran and Pakistan*
●*The book Qanat of Zarch*
●*Proceedings of the workshop on Groundwater Artificial Recharge and Rainwater*
●*Harvesting in Arid and Semi – Arid Regions of Asia*
●*Proceedings of the first international training course on Qanat; A Multidisciplinary*
●*Approach to Integrating Traditional Knowledge with Modern Development*

8.2 List of training courses conducted (there can be overlap with those listed in 2.3 above)

●*Workshop on Groundwater Artificial Recharge and Rainwater Harvesting in Arid and Semi – Arid Regions of Asia* ●*First international training course on Qanat; A Multidisciplinary Approach to Integrating Traditional Knowledge with Modern Development*

Reports by UNESCO's Water-related Centres (category 1 and 2) on activities related to the IHP in the period July 2006 – May 2008

1. Basic information on the centre

Name of the Centre		UNESCO IHP-HELP Centre for Water Law, Policy and Science
Name of Director		Professor Dr Patricia Wouters
Name and title of contact person (for cooperation)		Professor Dr Patricia Wouters Director, Dundee UNESCO Centre
E-mail		p.k.wouters@dundee.ac.uk
Address		University of Dundee, Dundee, Scotland, UK DD1 4HN
Website		www.dundee.ac.uk/water
Location of centre		city/town __Dundee_____ country Scotland UK _____
Geographic orientation *		X global ☐ regional
Year of establishment		2006
Themes	Focal Areas ♦	☐ groundwater ☐ urban water ☐ arid / semi-arid zones ☐ humid tropics X droughts and floods ☐ sediment transport and management X water and environment X ecohydrology X water law and policy X transboundary river basins/ aquifers X IWRM X global and climate change ☐ mathematical modelling ☐ social and cultural dimensions of water X water education X other: leadership; regional peace and security; operationalising interdisciplinary approach; _____
	Scope of Activities ♦	X vocational training X postgraduate education X continuing education XX research X institutional capacity-building X advising/ consulting ☐ software development X other: developing international networks _____
Support bodies [1]		Scottish Higher Education Funding Council
Hosting organization [2]		University of Dundee
Sources of financial support [3]		SHEFC and research grants
Existing networks and cooperation [4]		IHE-Delft; EU Research consortia; UN WWAP network; research project consortia;
Governance		X director and governing board ☐ other: (please specify) _____ Link to election of board members to the IHP IGC

* check on appropriate box
♦ check all that apply

[1] please specify bodies that cover the operational costs of the centre, and other essential costs such as salaries and utility bills, and that provide institutional support to ensure centre's sustainability
[2] if different from support bodies
[3] please specify sources of main budgetary and extrabudgetary funds to implement projects
[4] please write international networks, consortiums or projects that the centre is part of, or any other close links that the centre has with international organizations or programmes, which are not already mentioned above

	and hosting country IHP National Committee _____ Frequency of meetings: once every year ☐ Existence of UNESCO presence at meetings
Institutional affiliation of director	
Number of staff and types of staff	total number of staff (full-time, or equivalent) : ___10_____ number of staff who are water experts: ____8_____ number of visiting scientists and postgraduate students: ____10_____
Annual turnover budget in USD	$ 750,000.00

2. Activities undertaken in the framework of IHP in the period July 2006 – May 2008

2.1 Educational activities (i.e., those with accreditation) that directly contributed to the IHP-VI and WWAP
Please include here those activities which led to accreditation of degrees, or those held in formal school settings.

- *LLM in water law & policy; MBA and MSc in water law & policy*
- *PhD in water law & policy*
- *LLM in Conflict Management – joint degree with IHE-Delft and UNESCO PCCP (MSc and LLM degrees)*

2.2 Research activities that directly contributed to the IHP-VI and activities by WWAP
Please include research/applied projects outputs such as publications that directly contributed to the IHP-VI and WWAP objectives

- Dundee provides the water law expertise for the WWAP WWDR; Professor Patricia Wouters, Director of the Dundee UNESCO Centre, co-chairs with Dr Stefano Burchi (FAO), the Legal Experts Group for WWAP and works with Dr Sarah Hendry from the Dundee UNESCO Centre to coordinate the inputs for the legal inputs for WWAP.
-

2.3 Training activities that directly contributed to the IHP-VI and WWAP objectives

3. Collaboration and linkages

3.1 Participation in major international networks, programmes, partnerships with other UN or other International Agencies, media and professional bodies

3.2 Participation in meetings related to the IHP and UNESCO (e.g., the UNESCO General Conference, the UNESCO Executive Board, the IHP Intergovernmental Council and/or other meetings organized by IHP)

3.3 Collaboration and networking with other UNESCO category 1 or 2 institutes/ centres

3.3.1 cross-appointment of directors of the category 1 or 2 institutes or centres on the governing board

3.3.2 exchange of information on activities such as training/educational materials, and funding opportunities

3.3.3 exchange of staff, most notably professionals and students

3.3.4 implementation of joint activities, such as workshops, conferences, training programmes, joint projects, field visits, software and data sharing, knowledge exchange and publications

The Dundee UNESCO Centre now cooperates with IHE-Delft to launch the first co-institutional graduate degree programme, which involves also the UNESCO PCCP programme. The co-institutional degree programme comprises an MSc in Water Management – specialization in Water Conflict Management; and LLM in Water Governance and Conflict Resolution. The first intake of students is 2008/2009.

3.4 Relationships with the UNESCO field office whose jurisdiction covers the country of location

3.5 Relationship with the UNESCO National Commission and the IHP National Committee in the country of location

The Dundee UNESCO Centre participates in meetings of the IHP National Committee and also in meetings of the UNESCO National Commission. Professor Wouters serves as a member of the UNESCO Scotland branch and attends the National Commission meetings of UNESCO Chairs.

3.6 Relationship with other UNESCO-related networks, such as UNESCO Clubs, ASPnet, and UNESCO chairs

The Dundee UNESCO Centre has ad hoc arrangements with other UNESCO Centres; it participates in the UK national commission (with UK IHP; and with UK UNESCO chairs committee; also with UNESCO UK / Scotland committee)

4. Communication

4.1 Communication and knowledge dissemination activities undertaken in the framework of IHP

4.2 Policy documents and advice

Details in Annex attached.

5. Update on Centre Operations

5.1 Membership of the Board of Governors during designated period

5.2 Key decisions made (attach minutes of meetings)

The first meeting of the Governing Board is set for September 2008; the Members include: University of Dundee Principal Sir Alan Langlands; a representative of UNESCO as delegated by the Director General; Dr John Francis (UNESCO Scotland and UNESCO UK delegate); Dr Alan Sutherland (Water Industries Comissioner, Scotland); Dr Bill Cosgrove (UNESCO WWAP); Dr David Gani (Scottish Funding Council; sitting in his personal capacity).

6. Assessment of the Centre's Impacts

6.1 Science Impacts (Major contributions to the science, technology, education, and regional and/or international cooperation in the field of water)

6.2 Knowledge Transfer Impacts (Major achievements in the dissemination of knowledge and technology transfer)

6.3 Policy Impacts (advice sought by government and other bodies and evidence of inputs into policy arena)

7. Future activities that will contribute directly to IHP and/or to WWAP

7.1 Operational Plan (2008-2009) (attach operational plan for 2008-09 if available)

7.2 Strategic Plan linked with IHP-VII (attach strategic plan for 2008-11 if available)

This is contained within UK IHP national committee report.

8. Annexes

8.1 List of publications released by the centre (there can be overlap with those listed in 2.2 above)

8.2 List of training courses conducted (there can be overlap with those listed in 2.3 above)

Annex 1: Key Objectives of Dundee UNESCO IHP-HELP Centre

1. UNESCO Resolution: Article 3 Objectives and functions

1. The objectives of the IHP-HELP Centre are:
(a) to provide a facility that promotes an interdisciplinary approach to addressing global water issues with a focus on poverty reduction and international development issues (including the United Nations Millennium Development Goals related to water), and, including water law (international, national and transnational water law) as an essential and integral element thereof;
(b) to provide the intellectual leadership necessary in achieving this approach and to establish a dedicated institution for the dissemination of relevant research and scholarship on the topic, available to the global water-concerned community worldwide and aimed at generating goodwill with the international community;
(c) to communicate legal expertise on global water issues for the HELP Programme of the UNESCO IHP, especially through the IHP-HELP Regional Coordinating Units, as well as to support the other water-related activities of IHP.
(d) to act as the Regional Coordinating Unit for the European HELP basins and proactively interact with other HELP Regional Coordinating Units.

2. The functions of the IHP-HELP Centre shall be to:
(a) design, develop and deliver educational and training activities related to its interdisciplinary approach to water-resources management, with a particular focus on poverty reduction and international development, including assisting States to achieve the United Nations Millennium Development Goals related to water;
(b) convene interdisciplinary scientific symposia and conferences at regional and international levels, as well as training workshops, with a particular focus on interfacing water law, policy and science and to developing capacity within nation-states worldwide;
(c) provide a focal point for HELP basins worldwide on issues related to water law and the interface between water law, policy and science issues;
(d) endeavour to establish the Spey Basin (Scotland) as a HELP basin for research and training within the IHP-HELP Centre's mandate of providing an interface between hydrological research and water policy and law; and act as liaison with related UK-based research programmes, such as CHASM-HELP (Catchment Hydrology and Sustainable Management), SNIFFER (Scotland and Northern Ireland Forum for Environmental Research), RELU (Rural Economy and Land Use Programme);
(e) develop new approaches to water resources management incorporating water law, policy and science as integrated components to address global water problems, with efforts also to support the development of a new generation of water leaders at the national level worldwide, familiar with the IHP-HELP Centre approach;
(f) provide a forum for think-tank meetings on water-related topics;
(g) provide expert input as required by UNESCO IHP; and
(h) collaborate proactively with other UNESCO HELP Regional Coordinating Units and IHP Water Centres.

3. The IHP-HELP Centre shall pursue the above objectives and functions in close coordination with UNESCO IHP, and in particular, the IHP-HELP Programme.

4. The IHP-HELP Centre shall carry out the above functions to the extent to which resources and international support can be mobilized.

2. Scottish Funding Council - Key objectives

1. To establish a **global Centre of Excellence** in water law, policy and science and enhance Scottish excellence in water-related research;

2. To **enhance existing excellence in water law** through the creation of a new Chair and a Senior Lectureship in Water Law, supported by PhD research studentships (a broader research base);

3. To **enhance existing excellence in water science** through the creation of a new Chair in Water Science, to serve the UNESCO HELP programme, supported by PhD research studentships;

4. To develop an **operational model of engagement** that enhances the integration of research and uptake of research across the disciplines of water law, policy and science (broadly defined, i.e. hydrology, life sciences, social sciences);

5. To focus **on identifying means to assist States** to address their water related challenges, including supporting developing countries to meet their Millennium Development Goals (MDGs) through research outputs and training developed and disseminated by the Centre;

6. To act as the **Regional Coordinating Unit for the European UNESCO HELP basins** and provide water law and policy input for the global HELP network of 67 basins;

7. To develop and implement the **"Water Law - Water Leaders" LLM postgraduate programme**, especially in developing country regions, e.g., Africa, Central Asia, South-east Asia;

8. To convene **international symposia, including high-level meetings** on relevant topics, featuring UNESCO HELP basins as developmental case studies for the integrated approach to water law, policy and science;

9. To develop a Scottish river basin as **a model HELP basin** for developing expertise on integrated water law, policy and science approaches to addressing basin-wide water resource management issues; to link the Scottish basin to other HELP basins which seek to integrate water law, policy and science;

10. To act as an **international think-tank**, bringing together researchers from Scotland and abroad for symposia and experts meetings to address the world's water resource management problems, with a particular focus on poverty reduction.

Current Year Priority Objectives (2007/2008)

1. Establish the Governing Board and the Research Advisory Group and develop a Research Strategy for the Centre.

2. Plan and implement high profile "launch" of the Centre, with international officials invited to Scotland for the event.

3. Investigate procedure for making honorary appointments to Centre from world-wide network.

4. Recruit 4 PhD students this year.

5. Consolidate links with Scottish public and private sector institutions in the water sector to ensure effective information transfer between UNESCO Centre and the water sector in Scotland.

6. Begin to develop strategy to support European HELP Basins; Dundee to consolidate its leadership role as Regional Coordinating Unit for UNESCO European HELP basins. Identify a Scottish HELP basin to use as an exemplar of best practice.

7. Convene International Steering Committee, devise strategy and host International HELP Basin Symposium in Dundee, to exchange best practice across Europe.

8. Convene International Symposium (joint with European Water Partnership, Global Water Partnership and American Water Resources Association) on Water Security in Brussels.

9. Finalise the content and delivery of **Water Law - Water Leaders** LLM programme as fundamental pillar for capacity-development; target key sponsors and regions for implementation of a pilot programme. Seek local in-county regional partnerships to assist in development of Regional Centres of Excellence, mentored by the UNESCO Centre, with the objective of in-country capacity-development in water law, policy and science.

10. Devise and implement plan for further international uptake of Dundee Legal Assessment Model, developing in particular the water law, policy and science interface

11. In association with national and international partners, initiate work on the joint delivery of River Basin Management Plans and Flood Risk Management Plans in accordance with EU Directives.

12. **All and ongoing**
    - Consolidate links with academics and other practitioners world-wide working in cognate fields.
    - Identify key international events for outreach activities (i.e. keynote addresses consistent with Centre's objectives).
    - Target specific global programmes that offer opportunities for research proposals in line with the objectives of the Centre. Develop initial research proposals for projects exploiting the enhanced capacity of the Centre.

