



## INTERNATIONAL HYDROLOGICAL PROGRAMME

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# 15<sup>th</sup> IHP Regional Steering Committee meeting for Southeast Asia and Pacific

*Manila, Philippines, 22-23 November, 2007*

## FINAL REPORT

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IHP-VI Regional Steering Committee meeting | No. 15  
Regional Steering Committee for Southeast Asia and the Pacific  
UNESCO Jakarta Office, 2007

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**The 15th IHP  
Regional Steering Committee Meeting for  
Southeast Asia and the Pacific**

**Manila, Philippines,  
22-23 November 2007**

Chairman: Mr Eddy Djajadiredja (Indonesia)  
Secretary: Prof Kaoru Takara (Japan)

UNESCO Representatives: Mr Giuseppe Arduino (Jakarta Office)  
Mr Hans Decker Thulstrup (Apia Office)  
Mr R. Jayakumar (Beijing Office)

Countries Represented: Australia, Cambodia, China, Kiribati (Pacific Island countries),  
Indonesia, Japan, Korea (Republic of), Lao PDR, Malaysia,  
Mongolia, Myanmar, New Zealand, Papua New Guinea,  
Philippines, Thailand, Vietnam.  
(See Annex 1 for the list of participants)

Observing Countries and Organizations: Canada

## **1 OPENING**

The RSC Chair Mr Eddy Djajadiredja (Indonesia) opened the meeting at 09:45am on 22 November and welcomed the participants. The Philippine National Committee was thanked for organizing the conference and meeting.

## **2 ELECTION OF RAPPORTEUR**

It was agreed that the task of Rapporteur would be shared between Mr Ross James (Australia), Mr Dennis Jamieson (New Zealand) and Mr Hans Thulstrup (UNESCO Office, Apia).

## **3 ADOPTION OF AGENDA**

The draft agenda was presented by the Chairman. Following some minor editorial changes, clarification that the handover date to a new RSC Chair was immediately after the closure of the meeting and, agreement that, as the AP FRIEND Technical Sub-committee meeting was scheduled for Thursday evening, the AP FRIEND report (Agenda Item 11) would be on Friday morning, the Agenda at Annex 2 was adopted.

## **4 SECRETARIAT REPORTS**

### **4.1 UNESCO JAKARTA OFFICE REPORT**

Mr Arduino preceded his report with a reference to discussions about the Journal of Hydrologic Environment published by the International Hydrologic Environmental Society and requested that researchers from within the region consider forwarding papers to Professor Soontak Lee for publication in the journal.

Mr Arduino reviewed the status of the 6 action items from the 14<sup>th</sup> RSC meeting in Bangkok, Thailand. The involvement in or organization of 3 workshops/courses/seminars involving a total of 72 participants as well as the provision of travel grants enabling 14 regional scientists to attend a range of meetings and conferences were briefly described. Mr Arduino described a number of activities organized by other UNESCO field offices which were supported by 34% of the Jakarta IHP budget. A number of activities undertaken within UNESCO Jakarta, such as the hydrogeological investigation in Viet Nam and the rainfall station operated in Jakarta were described. Results from the rain station, including analysis of water samples are contributing to a number of projects and should be available soon.

Mr Arduino summarized the outcomes of the review and evaluation meeting on activities supported by the Japanese Fund in Trust and highlighted the development of an online information and discussion forum ([www.ihpnagoyaforum.org](http://www.ihpnagoyaforum.org)) and the IHP Training Course data base. The data base contains contact details of course participants and helps with the evaluation of the Nagoya training courses. Contact details for approximately half of the participants of courses held over the last 16 years are incomplete and the help of National Committees is requested to trace these participants.

⇒ **ACTION: National Committees to help trace ‘missing’ participants of Nagoya courses.**

The complete report, including status of action items, is included as Annex 3.

#### **4.2 UNESCO APIA REPORT**

Mr Thulstrup informed the meeting that partnerships were the major means for delivering projects in the Pacific, that these were coordinated by SOPAC and that the Regional Action Plan on Sustainable Water Management provided the guiding principles for the partnerships and projects. UNESCO is a partner in two large projects currently underway in the Pacific; the GEF funded Integrated Water Resources Management Project, and the European Union funded Pacific HYCOS Project.