Longer Term Objectives

Medium Term Strategy: leading on key water law, policy and science research themes (Year 3 Oct 08/ Sept 09)

Convene international think-tank meeting with key global actors on topics related to the role of the private and public sector in water services provision – with a specific focus on the challenges in developing countries and the supporting role of the water law, policy and science interface (technology transfer; new PPP models, water services governance, etc). Seek sponsorship for the PPP think-tank meeting and commitment from world leaders on the topic for meeting in Dundee. Prepare possible outputs on the topic for the World Water Forum meeting (Turkey 2009).

Develop more deeply the transnational water law (water services governance, PPP) programme and outreach.

Convene a think tank of international experts to explore water and health issues, focussing on experiences and expertise in Scotland and poverty-related diseases with a view to develop new water law / science research themes for Year 4.

Implement first **Water Law – Water Leaders** LLM regional training programme.

In association with national and international partners, continue work on joint delivery of River Basin Management Plans and Flood Risk Management Plans in accordance with EU Directives.

Continue to support HELP programme with Dundee as Regional Coordinating Unit for UNESCO European HELP basins.

Recruit third tranche of PhD students.

Initiate discussions with EU on devising more effective EU FP calls (i.e. influence the policy for development calls).

Long Term Strategy: Pioneering new cross-cutting issues in water law, policy, science and health issues (Year 4 Oct 09/ Sept 10)

Develop platform of support for seeking international funding to address crosscutting issues in the area of water law, policy, science and the role of of the public and private sectors in water services provisions (PPP and governance).

Water Law - Water Leaders LLM programme fully operational.

Recruit fourth tranche of PhD students.

Cross-fertilisation of research expertise between Scotland and the international HELP networks working effectively and efficiently.

Recognition -- by international organisations, national governments, non-governmental organisations, multi-nationals, and academic institutions -- of the Dundee UNESCO Centre as the “international think-tank” for issues related to water law, policy and science.

Annex 2: List of Publications Dundee UNESCO IHP-HELP Centre

Kluwer International and National Water Law Book Series (P. Wouters & S. Vinogradov, Series Editors)

- Volume 1: *International Water Law - Selected Writings of Professor Charles B. Bourne*, Patricia Wouters, Kluwer Law International, ISBN 90-411-0714-2, (1998).
- Volume 2: *Dividing the Waters. The Resolution of Interstate Water Conflicts in the United States*, George William Sherk, Kluwer International, London, ISBN 90-411-9819-9, (2000).
- Volume 3*: International Law of Water Resources. Contribution of the International Law Association (195402000)*, Slavko Bogdanovic, Hardbound, ISBN 90-411-1623-0, June 2001.
- Volume 4: *The United Nations Convention on the Law of International Watercourses*, Attila Tanzi, Maurizio Arcari , Kluwer Law International , ISBN 90-411-1652-4, (2001).
- Volume 5: *Water Projects. A Commercial and Contractual Guide*, Jeffrey Delmon, Kluwer Law International, ISBN 90-411-1685-0, (2001).
- Volume 6: *Building a Regime for the Waters of the Euphrates-Tigris River Basin*, Aysegal Kibaroglu, Kluwer Law International, ISBN 90-411-1897-7, (2002).
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Format for Reports by UNESCO's Water-related Centres (category 1 and 2) on activities related to the IHP in the period July 2006 – May 2008

1. Basic information on the centre

Name of the Centre		International Research and Training Center on Erosion and Sedimentation (IRTCES)
Name of Director		Kuang Shangfu
Name and title of contact person (for cooperation)		Hu Chunhong, Secretary General and Vice Director
E-mail		huch@iwhr.com
Address		20 Chegongzhuang West Road, Beijing 100044
Website		www.irtces.org
Location of centre		city/town Beijing____country _China_____
Geographic orientation *		√ ☐ global ☐ regional
Year of establishment		1984
Themes	Focal Areas	☐ groundwater ☐ urban water ☐ arid / semi-arid zones ☐ humid tropics ☐ droughts and floods √ ☐ sediment transport and management √ ☐ water and environment ☐ ecohydrology ☐ water law and policy ☐ transboundary river basins/ aquifers ☐ IWRM ☐ global and climate change √ ☐ mathematical modelling ☐ social and cultural dimensions of water √ ☐ water education ☐ other: (please specify) _____
	Scope of Activities ♦	√ ☐ vocational training ☐ postgraduate education √ ☐ continuing education √ ☐ research ☐ institutional capacity-building √ ☐ advising/ consulting ☐ software development ☐ other: (please specify) _____
Support bodies [1]		Ministry of Water Resources, China
Hosting organization [2]		
Sources of financial support [3]		Ministry of Water Resources, UNESCO, IRTCES service rendered

* check on appropriate box

[1] please specify bodies that cover the operational costs of the centre, and other essential costs such as salaries and utility bills, and that provide institutional support to ensure centre's sustainability
[2] if different from support bodies
[3] please specify sources of main budgetary and extrabudgetary funds to implement projects

Existing networks and cooperation [4]	● World Association for Sedimentation and Erosion Research（WASER） ● Network of Regional Water Knowledge Hub in Asia-Pacific Region ● Network of Asian River Basin Organization ● International Association of Hydraulic Engineering and Research (IAHR) ● IAHS ● Universiti Teknologi Mara (UiTM), Malaysia ● National Centre for Computational Hydroscience and Engineering of the University of Mississippi (NCCHE). USA ● National Hydroelectric Power Corporation LTD. (NHPC), India ● ICHARM, Japan ● Elsevier
Governance	√ ☐ director and governing board √ ☐ other: (please specify) International Advisory Council Link to election of board members to the IHP IGC and hosting country IHP National Committee _____yes Frequency of meetings: once every _2_year(s) √ ☐ Existence of UNESCO presence at meetings
Institutional affiliation of director	Ministry of Water Resources, China
Number of staff and types of staff	total number of staff (full-time, or equivalent) : 15 number of staff who are water experts: 11 number of visiting scientists and postgraduate students: 3（访问学者和学生）
Annual turnover budget in USD	0.3 million USD

2. Activities undertaken in the framework of IHP in the period July 2006 – May 2008 I

2.1 Educational activities (i.e., those with accreditation) that directly contributed to the IHP-VI and WWAP

Please include here those activities which led to accreditation of degrees, or those held in formal school settings.

N/A

2.2 Research activities that directly contributed to the IHP-VI and activities by WWAP

Please include research/applied projects outputs such as publications that directly contributed to the IHP-VI and WWAP objectives

[4] please write international networks, consortiums or projects that the centre is part of, or any other close links that the centre has with international organizations or programmes, which are not already mentioned above

Under the framework of UNESCO-IHP International Sediment Initiative, IRTCES carried out four case studies in the period of 2006-2008. The purpose of the studies is to contribute the integrated river basin management under Eco-hydrology by increasing awareness of eco-hydrology approach and sedimentation and erosion issues, as well as to promote sustainable integrated water resources management and advice on policy development and implementation.

- Integrated Physical and Ecological Management of Rivers – with Particular Reference to the East River—Phase I & II (Case study) 2006-2007
- Case study of the Yellow River Sedimentation (2005-2006)
- Sediment Management and Wetland Conservation at Yellow River Mouth (case study) 2006
- Report of Changing in water and sediment loads of Rivers in China and Wrapping dams in China (contribution to WWDR – 3) 2007
- Research project on Variation in Runoff and Sediment Load in the Pearl River Basin and Its Cause (case study) 2008

2.3 Training activities that directly contributed to the IHP-VI and WWAP objectives

- Flood Forecasting and preparedness at DPRK
- International Advanced Training Workshop on Reservoir Sedimentation
- National Advanced Training Workshop on Hydroproject Construction

3. Collaboration and linkages

3.1 Participation in major international networks, programmes, partnerships with other UN or other International Agencies, media and professional bodies

- World Association for Sedimentation and Erosion Research (WASER)
- UNESCO-IHP International Sediment Initiative (ISI)
- Network of Regional Water Knowledge Hub in Asia-Pacific Region
- Network of Asian River Basin Organization (NARBO)
- International Association of Hydraulic Engineering and Research (IAHR)
- IAHS
- Universiti Teknologi Mara (UiTM), Malaysia
- National Centre for Computational Hydroscience and Engineering of the University of Mississippi (NCCHE). USA
- National Hydroelectric Power Corporation LTD. (NHPC), India
- ICHARM, Japan
- Elsevier

3.2 Participation in meetings related to the IHP and UNESCO (e.g., the UNESCO General Conference, the UNESCO Executive Board, the IHP Intergovernmental Council and/or other meetings organized by IHP)

- Director Meeting of Asia-Pacific Category II Water–Related Centers UNESCO Bangkok Office on September 26-27, 2007
- Meeting of the Directors of UNESCO's Water-related Centers Delft, 11–12 June 2007
- The 17th session of the Intergovernmental Council of the International Hydrological Programme (IHP) , UNESCO Headquarters in Paris from 3 to 7 July 2006
- 5th ISI Steering Committee Meeting, UNESCO-IHP-ISI, in Sudan, November 11, 2006
- International Sediment Initiative Conference, UNESCO-IHP-ISI, Sudan on November 12-15, 2006

3.3 Collaboration and networking with other UNESCO category 1 or 2 institutes/ centres

- Regional Humid Tropics Hydrology and Water Resources Centre (HTC, Malaysia)
- Regional Centre on Urban Water Management (RCUWM, Iran)
- International Center on Qanats and Historic Hydraulic Structures (ICQHHS, Iran)
- International Centre for Water Hazard and Risk Management (ICHARM, Japan)

3.3.1 cross-appointment of directors of the category 1 or 2 institutes or centres on the governing board
Not yet

3.3.2 exchange of information on activities such as training/educational materials, and funding opportunities

- Exchange visit of directors between IRTCES and International Center for Hazard and Risk Management (ICHARM) (???)
- Exchange of information on activities with International Center for Hazard and Risk Management (ICHARM)
- Training materials have been uploaded in IRTCES's websites for information exchanging.

3.3.3 exchange of staff, most notably professionals and students
Not yet

3.3.4 implementation of joint activities, such as workshops, conferences, training programmes, joint projects, field visits, software and data sharing, knowledge exchange and publications

3.4 Relationships with the UNESCO field office whose jurisdiction covers the country of location

IRTCES keeps closed cooperative relationship with UNESCO Office Beijing. Every year IRTCES has 2-3 or more projects contracted with UNESCO since its establishment. Beijing UNESCO office played a very important role in guiding and assisting IRTCES in the preparation of project proposal, activities implementation and evaluation. Especially, Beijing Office tried its best to promote collaboration between UNESCO filed offices for training programs (training activities in 2005 and 2007). A good and regular communication has been built to exchange ideas and information and discuss some important events and special cases between both sides.

3.5 Relationship with the UNESCO National Commission and the IHP National Committee in the country of location

Chinese National Commission for UNESCO and Chinese National Committee for IHP provided lots of guidance to IRTCES in capacity building and development of IRTCES and also gave full supports to IRTCES activities.

3.6 Relationship with other UNESCO-related networks, such as UNESCO Clubs, ASPnet, and UNESCO chairs
N/A

4. Communication

4.1 Communication and knowledge dissemination activities undertaken in the framework of IHP

- UNESCO-IHP-ISI Workshop on Sediment Management in South and Southeast Asia in Asian Institute of Technology (AIT) from April 24 through 25, 2006
- MOU between IRTCES and NHPC (National Hydroelectric Power Corporation LTD. India) signed in Guangzhou, on November 28, 2006
- The Second International Conference on Estuaries & Coasts (ICEC-2006) in Guangzhou, China on November 28-30, 2006
- Second Sino-American Workshop on Advanced Computational Modeling in Hydroscience and Engineering, Nov.25-26,2006 Beijing
- Expert Meeting on Erosion and Sedimentation in Arid and Semi-Arid Regions, Kalar Abad Natural Resources Education Center in Chalous, Iran on April 15-19, 2007
- 10th International Symposium on River Sedimentation (10th ISRS) was successfully held in the M.V. Lomonosov Moscow State University, Moscow, Russia on August 1 to 4, 2007. with 237 participants from 30 countries and regions
- On invitation by Dr. Andras Szollosi-Nagy, Director of the Division of Water Sciences, UNESCO, IRTCES' representative attended the Regional Consultation Meeting of Candidate Water Knowledge Hubs held on 29-31 Oct. 2007 in Singapore
- Prof. Zhang Yanjing of IRTCES attended 3rd general meeting of the Network of Asian River Basin Organizations (NARBO) Indonesia, on February 22~24, 2008. She made a presentation on river basin sedimentation management in China and future strategies for river basin conservation
- IRTCES representative took part in the 2nd regional meeting for candidate water knowledge hubs on 2-4 April 2008 at the Singapore WaterHub
- MOU between IRTCES and Universiti Teknologi Mara (UiTM), Malaysia signed in Beijing, March 24, 2008 for promotion of scientific study, information communication and technical cooperation
- Third Sino-American Workshop on Advanced Computational Modeling in Hydroscience and Engineering, May 12-16,Hawaii, USA
- International Workshop on Erosion, Transport and Sedimentation, 28-30 May 2008, Switzerland, Prof. Hu Chunhong and Dr. Liu Cheng made a keynote presentation: Changes in water and sediment loads of rivers in China
- 5th ISI Steering Committee Meeting, UNESCO-IHP-ISI, in Sudan, November 11, 2006
- International Sediment Initiative Conference, UNESCO-IHP-ISI, Sudan on November 12-15, 2006. Presentations made by Prof. Zhaoyin Wang and Dr. Cheng LIU

4.2 Policy documents and advice

5. Update on Centre Operations

5.1 Membership of the Board of Governors during designated period

Board of Governors:

IRTCES is administrated by a Board of Directors, which is appointed by the Ministry of Water Resources, P. R. of China. The Secretary General presides over the routine work of IRTCES. The Board consist one director and two vice directors.

IRTCES' Advisory Council:
During designated period (2006-2010) 13 members including one representative of the Chinese Government, one representative of the Director General of UNESCO, six members elected by the IHP Intergovernmental Council and five members selected by the Government in consultation with the Director-General of UNESCO.

5.2 Key decisions made (attach minutes of meetings)

First Advisory Council meeting will be held in November 2008.

6. Assessment of the Centre's Impacts

6.1 Science Impacts (Major contributions to the science, technology, education, and regional and/or international cooperation in the field of water)

- Contribution to sediment science development

All activities conducted by IRTCES not only focused on study of traditional sediment theories, such as sediment transport, fluvial processes and related topics, but also put great efforts into combination of traditional theories with engineering problems and solution of natural problems in erosion and sedimentation management of river basin. In recent years, IRTCES organized some research projects and important conferences and themed workshops for studying and discussing some key issues and advanced concepts on ecological environment, river system management, river channels training and environmental sedimentation, etc. These activities made a great impact on erosion and sedimentation research in the future. Since 1984, IRTCES is also in charge of the editing office for publication of International Journal of Sediment Research, which is quarterly journal covering all aspects of erosion and sedimentation problems. It got a good reputation in the world for promotion of sediment science development. The fact that the technical secretariat of ISI established in IRTCES provides an important opportunity for IRTCES to play the leading role in broadening networking with more scientists and institutions in the world to reach global sustainable management of erosion and sedimentation.

- Promotion of scientific exchange in erosion and sedimentation in the world

The International Symposium on River Sedimentation (ISRS) is one of the most important events for scientific exchange organized by IRTCES. ISRS is a triennial conference series initiated in 1980 by the Chinese Hydraulic Engineering Society and supported by UNESCO. Since that 10 symposia have been organized consecutively in Asia, America, Europe and Africa respectively with over 3000 scientists and experts participating in above symposia. Its general objective is to provide a regular opportunity for scientists, engineers, researchers, and decision-makers to exchange latest research results and advance concepts and techniques, as well as to share their information and experience in the related fields. To date, a large and stable group of scientists and engineers worldwide for sedimentation research are involved in this strongly supportive activity.

- Promotion of scientific research results exchange

Through the technical staff exchange visit and study tour, scientific research results in erosion and sedimentation research are introduced between china and other countries. Chinese scientists gained rich theoretical and practical experiences for long period in erosion and sedimentation research and management. Therefore, a number of Chinese experts were invited to give consultations, advices and lectures to some countries suffering from severe erosion and sedimentation problems. In the same time, some advanced achievements obtained by scientists in the world were passed to Chinese scholars. In addition, bilateral cooperation exchange mechanism developed between IRTCES and some institutions. For example, a regular exchange of advanced computational modeling in hydroscience and engineering was held between IRTCES and National Center for Computational Hydroscience and Engineering of USA in order to promote the verification, validation, and standardization of computational models, especially using the prototype data in calibration and validation to assure the quality and reliability of computational models.

- Promotion of regional and international cooperation

The projects and activities carried out by IRTCES have contributed to cooperation among countries in the world. More than hundred Chinese experts were invited as consultants for river and reservoir sedimentation problems in Asia, Africa and South America. Technical exchange visits and special training activities were arranged between IRTCES and related institutions in Japan, Pakistan, Thailand, Nepal, India, Iran and Malaysia. Eight co-operation agreements have been singed with former Yugoslavia, Pakistan, Sudan, Iran, USA, India, Malaysia and the International Coordinating Committee on Reservoir Sedimentation. In 2004 World Association for Erosion and Sedimentation Research (WASER) was established in China for promotion international co-operation on the study and development of the science of erosion and sedimentation interpreted in its widest sense and foster the application and dissemination of knowledge through international contacts among scientists, engineers, organizations, institutions and governments. Since 2007 , IRTCES as a candidate of water knowledge hub was invited in Network of Regional Water Knowledge Hub in Asia-Pacific Region with other 15 institution/center of excellence.

6.2 Knowledge Transfer Impacts (Major achievements in the dissemination of knowledge and technology transfer)

Knowledge and technology transfer is one of main functions and missions of IRTCES. Actually, IRTCES has been acting as water related knowledge hub for providing knowledge generation and sharing, best practice and valuable technical information on erosion and sedimentation. Over past twenty years, IRTCES reached major achievements contributed to knowledge and technology transfer as follows:

- Three regional training programs : “Regional Training Program on Erosion and Sedimentation for Asia” “Farmer Centered Agricultural Resources Management” and “Participatory Watershed Management Training in Asia”

- About 50 training courses at national, regional and international levels concerning river and reservoir sedimentation, soil and water conservation, watershed management, ecological and environmental protection, water resources management, flood control and disaster mitigation.

- More than thousand engineers, experts, scholars and managers participated in various training activities where they discussed their common issues and exchanged their knowledge and experience.

- Many volumes of lecture notes and proceedings have been published containing a wealth of knowledge, practical experience and theoretical information.

6.3 Policy Impacts (advice sought by government and other bodies and evidence of inputs into policy arena)

- Technical support to the Sedimentation Panel of the Three Gorges Project under State Council of China

The sediment problem is one of the key technical issues of the Three Gorges Project (TGP),which is a key backbone project for the flood control, navigation and water resources development of the Yangtze River . It directly affects the lifespan of the reservoir, the operation condition of power plants and shiplocks, as well as the extent of channel degradation and flood control situation downstream of the dam. IRTCES is responsible for Sedimentation Panel of the Three Gorges Project. Before and during construction of TGP a large number of research projects including physical and mathematical models on TGP sedimentation problems were organized. The research results and analysis reports were directly submitted to the State Council for decision making on Project operation and utilization.

- Gazette of River Sediment in China for Ministry of Water Resources

Since 2002 IRTCES has been in charge of editing Gazette of River Sediment in China for collection and analysis of erosion and sedimentation data in main river systems in the country. It provided valuable observation date for governmental decision makers in considering river regulation, water resources management and investment.

7. Future activities that will contribute directly to IHP and/or to WWAP

7.1 Operational Plan (2008-2009) (attach operational plan for 2008-09 if available)

(1) Fulfill responsibilities for serving several secretariats:

- For ISI technical secretariat, IRTCES will continue to provide technical services to ISI activities including assisting in organization and arrangement of ISI Steering Committee meeting in November 2008 in Beijing, update of webpage and Sediment Information system, editing Newsletter and other necessary jobs;

- For permanent secretariat of International Symposium on River Sedimentation(ISRS), IRTCES will sponsor the 11th ISRS in cooperation with Stellenbosch University (SA);

- For WASER secretariat, IRTCES will assist WASER Council to keep good operation and develop network and related projects.

(2) Networking:
Preparation for initiating International Network on Erosion and Sedimentation (INES), such as formulation of vision, mission, operation principles, development of activities, capacity building, etc.

(3) Meeting: Organizing first International Advisory Council meeting in November 2008 for advice and review of IRTCES activities.

(4) Research: Develop and collaborate research projects including National Key Projects and case studies in cooperation with UNESCO, such as:

Case Study of Research project on Variation in Runoff and Sediment Load in the Pearl River Basin and Its Cause, 2008

(5) Publications: Publish International Journal of Sediment Research and Gazette of River sediment in China

(6) Training workshops

- National training workshop on river channel training and flood control, at Three Gorges Dam Site in 2008
- International advanced training workshop on integrated river basin management, Beijing , 2009

(7) Preparation of Conference:
Sponsor the Third International Conference on Estuaries & Coasts in 2009 in Japan organized by the Tohoku University Japan

7.2 Strategic Plan linked with IHP-VII (attach strategic plan for 2008-11 if available)

(1) Research

ISI Case studies

Research projects

National Key projects

(2) Training

Organize a national training workshop on river channel training and flood control, at Three Gorges Dam Site in 2008

Organize an International advanced training workshop on integrated river basin management, Beijing 2009

(3) Conference

Third International Conference on Estuaries & Coasts in 2009 in Japan
11th International Symposium on River Sedimentation; 2010 in South Africa
Fourth Sino-American Workshop on Advanced Computational Modeling in Hydroscience and Engineering, 2010

(4) Publication
International Journal of sediment research,
Technical reports and
Gazette of River Sedimentation in China
Conference proceedings and lecture notes
Journal and conference papers

(4) Networking

Initiate International Networks on Erosion and Sedimentation

Promote WASER activities and capacity building in networking

Develop Sediment Information System and Database for erosion and sedimentation in rivers

Collaboration and networking with other UNESCO's water related centers (Category I and II), such as exchange visit and stuff and students exchange

Collaboration with all hubs in Network of Regional Water Knowledge Hub in Asia-Pacific Region, such as exchange visit and mutual supportive of activities

8. Annexes

8.1 List of publications released by the centre (there can be overlap with those listed in 2.2 above)

1. Case Study Report of Integrated Physical and Ecological Management of Rivers – with Particular Reference to the East River2006-2007
2. Case Study Report of Sediment Management and Wetland Conservation at Yellow River Mouth 2006
3. Case Study Report on Variation in Runoff and Sediment Load in the Pearl River Basin and Its Cause 2008
4. International Journal of Sediment Research
5. Proceedings of The Second International Conference on Estuaries & Coasts (ICEC-2006) November 28-30, 2006
6. Proceedings of Second Sino-American Workshop on Advanced Computational Modeling in Hydroscience and Engineering, Nov. 2006
7. Proceedings of 10th International Symposium on River Sedimentation (10th ISRS) , 2007
8. Proceedings of Third Sino-American Workshop on Advanced Computational Modeling in Hydroscience and Engineering, May 2008
9. Lecture notes of International Advanced Training Workshop on Reservoir Sedimentation, October, 2007
10. Lecture Notes of National Advanced Training Workshop on Hydroproject Construction, in Chinese November 2, 2007
11. Gazette of River Sediment in China 2005, in Chinese
12. Gazette of River Sediment in China 2006, in Chinese
13. A great number of research papers edited by IRTCES experts to be published in related Journals and proceedings

8.2 List of training courses conducted (there can be overlap with those listed in 2.3 above)

1. Training course of Flood Forecasting and preparedness at DPRK, June 12-16, 2006
2. International Advanced Training Workshop on Reservoir Sedimentation, Beijing, October 10-16, 2007
3. National Advanced Training Workshop on Hydroproject Construction, Hangzhou, October 21- November 2, 2007

Format for Reports by UNESCO's Water-related Centres (category 1 and 2) on activities related to the IHP in the period July 2006 – May 2008

1. Basic information on the centre

Name of the Centre		IRTCUD – International Research and Training Centre for Urban Drainage
Name of Director		Prof. Dr. Cedo Maksimovic
Name and title of contact person (for cooperation)		Ljiljana Jankovic, Dipl. Eng
E-mail		irtcud@hikom.grf.bg.ac.yu
Address		Bulevar Kralja Aleksandra 73 P.O.Box 35-42; 11120 Belgrade Serbia
Website		http://hikom.grf.bg.ac.yu/Frames.htm
Location of centre		city/town _Belgrade_____ country ___Serbia___
Geographic orientation *		☐ global ☐ regional
Year of establishment		
Themes	Focal Areas ♦	X groundwater X urban water ☐ arid / semi-arid zones ☐ humid tropics x☐ droughts and floods ☐ sediment transport and management X water and environment x☐ ecohydrology ☐ water law and policy ☐ transboundary river basins/ aquifers ☐ IWRM ☐ global and climate change X mathematical modelling ☐ social and cultural dimensions of water X water education ☐ other: (please specify) _____
	Scope of Activities ♦	x☐ vocational training X postgraduate education X continuing education X research x☐ institutional capacity-building x☐ advising/ consulting x☐ software development ☐ other: (please specify) _____
Support bodies [1]		
Hosting organization [2]		Faculty of Civil Engineering, University of Belgrade
Sources of financial support [3]		Projects acquired in market competition
Existing networks and cooperation [4]		IRTCUD network of regional centres: • Centre for the Cold Climates (Trondheim, Norway) • Centre for Humid Tropics (Porto Alegre, Brazil) • Centre for Arid and Semiarid Climates (Cairo, Egypt) • RCUWM- Tehran Iran CUWs (Centres for Urban Water)

* check on appropriate box
♦ check all that apply

[1] please specify bodies that cover the operational costs of the centre, and other essential costs such as salaries and utility bills, and that provide institutional support to ensure centre's sustainability
[2] if different from support bodies
[3] please specify sources of main budgetary and extrabudgetary funds to implement projects
[4] please write international networks, consortiums or projects that the centre is part of, or any other close links that the centre has with international organizations or programmes, which are not already mentioned above

Governance	X director and governing board ☐ other: (please specify) _____ Link to election of board members to the IHP IGC and hosting country IHP National Committee _____ Frequency of meetings: once every 2year(s) x☐ Existence of UNESCO presence at meetings
Institutional affiliation of director	
Number of staff and types of staff	total number of staff (full-time, or equivalent) : ____31_____ number of staff who are water experts: _____28____ number of visiting scientists and postgraduate students: _____32____
Annual turnover budget in USD	100k

2. Activities undertaken in the framework of IHP in the period July 2006 – May 2008

2.1 Educational activities (i.e., those with accreditation) that directly contributed to the IHP-VI and WWAP

Please include here those activities which led to accreditation of degrees, or those held in formal school settings.

Postgraduate studies in Water Resources and Environmental Management, in a framework of EDUCATE project, started in December 2007. It is international course implemented by four universities in the SEE region: National Technical University of Athens - School of Civil Engineering and School of Chemical Engineering, University of Ljubljana – Faculty of Civil and Geodetic Engineering, Technical University of Bucharest, University of Belgrade-Faculty of Civil Engineering and IRTCUD.

2.2 Research activities that directly contributed to the IHP-VI and activities by WWAP

Please include research/applied projects outputs such as publications that directly contributed to the IHP-VI and WWAP objectives

Within the Focal Area 3.5 of the IHPVI programme Training Tool for *'Urban Water Education, Training and Technology Transfer (UWETTT)'* project (Project No. 9) was developed, to which contribution is provided by the project *'Towards Sustainability in Urban Ground Water Management'* (Project No. 3). Urban GROunWater (UGROW) Modelling System was developed for modelling of interactions of groundwater and urban infrastructure systems.

The following publications have been prepared within the IHPVI programme:

1. Focal Area 3.5 , Project "Urban Water Education, Training and Technology Transfer (UWETTT)"
   Data Requirements for Integrated Urban Water Management.
   Edited by: Tim Fletcher and Ana Deletić. Taylor & Francis, ISSN 1749-0790.
2. Focal Area 3.5, Project Urban Water Management on Specific Climates:
   Integrated Urban Water Management in Temperate Climate.
   Edited by: Cedo Maksimovic
   UNDER PREPARATION

2.3 Training activities that directly contributed to the IHP-VI and WWAP objectives

Training course on Urban GROunWater (UGROW) Modelling System, as a part of the Project 9: "Urban water education, training and technology transfer".

Training courses for water industry, in a framework of EDUCATE project.

3. Collaboration and linkages

3.1 Participation in major international networks, programmes, partnerships with other UN or other International Agencies, media and professional bodies

IRTCUD activities were done through cooperation with UNESCO and other UN organizations (UNEP, UNDP, and UNIDO), professional institutions (IAHR, IAWPRC, IAHS), World Meteorological Organization (WMO), universities and research institutions all over the World.

IRTCUD has a role of global coordinator of the regional IRTCUD Centres for the Cold Climates (Trondheim, Norway), Humid Tropics (Porto Alegre, Brazil) and Centre for Arid and Semiarid Climates established in the Regional Center of Research and Studies of Water Ethics (Kairo, Egypt).

In a framework of INTERREG III Programme, IRTCUD is involved in the network of four SEE countries working together on the project "Building the Future of Transnational Cooperation in Water Resources in South East Europe": Greece (National Technical University of Athens), Romania (Technical University of Bucharest), Slovenia (University of Ljubljana) and Serbia (University of Belgrade and IRTCUD).

3.2 Participation in meetings related to the IHP and UNESCO (e.g., the UNESCO General Conference, the UNESCO Executive Board, the IHP Intergovernmental Council and/or other meetings organized by IHP)

IRTCUD took part in several activities related to IHPVI programme, from its preparatory activities, through programme creation and finally through implementation of some projects within the IHPVI programme. IRTCUD representatives participated in numerous meetings related to IHPVI programme, such are:

1. International Symposium: New Directions in Urban Water Management
   UNESCO, Paris
   11-14 September 2007
2. Meeting: Focal Area 3.5 , Project "Urban Water Education, Training and Technology Transfer (UWETTT)"
   UNESCO, Paris
   23-24 January 2006
3. Workshop: Integrated Urban Water Management in Temperate Climates
   IRTCUD, Belgrade
   15-16 May 2006

3.3 Collaboration and networking with other UNESCO category 1 or 2 institutes/ centres

- 3.3.1 cross-appointment of directors of the category 1 or 2 institutes or centres on the governing board
- 3.3.2 exchange of information on activities such as training/educational materials, and funding opportunities
- 3.3.3 exchange of staff, most notably professionals and students
- 3.3.4 implementation of joint activities, such as workshops, conferences, training programmes, joint projects, field visits, software and data sharing, knowledge exchange and publications

3.4 Relationships with the UNESCO field office whose jurisdiction covers the country of location

3.5 Relationship with the UNESCO National Commission and the IHP National Committee in the country of location

3.6 Relationship with other UNESCO-related networks, such as UNESCO Clubs, ASPnet, and UNESCO chairs

4. Communication

4.1 Communication and knowledge dissemination activities undertaken in the framework of IHP

4.2 Policy documents and advice

5. Update on Centre Operations

5.1 Membership of the Board of Governors during designated period
Director: Prof. Dr. Cedo Maksimovic
Local Coordinator: Prof. Dr. Marko Ivetic
Programme Coordinator: Ljiljana Jankovic

5.2 Key decisions made (attach minutes of meetings)

6. Assessment of the Centre's Impacts

6.1 Science Impacts (Major contributions to the science, technology, education, and regional and/or international cooperation in the field of water)

6.2 Knowledge Transfer Impacts (Major achievements in the dissemination of knowledge and technology transfer)

6.3 Policy Impacts (advice sought by government and other bodies and evidence of inputs into policy arena)

7. Future activities that will contribute directly to IHP and/or to WWAP

7.1 Operational Plan (2008-2009) (attach operational plan for 2008-09 if available)

7.2 Strategic Plan linked with IHP-VII (attach strategic plan for 2008-11 if available)

8. Annexes

8.1 List of publications released by the centre (there can be overlap with those listed in 2.2 above)

1. Data Requirements for Integrated Urban Water Management.
   Edited by: Tim Fletcher and Ana Deletić.
   Taylor & Francis, ISSN 1749-0790.
2. Integrated Urban Water Management in Temperate Climate.
   Edited by: Cedo Maksimovic
   UNDER PREPARATION

8.2 List of training courses conducted (there can be overlap with those listed in 2.3 above)

1. Training course on Urban GROunWater (UGROW) Modelling System, as a part of the Project 9: "Urban water education, training and technology transfer".
2. Training courses for water industry, in a framework of EDUCATE project.
3. Contribution to the Training Course on Urban Drainage in Humid Tropical Climates. Kuala Lumpur, February 2008

Reports by UNESCO's Water-related Centres (category 1 and 2) on activities related to the IHP in the period July 2006 – May 2008

1. Basic information on the centre

Name of the Centre		Regional Center for Training and Water Studies
Name of Director		Prof. Dr Dalal S. Alnaggar
Name and title of contact person (for cooperation)		Prof. Dr Dalal S. Alnaggar
E-mail		dalnagar@trainingcente-eg.com
Address		6 October City, St. No. 1, fourth industrial Zone
Website		www.rctws.com
Location of centre		city/town 6 October City_____ country Egypt_____
Geographic orientation *		☐ global X☐ regional
Year of establishment		It is established since 1984 and acts under the umbrella of UNESCO since 2002
Themes	Focal Areas ♦	☐ X groundwater ☐ X urban water ☐ X arid / semi-arid zones ☐ humid tropics ☐ X droughts and floods ☐ sediment transport and management ☐ X water and environment ☐ ecohydrology ☐ X water law and policy ☐ transboundary river basins/ aquifers ☐ X IWRM ☐ X global and climate change ☐ mathematical modelling ☐ X social and cultural dimensions of water ☐ water education ☐ other: (please specify) _Management_____
	Scope of Activities ♦	☐ X vocational training ☐ postgraduate education ☐ continuing education ☐ research ☐ X Institutional capacity-building ☐ X advising/ consulting ☐ software development ☐ other: (please specify) _____
Support bodies [1]		Ministry of Water Resources and Irrigation – MWRI - Egypt UNESCO (Cairo Office)
Hosting organization [2]		
Sources of financial support [3]		MWRI – Egypt (Main Budgetary) JICA (Cairo office) GTZ (Cairo office) ATP - NBI
Existing networks and cooperation [4]		AWARENET Cap-net

* check on appropriate box
♦ check all that apply

[1] please specify bodies that cover the operational costs of the centre, and other essential costs such as salaries and utility bills, and that provide institutional support to ensure centre's sustainability
[2] if different from support bodies
[3] please specify sources of main budgetary and extrabudgetary funds to implement projects
[4] please write international networks, consortiums or projects that the centre is part of, or any other close links that the centre has with international organizations or programmes, which are not already mentioned above

	G-WADI Nile Net
Governance	☐ X director and governing board ☐ other: (please specify) _____ Link to election of board members to the IHP IGC and hosting country IHP National Committee _____ Frequency of meetings: once every 1 year(s) ☐ X Existence of UNESCO presence at meetings
Institutional affiliation of director	National Project Coordinator ATP-NBI Vice President of FIG
Number of staff and types of staff	total number of staff (full-time, or equivalent) : 100_____ number of staff who are water experts: 6_____ number of visiting scientists and postgraduate students: 30_____
Annual turnover budget in USD	1,080,830 (National) 309,923 (Regional)

2. Activities undertaken in the framework of IHP in the period July 2006 – May 2008

2.1 Educational activities (i.e., those with accreditation) that directly contributed to the IHP-VI and WWAP
Please include here those activities which led to accreditation of degrees, or those held in formal school settings. Not included in the center activities

2.2 Research activities that directly contributed to the IHP-VI and activities by WWAP
Please include research/applied projects outputs such as publications that directly contributed to the IHP-VI and WWAP objectives Not included in the center activities

Training activities that directly contributed to the IHP-VI and WWAP objectives

The following table includes the activities implemented by the center

Workshop on:" Economic Appraisal of Dams Projects ". (ENSAP)
Training Program: "Water Use Management & Water User Associations" , (JICA-Iraq)
"International Hydropower Association" (IHA) - Board Meeting
Workshop on:" Inundation-Related Issues"
Workshop on: "Hydropolitics & Impacts of the Aswan High Dam"
"International Water Resources Association (IWRA) " - Board Meeting
"InWEnt Steering Committee Meeting"
Operational Planning Workshop for: " Management Training in the Water Sector in Egypt" - GTZ
Training Program: " Water Management in Irrigated Agriculture" , (ATP + EUWAP)

Workshop on:"Nile Environment Threats" (Contextual Framework Analysis) (ATP)
Training Program: "Protection of Shared Aquifers" (UNESCO + NGWP)
International Conference: "Water Governance in the MENA Region" (INWENT + Arab Water Council)
Training Program: "On Farm Water Management" , Irrigation & Drainage. (ATP + EUWAP)
Working Group Meeting; " Young Surveyors - FIG "
Training Program: "On Farm Water Management" , Irrigation & Drainage. (ATP + EUWAP)
Training Program: "Management of Water User Associations" (WUA) - (JICA-Iraq)
Training Program: "Farmers Training" - (JICA-Iraq)
Train-the-Trainer Workshop Learning about adaptive management in the Nile basin – Learning for interdependence

3. Collaboration and linkages

3.1 Participation in major international networks, programmes, partnerships with other UN or other International Agencies, media and professional bodies

1] Agreement with JICA office in Cairo to conduct regional training in On-farm water management at field level

2] Project initiated by MWRI and GTZ for capacity development of engineers in management.

3.2 Participation in meetings related to the IHP and UNESCO (e.g., the UNESCO General Conference, the UNESCO Executive Board, the IHP Intergovernmental Council and/or other meetings organized by IHP)

RCTWS's director participated in the regular meeting relevant to the center as UNESCO Category 2 center

3.3 Collaboration and networking with other UNESCO category 1 or 2 institutes/ centres

- 3.3.1 cross-appointment of directors of the category 1 or 2 institutes or centres on the governing board
- 3.3.2 exchange of information on activities such as training/educational materials, and funding opportunities
- 3.3.3 exchange of staff, most notably professionals and students
- 3.3.4 implementation of joint activities, such as workshops, conferences, training programmes, joint projects, field visits, software and data sharing, knowledge exchange and publications

Memorandum of understanding with RCUWM (Tehran) to organize regional workshops on "Climate Changes and Gender Roles in IWRM"

3.4 Relationships with the UNESCO field office whose jurisdiction covers the country of location

Many regional courses have been conducted under the umbrella of UNESCO Cairo office.

3.5 Relationship with the UNESCO National Commission and the IHP National Committee in the country of location

participating in national meetings and seminars

3.6 Relationship with other UNESCO-related networks, such as UNESCO Clubs, ASPnet, and UNESCO chairs
No relations

4. Communication

4.1 Communication and knowledge dissemination activities undertaken in the framework of IHP
It is running through e-mails and websites

4.2 Policy documents and advice
It is running through e-mails and websites

5. Update on Centre Operations

5.1 Membership of the Board of Governors during designated period
It has been updated

5.2 Key decisions made (attach minutes of meetings)
It is attached (1)

6. Assessment of the Centre's Impacts

6.1 Science Impacts (Major contributions to the science, technology, education, and regional and/or international cooperation in the field of water)
Transferring technology to arid and semi-arid and African countries throughout courses, workshops in the field of IWRM

6.2 Knowledge Transfer Impacts (Major achievements in the dissemination of knowledge and technology transfer)
Improving and developing the skills and capacities of trainees in IWRM

6.3 Policy Impacts (advice sought by government and other bodies and evidence of inputs into policy arena) increasing awareness of Junior; senior staff and policy makers in IWRM

7. Future activities that will contribute directly to IHP and/or to WWAP

7.1 Operational Plan (2008-2009) (attach operational plan for 2008-09 if available)
It is attached (2)

7.2 Strategic Plan linked with IHP-VII (attach strategic plan for 2008-11 if available)
It is attached (3)

8. Annexes

8.1 List of publications released by the centre (there can be overlap with those listed in 2.2 above)

8.2 List of training courses conducted (there can be overlap with those listed in 2.3 above)

Ministry of Water Resources and Irrigation
Regional Center for Training and Water Studies

3rd Regional Governing Board of the Regional Center for Training and Water Studies (RCTWS) December 10, 2007

Dubai, Emirates

Minutes, Conclusions and Recommendations

The members and representatives of the Regional Center for Training and Water Studies (RCTWS) met at Oasis Beach Hotel, Dubai, Emirates, on Monday December 10, 2007 (List of Participants is attached).

Dr. Dalal Alnaggar, Chairperson of the RCTWS, started the meeting welcoming all the guests, stressed the importance of this event, and highlight the main subjects which came as follows:

- Implemented activities during the years 2006-2007
- Future activities for the year 2008-2009
- Contributions of G.B. members regarding the projects items which do not have financial resources.

H.E. Dr Mahmoud Abu-Zeid, Minister of water resources and irrigation in Egypt and the chairman of the governing board, started his speech by welcoming the guests, and then mentioned the importance of capacity building, especially human resources development in the water sector to address the continued demand of many organizations in the region as they face the same challenges.

Therefore, H.E. Dr Mahmoud Abu-Zeid specified what relevant efforts should be directed to improve the scientific base of IWRM and

intergovernmental cooperation on the regional level. Then, H.E. Dr Mahmoud Abu-Zeid stated what have been done in the center to cope with all these issues. Finally, H.E. Dr Mahmoud Abu-Zeid pointed out the objectives of such meetings to activate the role of capacity development in IWRM.

Dr. Dalal Alnaggar, who has revived the programs of the center, started the presentations by emphasizing that the Center has been conducting mainly three programs (National, Regional and Nile Basin). The chairperson of the RCTWS focused on the national program and demonstrated the training needs assessment that had been partially done to determine the gab between required and actual job performance.

Dr. Dalal Alnaggar also highlighted all activities and achievements done at the center such as the video conference facility; renovation of the RCTWS hotel; the remote sensing laboratory and the interactive web site.

Dr Dalal Alnaggar mentioned that each program has gotten its own strategy, budget and work plan, although the 3 programs are complementary.

Dr. Mohamed Bakr, the Regional Program Coordinator, presented the activities and achievements of the Regional Training Program (RTP) during the years 2006 and 2007. He started with the objectives of the RTP and the contributions of RCTWS at the international networks and institutions concerned with water management.

Dr. Mohamed Bakr also demonstrated the training modules and workshops that had been achieved during the mentioned period.

Dr. Mohamed Bakr referred to the allocated budget for RTP as came from different donors as Egyptian government, UNESCO, JICA, GTZ, InWent IWRA, NBI and INWARDM. (At the same time UNESCO did not allocate any budget for any courses during the year 2007).

Eng. Khaled, Roshdy, head of information technology department presented the third program, Nile Basin Program, giving an overview about the Applied Training Project (ATP) and its objectives and activities.

Eng. Khaled, Roshdy mentioned the training courses and workshops held under the ATP in Egypt and in the Nile Basin Countries highlighting the Egyptian participation. Added to that, the responsibilities carried by the center twards ATP were focused on.

At the end of presentations, Dr. Dalal Alnaggar gave an overview about the workplan 2008/2009 and mentioned the proposed financed and non-financed projects.

The future projects proposed by RCTWS are summarized in the following items*:*

1. Cooperation with concerned institutions in the region.
2. Effective role of private sector for fund raising.
3. Evaluation of RCTWS activities by UNESCO.
4. Developing the ongoing marketing plan to create new interests and boost the existing ones.

H.E. Dr. Abu Zied started an open discussion with the participants whose comments were as follows.

- Dr. Radwan Elweshah, representative of UNESCO, mentioned that UNESCO is quite satisfied with all activities of the center and IHP can fill the gaps in RCTWS's work plan. He also added that during 2008 the UNESCO will share RCTWS in its work plan and many joint activities will take place.

  Dr. Radwan Elweshah also mentioned that:

  1. Two workshops under the title Water Ethics had been held at RCTWS. The socio economic had been discussed during that workshop.
  2. Workshops in Gender role were held at RCTWS.
  3. Emphasis on the evaluation of RCTWS achievements based on results-based management is recommended.
  4. Feedback from member states is important (throughout an letter of satisfaction of the work of the RCTWS)

- Dr. Hussien Elatefy, head of irrigation department-MWRI - Egypt in Egypt, appreciated the work done by RCTWS and put emphasis on the importance of some topics to be considered in the training programs of RCTWS such as: Training of Trainers (ToT), Training

of Technicians and Marketing which is an essential issue to be done jointly with UNESCO.

Dr. Hussien Elatefy also focused on the role of private sector which can not be denied as it could be a source of fund for courses like desalination of water supply and sanitation which could be considered also as important topics.

Dr. Hussin. Alatfy suggested that capacity building is an important issue in Arab forum and he suggested that:

1. Hydro politics course could be arranged for decision makers.
2. Internal evaluation for RCTWS activities is an important issue.
3. Refresher courses are needed for the same participants after long period.

- Dr. Mohamed Elshatanawy, representative of university of Jordan - Jordan, also appreciated the effort done by RCTWS and promised to support RCTWS financially.

- Dr. Atef Hamdy, representative of Bari institute - Italy, congratulated RCTWS for the remarkable progress and achievements that had been done. Dr. Atef Hamdy added that UNESCO can do more efforts to support RCTWS and the Arab countries should share RCTWS their programs for cooperation. Dr. Atef Hamdy raised some topics to be addressed in training programs as follows:

  1. Socio- economic issues are important for the region.
  2. Water pricing

  Dr. Atef Hamdy recommended RCTWS to advertise the prices of all services offered to all clients, which will guide them during arranging any training programs with the Center.

  Dr. Atef Hamdy mentioned importance of the role of private sector in financing some courses in Italy.

  Dr. Atef Hamdy raised the topic of e-learning which is an important task particularly in the region. Many activities could be

done by the RCTWS in that concern and UNESCO could help in that task.

- Dr. Waleed Abdel Rahman, representative of King Fahd University – Saudi Arabia, congratulated RCTWS for the progress and achievements. Dr. Waleed Abdel Rahman asked about the number of participants from different Arab countries and NB countries.

  Dr. Waleed Abdel Rahman asked RCTWS to focus on*:*
  1. Courses related to forecast climatic changes.
  2. The coordination between RCTWS and UNESCI-IHE to prevent duplication in courses.
  3. As ministry of water in Saudi Arabia is constructing a training center, further cooperation between RCTWS and this new center could be a good opportunity for supporting the water sector in all countries of the region.
  4. The development of market department at RCTWS.

  Dr. Waleed Abdel Rahman focused on the follow up for trainees through establishing Alumni of them.

- Dr. Khaled Abu Zeid, representative of CEDARE, raised the following points:
  1. How are training course selected.
  2. Are technical material and budget ready for any proposed courses?
  3. CIDARE could offer free technical material to RCTWS.
  4. Marketing is an important task and this could be done throughout advertising using RCTWS web site and other web sites.

- H.E. Dr. Kamal Aly, Minister of water resources and irrigation in Sudan, congratulated the RCTWS and the staff on all the achievements and the advanced technology offered to all the trainees. H.E. Dr. Kamal Aly also focused on the socio economic aspects that could be addressed by ATP, and TOT in the field of information media.

- Dr. R. Ardkamian, representative of ministry of water - Iran, mentioned the following issues:

1. RCTWS is UNESCO category II center, and the agreement between UNESCO and RCTWS should be revised.
2. Monitoring the RCTWS activities should be done every 5 years. This monitoring could be done (Internally and internationally by UNESCO) throughout reports of achievements prepared by RCTWS.
3. The role of UNESCO has to be extended to cover operational phases.
4. UNESCO-IHE as a UNESCO category I center has to be involved in RCTWS activities.
5. Emphasis on the climate changes courses that should be considered.
6. Establishing an executive committee to optimize the outputs of governing board meetings.

- H.E. Dr. Mahmoud Abu Zeid mentioned that RCTWS has already a scientific committee and highly technical council, and both are responsible for selection of the training modules and developing the technical materials.

  H.E. Dr. Mahmoud Abu Zaid emphasized preparation of an evaluation report including all achievements of RCTWS. This report could be prepared according to the format already used by RCUWM in Iran.

After presenting and discussing the achievements and future work plan, the Regional Governing Board approved the proposed work plan for 2008 and 2009, and elaborated the following conclusions and recommendations:

- The effort that has been done during the last two years is very appreciable. The continuity of such efforts is a must. ***The relevant governmental and non governmental organizations have to keep or/and increase financial support to RCTWS***.
- The regional cooperation of RCTWS is still not optimized. ***The role of UNESCO must be more effective in subsidizing RCTWS through cooperation in arranging training courses and workshops***.
- Marketing is an important issue for the continuity of RCTWS success. ***RCTWS should plan to develop a marketing unit***.
- The role of private sector in supporting RCTWS with financial resources is essential. ***Conducting TNA for private sectors is required to address their needs such water desalination and water treatment***.
- Socio-Economic aspect in the field of water sciences is a very crucial one. ***RCTWS must include socio-economic dimension in its programs.***
- The evaluation is very important issue for any development process. ***An internal evaluation for RCTWS achievements should be done each 2 years. At the same time, RCTWS can send to UNESCO for a regional evaluation***.
- The decision makers have great influences on the progress of RCTWS. ***Courses for decision makers such as hydro politics should be considered by RCTWS to increase their awareness***.
- The climatic changes is still an important topic particularly for arid and semi arid areas. ***It should be included in RCTWS training programs***.
- The scope of training material should be continuously enlarged and updated. ***RCTWS can ask intended organization such as CIDARE to offer RCTWS technical materials freely in the field of water sciences***.
- Monitoring and evaluating the participants and keeping them in touch with RCTWS are important issues. ***Alumni for the participants should be formed***.

- E-learning is an important technology for transferring knowledge along far distance. ***It has to be studied to be available at RCTWS to serve the countries of the region***.

The Chairman of the Regional Governing Board

Dr. Mahmoud Abu-Zeid
Minister of Water Resources and Irrigation, EGYPT

Regional Courses and Workshops during January – June 2008

No.	Event	Partners	Jan.	Feb.	Mar.	Apr.	May	June	July	Facilitators (RCTWS)	Meeting Room
1	**Train-the-Trainer Workshop "Learning about adaptive management in the Nile basin – Learning for interdependence"**	**NeWater + ATP + RCTWS**		**19-21**						**Dina A. Hamid**	**2006 + Room 7**
2	**Environmental Management of Mega Irrigation Project (National course)**	**ATP + RCTWS**					**11-22**			**Maha ElSharkawy**	**2006**
3	**IWRM: New Participatory Initiatives for Young Professionals (National course)**	**ATP + RCTWS**						**15-26**			
4	**National Nile-Net Workshop**	**ATP + RCTWS**						**26-28**			

Regional Courses and Workshops during July – December 2008

No.	Event	Partners	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Facilitators (RCTWS)	Meeting Room
1	**Integration of Remote Sensing and GIS for Water Resources Management (National course)**	**ATP + RCTWS**		**17-28**						
2	**Controlling Aquatic Weeds (Course)**	**JICA Iraq + RCTWS**		**17-28**						
3	**O&M of Pumping Station (Course)**	**JICA Iraq + RCTWS**				**1 - 21**				
4	**Impacts of Climate Change on Water Resources Management in the Region (workshop)**	**RCUWM + RCTWS + ACSAD + UNESCO (Cairo-Tehran)**				**5-8**				**Syria**
5	**CAD Application (Course)**	**JICA Iraq + RCTWS**					**16**	**11**		
6	**On Farm Water Management (Course)**	**JICA + RCTWS**				**25**		**20**		

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Appreciations and Acronyms

ARCOD	AfRican COnference for Drainage
ATP	Applied Training Program
DRI	Drainage Research Institute
GIS	Geographical Information Systems
GRI	Groundwater Research Institute
IHP	International Hydrological Program
IMI	Irrigation Management Institute
IRM	Irrigation Management Institute
IWRM	Integrated Water Resources Management
JICA	Japanese International Cooperation Agency
MWRI	Ministry of Water Resources and Irrigation
NAC	National Agriculture Center
NBI	Nile Basin Initiative
NTP	National Training Program
NWRC	National Water Research Center
RCTWS	Regional Center for Training and Water Studies
RTP	Regional Training Program
TAC	Technical Advisory Center
TC-MWRI	Training Center – Ministry of Water resources and Irrigation
TMDU	Training and Manpower Development Unit
TNA	Training Needs Assessment
UNESCO	United Nations Educational, Scientific & Cultural Organization
USAID	United States of America
WRI	Water Resources Institute

Executive Summary

The Regional Center for Training and Water Studies (RCTWS) was established under the auspices of UNESCO in January 2002 to carryout training and water studies for the arid and semi arid region. The RCTWS encompasses three programs namely, the National Training Program (NTP), the Applied Training Program (ATP) and the Regional Training Program (RTP).

For the last work plan at the national level, RCTWS targeted trainees from administrative, engineering and the technical levels. 120 training courses were offered yearly including some special and tailor made courses.

At the regional level, 15 module courses were conducted (1-6 weeks). In addition 19 workshops and seminars (1-4 days) were organized, beside three international conference and 6 regional meetings. The number of participants in all these programs reached about 1000.

For the next 6 years, the center has a minimum organization framework for implementing its regional function, consisting of :

- Governing Board (chaired by His Excellency, the Minister of MWRI – Egypt)
- Executive committee (chaired by the director of the center).
- Advisory committee (selected regional professionals).

In order to carry out the future regional program, the center has to appoint more of the professional key staff (one program manager and three regional coordinators). Beside the existing

qualified trainers, facilitators, the supporting staff is already available at the center. Several training needs assessments for the region and Africa had been done by RCTWS for reliable work plan.

To improve training efficiency, RCTWS is planning to coordinate and cooperate with national, regional and international Institutes. RCTWS plans for building an interactive relation with all regional training centers (Category I, Category II) also with UNESCO / IHP network.

About 10 module courses are proposed to be offered according to a given schedule for the next 6 years (2008 – 2013). These modules are:

1. Integrated water resources management (5 weeks).
2. Water resources assessment and hydro-informatics (6 weeks).
3. Shared water resources development and management (3 weeks).
4. Groundwater management in the framework of IWRM (2 weeks).
5. On-farm water management (6 weeks).
6. Role of artificial recharge of ground water (2 weeks).
7. Non-conventional water resources in arid and semi-arid regions (2 weeks).
8. Water valuation and Economics (2 weeks).
9. Environmental Management of Water Resources (4 weeks).
10. Project Management (2 weeks).

Some tailor made courses could be carried out as deemed required. In addition to these courses, workshops and seminars (1-4 days) can be organized according to the needs.

Summary and details of these courses, workshops, and seminars are given. Tentative phasing and time schedule of these training modules for the years (2008 - 2013) are also presented.

Since quality assurance and accreditation system are needed, a monitoring and evaluation unit that will use input indicators for both trainers and trainee are initiated. Certificates are issued including performance of the participants. RCTWS plans to have accreditation system which allows participants continuing post graduate studies.

Cost estimate of the training module courses has been done for staff requirement, technical program, and operation expenses. This cost amounts to 993,780 US$ per year. Besides the Egyptian government contribution, financial coverage is envisaged through the following inputs:

- Additional funds from the Government of Egypt.
- Service delivery to regional and international training programs .
- Long term training agreements with international funding organizations, bilateral and multilateral donors.
- Donor funded capacity building programs.
- Nile basin initiative (NileCom, Nile TAC) through the Applied Training project.

1. Background Information

The Training and Manpower Development Unit (TMDU) of the Ministry of Water Resources and Irrigation (MWRI) was established in 1982. In 1985, (TMDU) expanded its scope of services with support from USAID. TC-MWRI was established at the sixth of October city, and was affiliated directly to the Minister's office in 1994.

Since December 2001 after signed an agreement between the government of Egypt and the UNESCO, that the previous National Training Center are operated under the auspices of UNESCO with the name "Regional Center for Training and Water Studies in Arid and Semi-Arid Zones" (RCTWS).

2. Introduction

The approach to capacity building and utilization has several important features. First, it recognizes that capacity building is not as one-dimensional task but it involves human resources development, institutional development and infrastructure development. Second, it conceives and perceives indigenous capacity building and utilization as key to development.

It shows that technical assistance for capacity building should complement and not compete with or substitute for indigenous expertise. Third, it not only recognizes that individual countries have to determine their priorities for capacity building but also recognizes several mutually reinforcing linkages between the concerned countries for successful developments.

Capacity building and utilization are needed to cover the following areas; (1) Integrated water resources developments that combines a supply driven management policy with a demand oriented approach, (2) Information systems and analysis that help in planning, management and effective utilization of water systems, (3) Emergency situation like floods and draughts, (4) Water and land pollution resulting from human activities, (5) Decartelization and privatization, (6) Treat of conflicts for sharing scare resources as water flows without any regard for divisions between countries, people, religions or generations.

The above six areas require highly skilled professionals such as planners, developers, engineers and technicians. Egypt, Africa and the arid and semi-arid region in general must develop capacity to design its own requirements taking into account the actual needs of the community as well as the available natural resources.

Thus, policy measures must be taken in the area of human resources development and should include emphasis on training at all levels. The use of national institutions and regional instructions must be encouraged and supplemented by technical and or financial assistance from national and international institutions.

Methods that are adapted by the RCTWS to fulfill the needs for capacity building in the area of water resources are divided into six categories:

1. Short courses designed to deal with a restricted field of interest such as integrated water resources development, pollution, ground water, floods … etc. these courses are

directed to those professionals who cannot be absent from their home country or their job for a long period.

2. Tailor-made courses that are developed to deal with specific topics on request to respond for an immediate training need.
3. Refresher courses to present the state-of-the-art in a certain subject.
4. Seminars and workshops
5. On the job training for young professionals to enhance their capabilities to face challenges of field work.
6. Specialized conference and short meeting

3. RCTWS Mission

The mission of the RCTWS is to capacity building in the field of Integrated Water Resources Management, water engineering and water-related sciences on the national and regional levels, as well to achieve the following objectives:

- To function as *a regional center of excellence*, that provides up-to-date technologies and as far as generation transfer, exchange in the field of water resources management, water engineering and water-related sciences is concerned.
- To conduct quality training and education in relevant subjects, fields of work and expertise.
- To promote scientific studies, stimulate and coordinate applied research and enhance awareness creation in these fields.
- To play a pivotal role in stimulating connectivity between knowledge institutions and in establishing regional networks,

scientific cooperation, knowledge management and information exchange.

- To spread educational capacity through the region and level promote capacity building for under-privileged countries.

4. Institutional and Organizational Arrangement:

The present programs of the center are:

- The National Training Program (NTP).
- The Nile Basin Program (ATP).
- The Regional Training Program (RTP).

The NTP is mainly divided into:

- Scientific and Technical Programs for engineers and technicians.
- Management and administrative Programs.
- Computer and English languages Programs.
- Workshops, conferences and other scientific meetings.

The ATP components are directed to achieve:

- Establishing the Nile Net.
- Developing human resources.
- Building Institutional Capacity.
- Promoting Basin Exchange.

The RTP is directed for arid and semi-arid regions within the framework of the International hydrological program (IHP). These include organizing Module Courses, Conferences, Seminars and

Workshops in the field of Integrated Water Resources Management. It is covered in more details in the next section

5. The Regional Training Program

The mission of the regional program is to offer specialized training courses, workshops and applied studies focusing on *Integrated Water Resources Management*. This program is directed to managers, professionals, engineers, technicians and administrative staff, both in Egypt as well as Arab, African and other arid and semi-arid countries of the regional.

The RCTWS carries out its objectives and functions in close coordination with water-related courses of the UNESCO and depends upon the international and regional supports.

To insure the success implementation of the regional program, the following activities are implemented:

- Regional Training Needs Assessment (TNA)
- Selection of appropriate training program.
- On-the-job training and field tours.
- Field studies and technical tours.
- Introduction of modern communications.
- Workshops and seminars.
- Internet ships that provide training services with other organizations.

6. Summary of RCTWS activities on the regional level

Table 1 summarizes the regional capacity building activities: training courses, workshops, seminars, meetings, and conferences during period 2002 – 2007.

Key details of each event as it presents the title, the number of participants from the region, and the associated partners that contribute to conducting the event are shown too. In addition RCTWS offered courses for local participants in cooperation with local research centers and universities.

<u>Training courses</u>

Some examples of training courses (1-6 weeks) that have been conducted successfully in RCTWS are:

- Integrated water resources management (IWRM).
- On-farm water management (Irrigation/Drainage).
- Groundwater Management within the framework of IWRM.
- Non-conventional water resources in arid and semi-arid regions
- Shared Water Resources development and management.

- Role of artificial recharge of groundwater.
- Women's participation in water management.
- Geographic information system and remote sensing.

Workshops and Seminars:

In addition to the training courses, several workshops (1-4 days) have been organized for all regional countries. These events cover the following topics:

- Private sector participation.
- Water valuation and cost recovery.
- Gender issues.
- Decentralization and Institutional reform.
- Water and Ethics.
- Crops water requirement and water strategies.
- Water as human right.
- Groundwater protection and modeling.
- Knowledge mapping and human resources data Bank.
- International water's negotiation and dispute resolution.
- Urban water modeling in specific climates.
- Sustainable water and wastewater management.

Conferences:

- First African Conference for Drainage (ARCOD)
- Pharaohs to Geo-informatics Conference
- Global Spatial Data Infrastructure (GSAI)

7. Governance requirements

Governance applies to the whole set of procedures by which all the different functions of the organization is controlled. Therefore, the requirements needed for RCTWS to conduct its activities in efficient manner are presented in the next sub sections.

7.1. RCTWS Structure

The centre has fitted organization framework for implementing its regional functions as illustrated in figure (1):

a. Governing board (chaired by His Excellency the Minister)
b. Executive committee (chaired by the director)
c. Advisory committee consisting of selected regional scientists and sector experts (with revolving chairmanship).

In order to play a significant role in the region, the centre plans to provide a neutral social environment, which will enable scientific independence and confidence building. Therefore and in the next 6 years (2008/2013), *the plan is to work towards partial autonomy*. This means that legal status of RCTWS will have to be redefined.

A special marketing unit will be initiated. RCTWS plans for building an interactive relation with all regional training centers (Category I, Category II) also with UNESCO / IHP network.

The center is participating in the programs of the regional networks especially with the UNESCO/IHP network RCTWS is

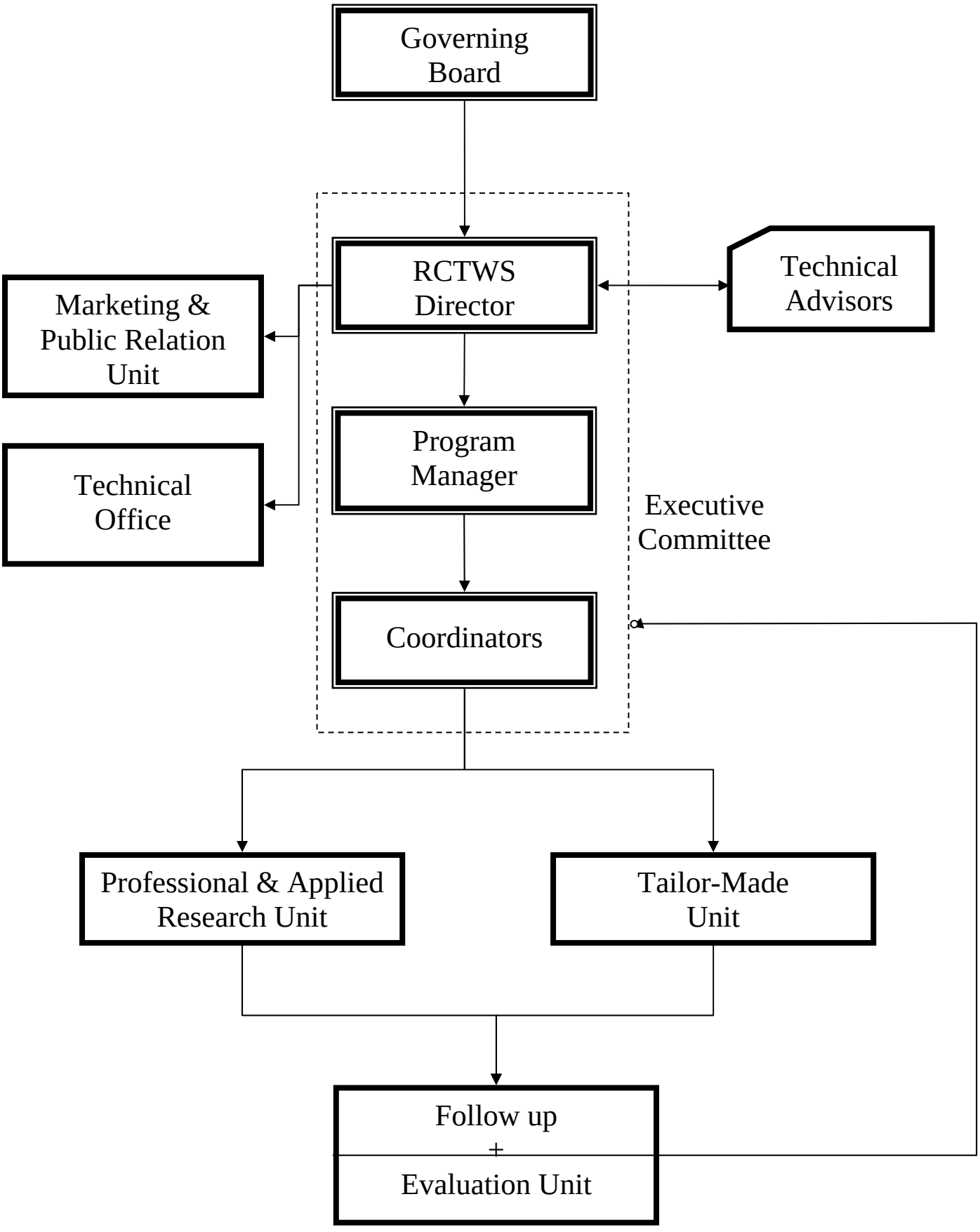

Figure (1) The Organization Chart of RCTWS Regional Program

7.3 Information and Data tools

Several tools developed during the first phase (2002 – 2007) such as:

- **Video Conference**

Video conferencing is an attractive tool to all people in different locations to electronically collaborate face to face in real time and share all types of information including data, documents, sound and picture.

Since 2006, this facility is already available at RCTWS.

- **Interactive Web Site**

To achieve our goals in more efficient way, RCTWS has developed a website to facilitate its information access. The main sections of the website are:

- RCTWS profile
- National program
- Regional program
- African program
- Communication
- Technical support

The main services of the website are:

- Event management system

- Electronic book
- Scientific dictionary
- Guest book
- On line marketing facilities
- Database use
- Mailing list system

7.4. Training Methods

To improve training efficiency in the future the two following steps have to be considered:

1. Planning to employ a number of permanent trainers as it own staff. They would have to have extensive field experience in the field of related water resources management. Also, a pool of part time trainers with practical experience is required.
2. Cooperation with national and international institutions. It is important to seek the integration with such institutions in the form of:

    - Developing new training modules, following modern training concepts.
    - Enhancing training materials as well as hand-outs.
    - Upgrading the training capabilities of (RCTWS) trainers, in modern training methods (RCTWS).
    - Planning to coordinate joint venturing with UNESCO / bodies Category I and II.
    - Contacting with different national institutes: (according to type of module course) e.g:

a. National water research center and its different research institutes and units.
b. Universities (Cairo, Ein Shams,…etc) and Faculties of Engineering

8. Curriculum Development

The educational program will be based on the Development of a set of educational modules on selected relevant regional themes in the field of Integrated Water Resources Management and engineering with other water related sciences. An educational module can be designed as training program of about 2-6 weeks duration, centered on a scientific theme relevant to the water sector. All modules are planned to be validated and accredited and giving credits to a planned consolidated international Diploma course in Integrated Water Resources Management.

8.1. Regional Training Needs Assessments and Important Issues

Assessment of training priorities for different regional countries such as Jordan, Lebanon … etc had been done.

Several topics had been discussed. The main issues discussed are:

- The importance of training in different subjects.
- The applied research and on-job training.
- The way of cooperation between RCTWS and the similar regional institutes.

- The need to train technical staff (civil, electrical and mechanical) and also technicians and administrative staff in the water sector.
- The value of water resources in the region and the practically common problems, especially the long term management of groundwater wells.
- The scarcity of water in the region.

From this training needs assessment, the most priority topics shared or common by the region are summarized as follows:

- Integrated water resources management.
- GIS and Remote sensing application in IWRM with emphasis on groundwater.
- Groundwater management and modeling.
- Economics of water resources projects.
- Water resources pollution and control.

And other specific training courses required by one or two countries are:

- Shared aquifers and water resources.
- Wady hydrology.
- Data acquisition and analysis.
- Hydro-informatics.
- Urban water supply, operation and management.
- Dams operation and maintenance.

On another direction, training needs assessment is made jointly between RCTWS and Japanese International Cooperation Agency (JICA) for Sub-Saharan countries in Africa on 2005. The priority

needs of such countries (Ghana, Senegal, Kenya, Zambia…etc) are summarized as follows:

- On farm water management course should include skills in the field of surface irrigation and drainage systems; participation and water harvesting operation and maintenance.
- In the field of integrated water resources management. The proposed courses should include:

  - Stakeholders and water management.
  - Legislative and organizational frameworks.
  - Water and sustainable development
  - Environment and water management
  - Water resources protection
  - Environmental and economic impacts of water project
  - Balancing water supply and demand
  - Management of shared water resources
  - Water quality management

Seminars are also suggested as following:

- Water governance
- Water harvesting
- Water quality
- Environment and water management

8.2. Modules Proposed

The committee of technical advisors had been met, and the proposed modules for water resources of the regional needs were

discussed. The professionals from the water sector shared and exchanged ideas. Also their best practices with lessons learned were studied. The following are the proposed modules for training courses in water science:

First Module: Integrated water resources management (5 weeks).

Second Module: Water Resources Assessment and hydro informatics (6 weeks).

Third Module: Shared water resources development and management (3 weeks).

Forth Module: On Farm Water Management (6 weeks).

Fifth Module: Groundwater management in the frame work of IWRM (2 weeks).

Six Modules: Role of artificial recharge of ground water (2 weeks).

Seventh Modules: Non-conventional water resources in Arid and semi-Arid regions (2 weeks).

Eights Module: Water valuation and Economics (2 weeks).

Ninth Module: Environmental Management of water resources (4 weeks).

Tenth Module: Project Management (2 weeks).

- Basic concepts of project management (1 week).
- Spread sheet applications in water resources (1 week).

Tailor Made Module courses:

Other tailor-made modules could be carried out as deemed required. Such modules may be as follows:

- Desalination of sea and brackish water.
- Urban water supply, operation and management.
- Water resources protection.
- Re-use of drainage water.
- Environmental impact assessment of irrigation and drainage projects.

Workshops and Seminars:

In addition to the courses several workshops (1-4 days) are proposed. These workshops cover the following topics

- Private Sector Participation.
- Water valuation and cost recovery.
- Gender water management.
- Water and ethics.
- Water as human right.
- Integrated urban water management.
- Decentralization and Institutional perform.
- Groundwater protection and modeling.
- Urban water modeling in specific climates.
- Sustainable water and waste water management.
- Knowledge mapping and human resources data bank.
- International water's negotiation and dispute resolution.

8.3 Summary of main contents of each module

Back ground of each module contents, course curricula, duration, and the supporting institutions are given as follows:

First Module: Integrated water resources management (IWRM) (5 weeks)

Integrated water resources management (IWRM) addresses, economic efficiency, environmental sustainability and equity of water resources. It addresses the management of water as resources and the frame work for provision of water services to all categories of users. It covers both water quantity and quality.

The course focuses on the integration of discipline for the comprehension management of water resources and to stimulate professionals to work in a multidisciplinary environment.

The main three pillars in IWRM are:

- Enabling environment of appropriate policies and laws.
- Institutional roles and framework.
- Management instruments for institutions to apply on daily basin.

Course Contents:

- Principles of hydrology and hydrogeology.
- Water resources, management and concept tools.
- Demand and supply management.
- Water resources planning and environmental management.
- Public private partnerships.

- Institutional, legal and economic frame works.
- IWRM, public awareness.

This 5 week course is designed for mid-career water professionals with an orientation to water sector and those who wish to upgrade their capabilities in water resources management within the framework of IWRM

Supporting institutions

The course will be supervised and held at RCTWS. The supporting institutions are:

- MWRI staff.
- Cairo and Ein-Shams University Staff specialized in water resources management.

Second Module: Water Resources and Hydro-informatics (6 weeks)

Water resources data, in particular hydrological and hydro geological data, are essential for planning, designing and operating water projects. Modernization of hydrological work is essential. Automatic measuring devices can provide more reliable and continuous recording of data, transmission by radio or satellite allows the immediate access to data and a remote control of the operation of the stations and the use of computers together with specialized software facilities, data processing including the quality control of data. So the course will cover the means and technology for adequate planning and projects preparations.

There are good tools for water resources assessment and data acquisition and analysis. These are remote sensing, geographical information system (GIS), and the use of models to predict quantity and quality of water resources.

Course Contents

- Data collection and analysis.
- Rain fall, stream flow measurements.
- Geographical information system.
- Remote sensing use in water resources.
- Environmental water resources modeling.

This six week course is designed for mid-career water professionals working in the field of water resources management and planning supporting institutions.

Supporting institutions

The course will be held and supervised by RCTWS. The other supporting agencies are:

- The survey research institute of the NWRC
- The soil and water research institutes of the National Agricultural Centre (MOA)
- Remote sensing Authority "Academy of Science, Ministry of Scientific Research".

Third Module: Shared water resources development and management (3 weeks)

Water management can be considered at the National, regional, basin and local levels. At each level, the logical management of water as a unitary source requires functional linkages in agency responsibilities for water surface and subsurface, water quantity and water quality.

Managing water requires dealing with water quantity and quality. So that issues of quantity and quality are this inseparable. This course will address water issues such as:

- Design management interactions
- Managing water quantity and quality
- Supply management both of conventional and non-conventional water resources.
- Demand management: which can take many forms, from direct measures to control water use, to indirect courses that affect (market mechanisms, financial incentives, and public awareness programs)?

Course contents

- Hydrology of the basin
- Water resources management within River Basins
- Geography and hydro-politics of shared water resources.
- Design management interactions.
- Supply management both of conventional and non-conventional water resources.
- Shared resources management.
- Institutional aspects.
- International law.

- Economic aspects.

This 3-week course is designed for senior staff that has enough experience and would gain knowledge about the latest development in planning and management of shared water resources.

Supporting Institutions:

- The Ministry of water resources and irrigation.
- Department of irrigation and hydraulics of the Faculty of Engineering, Cairo, University. The department gives the same course as a Diploma course for Nile Basin countries for one year).

Fourth Module: On-Farm Water Management (Irrigation / Drainage) (6 weeks)

During the last decades, new irrigation systems have been constructed and old systems have been modernized or rehabilitated. Systems manageability and sustainability under present and future conditions are the main pillars to gain the optimum benefit from a farm. Integrated management requires a flexible and positive response to social, traditional and institutional settings together with the technical aspects.

The RCTWS focuses in this course on the on-job training and hands-on experiences to insure the combination between theoretical education and real life practices and experience. The

course covers on-farm irrigation management for 3 weeks followed by the on-farm drainage management for another 3 weeks.

Course contents

The course includes the following main subjects:

- Soil-water-plant relationships.
- Crop water requirements
- Water distribution and control systems
- Efficiency of various irrigation/drainage techniques.
- Design of irrigation/drainage systems
- Operation and maintenance.
- Social, environmental and economic issues.
- Performance evaluation of the system
- Case studies and field visits.

The 6 week course is directed to professional actively working in the field of land and water development with at least 3 years of experience in the relevant field.

Supporting Institutions

- MWRI experts in Irrigation and Drainage.
- Universities specialists on farm irrigation and drainage.
- Drainage Research Institute of the NWRC.
- Irrigation Management Institute of the NWRC.

Fifth Module: Groundwater management in the frame work of IWRM (2 weeks).

One of the important water resources is the ground water and its availability both in quantity and quality. Groundwater resources are essential to satisfy the over growing needs of population in Africa. The module course covers the essential knowledge of how to manage ground water in the frame work of integrated water resources management.

The program exposes the professionals to new ideas, new concepts and new approaches in groundwater development utilization and management.

Course contents

The course includes the following subjects:

- Introduction to IWRM, its importance and its factors.
- Groundwater management (hydrology, resource assessment, information systems and ethics).
- Monitoring and Evaluation of ground water.
- Ground water modeling
- Sustainable management of ground water (environmental impact, social-economic impact ….etc).
- Case studies, lessons learned and field visits.

This 2-week course is directed to professional; having from 3 to 10 years of practical experience after graduation also a good knowledge of basic hydraulics, environmental engineering and modeling is necessary.

Six Modules: Role of Artificial Recharge of Ground Water in MENA Region (2 weeks).

Additionally, water resources depend on surface and ground supply to satisfy the increasing demand. However the limitation of such resources surpassed sustainable levels of supply. Such availability of the quantity and quality of water suggested the storage of water during excess water supply period to be later used in the time of shortage water availability.

Water Resources Managers have to find more balanced ways of allocating water when needed for planned development.

The Recharge of groundwater reservoirs is considered one of the successful means for water storage. This training course aims to making participants aware of the latest developments groundwater recharge technologies, quality control, monitoring evaluations and recovery techniques.

Course contents

The course covers the following main subjects:

- Principle of IWRM.
- Groundwater hydrology and hydrogeology.
- Pumping wells and pumping tests.
- Techniques for recharge and discharge
- Numerical modeling
- Quality control and environmental impact.
- Applications and case studies.

The 2 week course is directed to professional; having from 3 to 10 years of practical experience after graduation also a good knowledge of basic hydraulics, environmental engineering and modeling is necessary.

Seventh Modules: Non-conventional water resources in Arid and semi-Arid regions (2 weeks).

Due to the shortage of freshwater resources in arid and semi-arid region supply of good quality water is expected to decrease. Many countries are facing water scarcity as a problem that can be partially alleviated through the use of non-conventional water resources. The increasing water demand and the environmental impact of the disposal of drainage water and treated wastewater suggest that technological innovations are necessary for sustainable reuse for agriculture developments.

Experience suggests that there is usually no signal way or practical approach to manage poor quality water to be used successfully without long term impact on crops, soil and environments. The course covers a wide review concerning recent technologic development focusing or the proper management and practical approaches on the use of non-conventional water resources for irrigation highlighting the management approaches to maximize the benefits and minimize the adverse impact on soil production crop production, and other outputs.

The course includes the following;

- Type of non fresh water resources.
- Quality of drainage water and wastewater.
- Saline water.
- Assessing the suitability of non-conventional water for irrigation.

- Management practices using non-conventional water.
- Management of multi quality water resources.
- Desalination technology and management.
- Computer models for management of multi quality water resources.

This 2 week course involves practical and research experience which is needed. However all applicants for admission are to be considered on their individual merits. It is essential that participants have a good knowledge of English language.

Eight's Module: Water Valuation and Economics (2 weeks)

The economic system is concerned with productivity and allocation of resources. It impacts on all other systems as well as the ultimate decision-making process productive resources, usually are grouped into four main categories:

1. Natural resources
2. Labor
3. Capital and
4. Management

The contribution of economics lies in estimation of cost and returns of unit of water to productivity. The objective of this course is to highlight the linkage between economics and water resources

Course Content:

- Economic valuation of water
- Economic regulations
- Water rights and markets

- Demand management
- Water use and water pollution charges
- Cost sharing arrangements
- Cost of irrigation and drainage projects
- Fixed and running costs
- Cost of operation and maintenance
- Socio-economic impacts of irrigation and drainage

Ninth's Module: Environmental Management of Water Resources (4 weeks)

The environmental problems are caused by the interaction of a large number of factors such as groundwater recharge, drainage surface irrigation, soil characteristics, and seepage from canals, cropping patterns, and groundwater pumping for irrigation. The problems in these zones are water logging, salinity, alkalinity, water born diseases like malaria, changes in microclimate and other socio-economic conditions leading to the emergence of new cultural trends.

The objective of the course is to provide exposure to the development issues, institutional and legal arrangements in the different areas.

Provide professionals with up to date knowledge on environmental aspects and related issues.

Course Contents:

- Water quality protection of water resources
- Water-quality modeling.

- Engineering aspects of water harvesting in arid and semi arid environment.
- Management of lakes, wet lands, and coastal zones
- Impacts of climate change on water resources
- Environmental impact assessment.

Supporting Institutes:

The NWRC with its related institutes mainly:

- The Environmental and Climate Research Institute.
- The Drainage Research Institute.
- The Groundwater Research Institute.
- The Central Laboratory for environmental quality monitoring.

The program will be supervised by (RCTWS) and will be implemented by specialist from the Institutes.

Tenth Module: Project Management

a. Basic Concepts of Project Management (One week)

Objective:

The course is designed to enable engineers to carry out project Management calculations needed for critical path, cost budgeting, resource leveling. Etc. Engineers can produce. Graphical presentations of project components like Gannet chart, site work, cash flow, crash schedules, etc. The computational tool is MS Excel spreadsheet program.

The course is designed for engineers, managers and administrators involved in project management. Knowledge of Excel is preferable.

Course Contents:

- Introduction to project management.
- Use of linear programming in Excel.
- Calculation of EST and LFT.
- Deter imitation of critical path.
- Graphical presentation of project components.
- Resources crash calculations and graphics.
- Applications to real project.

b. Spread sheet applications in Water Resources (1 week)

Objectives:

Spread sheets will be used as the computational environment. Examples are chosen carefully to meet the needs of the participants, and ranges from simple to some what involved applications. The course is an opportunity to learn about the recent advances in several fields.

Course Contents:

- Introduction to spreadsheets
- Comparison with programming languages
- Simple applications (earth bank volume, well hydraulics, etc.)
- Advanced applications (rain fall – runoff calculations, pipe networks)

9. Appropriate Phasing and Time Schedule

The criteria for the regional program of RCTWS phasing depend on:

- The Institutional facilities dealing with each module.
- The staff of the training center and the trainers' availability which needs up grading to cope with such program.
- The financial facilities and the donors fund availability.
- The request of the regional institutes.

Since facilities of RCTWS are available, the module courses could be handled in parallel during the same year. If this is the case it means that RCTWS will be delivering the courses over 9 months, and three months will be left for preparations and holidays. However, in the first year of the plan i.e. year 2008, six modules can be given, until high quality coordinators are available. From year 2009 and on the ten modules could be delivered.

Beside these modules, seminars and conferences will be conducted according to the regional or national requirements.

Table (2) illustrated the phasing and time schedule of the module courses are shown in

10. Quality Assurance and Accreditation System

RCTWS would offer all programs as needed / demanded in the region. RCTWS oriented their costs on market conditions to assure budget sustainability. It is essential for RCTWS to study other training institutes' experiences. The plan is to move towards a joint cooperation with regional and International Institutes in the form of (twinning, public private partnership) to build a milestone experience in training as a business and which would also bring in additional technical and adult-oriented know-how.

The advisory committee tasks would be the revision and modernization of RCTWS' syllabuses and curriculums as a peer review of the courses should be undertaken.

Monitoring and evaluation unit will use impact indicators not only for both the trainers and trainee but also for the organization of the course.

Certificates of RCTWS will certify not only attendance but it will include performance of the participants. The tendency is to have accrediting system which allows participants continuing postgraduate studies. RCTWS is planning to establish affiliation with other accredited institution to be able to use credible certification and to obtain academic recognition.

11. Budget Requirements

Cost estimate of different training modules activities consists of:

1. Staff, trainees, and trainers requirements:
   - Participants whose mean number / course which ranges from 20 to 25 participants need to cover their travel costs, accommodation and honoraria.
   - Foreign lecturers may be called as qualified experts from the region or outside the region whenever possible. It is supposed that foreign lectures will be supported by donor countries and organizations.
   - Local lecturers who are available in Egypt and chosen within a certain criteria are mainly university staff or senior researchers from national institutes as NWRC.
   - Local staff includes mainly supporting staff such as secretariat, administrative finance staff and public relations. For every course, there must be a qualified coordinator, working hand by hand with the director of the training center or the program manager.
2. Technical program requirements:

The program operations include purchasing equipment such as copying machines, educational materials, audio-visual aids etc. It also includes printing materials, text books, and handout notes.

3. The operating expenses:

The operating expenses include cost of fuel, oil, car, maintenance furniture and car maintenance etc.

Table (3) shows the distribution of the costs of each module per year. (Tentative estimation as of January year 2007).

The estimated budget per year for the regional is US 993,780 (Nine hundred ninety three thousands and seventy hundred eighty US dollars).

12. Financial Arrangements and Sustainability

12.1. Contribution of the Government

The government covers the secretariat staff, including the administrative and financial staff, the director, program manager and coordinator. Salaries and compensations should be topped over from donor organizations or countries or from the running costs of the module programs.

Also, the Government covers the communication, utilities and maintenance costs of the center, plus the expenses of holding the sessions of the governing board and the meeting of the consultative group.

The Government contributes funds towards the implementation of studies, training and publication activities, complementing the contributions from other sources.

The RCTWS renders its facilities at the disposal of any UNESCO's activities. These include, but are not limited to, organizing conferences, Seminars, workshops, etc.

At the same time, the government of Egypt will continue to support the financial requirements to implement its national training program including the cost of the secretariat staff.

12.2. Contribution of the UNESCO

In conformity with the relevant policies of the Inter-governmental Council of the IHP, it may assign to the center the execution of agreed-upon water activities relevance to the region within the framework of its regular bi-annual budgets and programs, particularly those appropriate to reinforce its program.

It will encourage the international governmental and non-governmental financial entities, as well as member states of the organization to provide financial and technical assistance and to propose applicable projects to the center and to facilitate the contracts with other international organizations relevant to the functions of the center.

It will provide the center with IHP publications and other pertinent material and will disseminate information on the activities of the center via IHP website, newsletters and other mechanisms at its disposal.

12.3. Self Sustainability

With a more intensive regional orientation it is envisaged that the center will need to generate income from regional activities and programs and will aim for at least partial financial self-sustainability. Consequently, the centre is in need of the relevant partial autonomy to be able to be active on the free market and to develop and reach a commercial orientation. This should be reflected in the regulations and bi-laws of the centre.

Further, there is a strong need to develop a business and marketing plan for the centre as soon as the work plans of the related regional programs (NBI, UNESCO and JICA) are cleared.

In summary, apart from the levy, which is expected to disappear gradually, financial coverage is envisaged through the following modalities:

- Additional (for this plan) Government funds (maintenance, salaries).
- Service delivery to regional and international training programs
- Long term training agreements with international funding organizations, bilateral and multilateral donors.
- Donor funded capacity building programs
- Bilateral donor funded strengthening of the National Training Centre.
- Nile Basin Initiative (NileCom, Nile-TAC, ICCON) initially through the Applied Training Project.
- Consultative services of Key-personnel of the Centre.

Reports by UNESCO's Water-related Centres (category 1 and 2) on activities related to the IHP in the period July 2006 – May 2008

1. Basic information on the centre

Name of the Centre		**Regional Centre on Urban Water Management - Tehran**
Name of Director		**Dr. Farhad Yazdandoost**
Name and title of contact person (for cooperation)		**Mr. Alireza Salamat**
E-mail		info@rcuwm.org.ir
Address		**No. 120; Khoramshahr St. Tehran, 1553713511; Iran**
Website		www.rcuwm.org.ir
Location of centre		city/town **Tehran** country **Iran**
Geographic orientation *		☐ global ☒ regional
Year of establishment		2002
Themes	Focal Areas ♦	☒ groundwater ☒ urban water ☒ arid / semi-arid zones ☐ humid tropics ☒ droughts and floods ☐ sediment transport and management ☒ water and environment ☐ ecohydrology ☐ water law and policy ☐ transboundary river basins/ aquifers ☒ IWRM ☒ global and climate change ☐ mathematical modelling ☒ social and cultural dimensions of water ☒ water education ☐ other: (please specify) _____
	Scope of Activities ♦	☐ vocational training ☐ postgraduate education ☐ continuing education ☒ research ☒ institutional capacity-building ☒ advising/ consulting ☒ software development ☐ other: (please specify) _____
Support bodies [1]		Government of I.R. Iran
Hosting organization [2]		Ministry of Energy, I.R. Iran
Sources of financial support [3]		Government of I.R. Iran, UNESCO and some Governing Board Members
Existing networks and cooperation [4]		G-WADI, UNESCO-IHP, IAHR
Governance		☒ director and governing board ☐ other: (please specify) _____ Link to election of board members to the IHP IGC and hosting country IHP National Committee _____ Frequency of meetings: once every year(s)

* check on appropriate box
♦ check all that apply

[1] please specify bodies that cover the operational costs of the centre, and other essential costs such as salaries and utility bills, and that provide institutional support to ensure centre's sustainability
[2] if different from support bodies
[3] please specify sources of main budgetary and extrabudgetary funds to implement projects
[4] please write international networks, consortiums or projects that the centre is part of, or any other close links that the centre has with international organizations or programmes, which are not already mentioned above

	☒ Existence of UNESCO presence at meetings
Institutional affiliation of director	K.N. University of Technology, Professor
Number of staff and types of staff	total number of staff (full-time & part time) : **6 full time and 4 part time** number of staff who are water experts: **5** number of visiting scientists and postgraduate students: **2**
Annual turnover budget in USD	**~$ 500,000**

2. Activities undertaken in the framework of IHP in the period July 2006 – May 2008

2.1 Educational activities (i.e., those with accreditation) that directly contributed to the IHP-VI and WWAP
Please include here those activities which led to accreditation of degrees, or those held in formal school settings.

2.2 Research activities that directly contributed to the IHP-VI and activities by WWAP
Please include research/applied projects outputs such as publications that directly contributed to the IHP-VI and WWAP objectives

- **Proceedings of the International Workshop on "Groundwater for Emergency Situations", IHP-VI, Series on Groundwater, No.16**

2.3 Training activities that directly contributed to the IHP-VI and WWAP objectives

- **Training of Trainers Workshop on "Application of Models and New Technologies in Groundwater Management in Arid and Semi-arid Regions", Karaj, Iran, 29 July-1 August 2006**
- **Training of Trainers Workshop on "Integrated Urban Water Management (IUWM)", Lahore, Pakistan, 2-5 May 2007**

3. Collaboration and linkages

3.1 Participation in major international networks, programmes, partnerships with other UN or other International Agencies, media and professional bodies

- **The International Water Academy**
- **The International Water Association**
- **UNESCO-IHE**
- **UNW-DPC**

3.2 Participation in meetings related to the IHP and UNESCO (e.g., the UNESCO General Conference, the UNESCO Executive Board, the IHP Intergovernmental Council and/or other meetings organized by IHP)

- **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**
- **18th session of IHP Intergovernmental Council, UNESCO HQ, Paris, June 2008**

3.3 Collaboration and networking with other UNESCO category 1 or 2 institutes/ centres

3.3.1 cross-appointment of directors of the category 1 or 2 institutes or centres on the governing board

- **UNESCO – IHE**
- **Regional Centre for Training and Water Studies (RCTWS-Cairo)**

3.3.2 exchange of information on activities such as training/educational materials, and funding opportunities
- **Regional Centre for Training and Water Studies (RCTWS-Cairo)**
- **UNESCO-IHE**

3.3.3 exchange of staff, most notably professionals and students

3.3.4 implementation of joint activities, such as workshops, conferences, training programmes, joint projects, field visits, software and data sharing, knowledge exchange and publications
- **Regional Centre for Training and Water Studies (RCTWS-Cairo)**
- **UNESCO-IHE**

3.4 Relationships with the UNESCO field office whose jurisdiction covers the country of location
- **UNESCO Tehran Cluster Office**
- **UNESCO New Delhi Office**
- **UNESCO Cairo Office**
- **UNESCO Beijing Office**

3.5 Relationship with the UNESCO National Commission and the IHP National Committee in the country of location
- **Iranian National Commission for UNESCO**
- **Turkmenistan National Commission for UNESCO**
- **Pakistan National Commission for UNESCO**

3.6 Relationship with other UNESCO-related networks, such as UNESCO Clubs, ASPnet, and UNESCO chairs

4. Communication

4.1 Communication and knowledge dissemination activities undertaken in the framework of IHP

4.2 Policy documents and advice

5. Update on Centre Operations

5.1 Membership of the Board of Governors during designated period

4 new members of the Governing Board:
- **Ministry of Water and Power, Pakistan**
- **Ministry of Water and Environment, Yemen**
- **Islamic Network on Water Resources Development and Management (INWARDAM)**
- **UN-Water Decade Program on Capacity Development (UNW-DPC)**

5.2 Key decisions made (attach minutes of meetings)

Annex (I)

6. Assessment of the Centre's Impacts

6.1 Science Impacts (Major contributions to the science, technology, education, and regional and/or international cooperation in the field of water)
- **Reconstruction of Hydro-meteorological Network of Afghanistan**
- **Establishment of Water Research Center in Kabul, Afghanistan**
- **Expert Group Meeting on "Municipal Wastewater Use for Irrigation", Sana'a, Yemen**
- **Participating in the 4th International Water Exhibition, Tehran, Iran**
- **International Conference on "Water Resources Management in the Islamic Countries", Tehran, Iran**
- **International Symposium on "New Directions in Urban Water Management", Paris, France**

6.2 Knowledge Transfer Impacts (Major achievements in the dissemination of knowledge and technology transfer)

- **Training of Trainers Workshop on "Application of Models and New Technologies in Groundwater Management in Arid and Semi-arid Regions", Karaj, Iran**
- **International Workshop on "Flash Floods in Urban Areas and Risk Management", Muscat, Oman**
- **International Workshop on "Groundwater for Emergency Situations", Tehran, Iran**
- **Training of Trainers Workshop on "Integrated Urban Water Management (IUWM)", Lahore, Pakistan**
- **International Workshop on "Water Demand Management in Urban Areas in Light of Tourism", Muscat, Oman**
- **International Workshop on "Capacity Development for Water Journalists", Tehran, Iran**

6.3 Policy Impacts (advice sought by government and other bodies and evidence of inputs into policy arena)

- **Acting as advisor to the Ministry of Energy, Iran, on international water activities**

7. Future activities that will contribute directly to IHP and/or to WWAP

7.1 Operational Plan (2008-2009) (attach operational plan for 2008-09 if available)

Annex (II)

7.2 Strategic Plan linked with IHP-VII (attach strategic plan for 2008-11 if available)

8. Annexes

8.1 List of publications released by the centre (there can be overlap with those listed in 2.2 above)

- **3 Newsletters (January and June 2007, January 2008)**
- **Proceedings of the International Workshop on "Groundwater for Emergency Situations"**

8.2 List of training courses conducted (there can be overlap with those listed in 2.3 above)

- **Training of Trainers Workshop on "Application of Models and New Technologies in Groundwater Management in Arid and Semi-arid Regions", Karaj, Iran**
- **Training of Trainers Workshop on "Integrated Urban Water Management (IUWM)", Lahore, Pakistan**