Mr Thulstrup briefly described progress in a number of activities undertaken during the year including, Groundwater Monitoring, Management and Legislation in Niue, HELP in the Pacific, work to establish the Nadi River, Fiji as a HELP basin and, the UNESCO-SOPAC JFIT project on Biosphere Reserves for Sustainable Community-Driven Management of Natural Resources in Micronesia. The meeting was informed of the availability from the Apia office of the much-requested report *Hydrology and Water Resources of Small Islands: A practical guide - UNESCO IHP Studies and Reports in Hydrology 49, Editor: A. Falkland* and also of contributions made to consultations and preparations for a number of regional training events which were described in more detail in the full report.

The 14<sup>th</sup> RSC meeting requested the Apia Office to investigate the feasibility of seeking status as a UNESCO Category II Centre for the Water and Sanitation Programme of SOPAC. Mr Thulstrup advised the meeting that, as a result of the well developed cooperative arrangements between UNESCO and SOPAC and the existence of numerous and proposed Category II Centres in Asia, it is not recommended that the RSC pursue Category II status for the SOPAC Water and Sanitation Programme. If developments warrant it the RSC, SOPAC and UNESCO may wish to reconsider this in the future.

The complete report is included as Annex 4.

### **4.3 UNESCO BEIJING REPORT**

Mr Jayakumar described a number of capacity building activities such as the Advanced Training Workshop on Reservoir Sedimentation Management held at IRTCES Beijing, China during October. Two workshops, one on groundwater management and the other on water pollution and environment protection in agriculture, were held under the UNESCO Chair on Sustainable Water Management at Hohai University, Nanjing, China. This Chair is mainly sponsored by funding from Germany.

The establishment of a joint UNESCO Chair on Groundwater at the Mongolian Academy of Sciences and Tsukuba University Japan was described. Funding for the Chair is from Japanese Funds in Trust and the two institutions will research the setting up of groundwater monitoring systems in Mongolia.

Mr Jayakumar referred to a recent workshop under the G-WADI program and a meeting of the Asian G-WADI Network held in China, 11-17 June. The activities of the G-WADI Asia group were described as was a poster and brochure about the group, which are available from the web site [www.asian-gwadi.org](http://www.asian-gwadi.org).

Four research projects have been undertaken in China with funding support from the Ministry of Water Resources. Mr Jayakumar informed the meeting of funding Spain has provided to the UN and that \$12M of this funding is to be made available for projects in China.

Mr Jayakumar's complete report which is included as Annex 5

## **5 COUNTRY REPORTS**

All country reports are included as Annex 6.

### **5.1 AUSTRALIA**

Mr Ross James referred the meeting to the membership and institutions represented on the IHP National Network shown in the distributed Country Report. The meeting was informed of Mr Daniell's election as Chair of the UNESCO FRIEND Inter-Group Coordinating Committee (FIGCC) at its meeting in Cuba in December 2006 and that the next meeting of FIGCC will be held in Adelaide, Australia in April 2008. The meeting was also informed of significant changes in water management in Australia with the enactment by the Federal Government of a National Water Act. The Water Act 2007 was prompted by 10 years of drought and underpins a \$10 billion dollar National Plan for Water Security which will drive the water reform process. Mr James briefly described the launch of the Pacific HYCOS Project that was held in Brisbane, Australia in April 2007 and that will be described in more detail by the Pacific delegate.

### **5.2 CAMBODIA**

Mr Monichoth So Im informed the meeting of the key position water has in the economic plans of the government. However, resource constraints limited the activities that could be undertaken. Mr Monichoth So Im briefly described water resource management and flood warning projects on two river basins and referred to cooperation with the Mekong River Commission in establishing data collection networks and in information sharing. A number of seminars and training courses related to flood forecasting were held as was a training course in 3 models (SWAT, ISIS and IQQM) which was supported by the Mekong River Commission.

### **5.3 PR CHINA**

Mr Liu Heng referred to a number of IHP-VI activities and highlighted the 5th China Water Issues Forum and China Engineering Academy Academician Forum, which was held during November in Nanjing and the China Hydrology Regulation that was introduced in June 2007. This is the first regulation guiding hydrological activities in China and covers issues such as standards and access to data. Collaboration activities with the Hindu-Kush-Himalayan FRIEND Project and the 22<sup>nd</sup> Sino-Japan Water Resources Workshop were described. In addition to describing a number of education activities and international meetings that were held in China, Mr Liu also described the presentation of awards to 2 people (Mr Zhang Hailun and Mr Xu Zongxue) and one group (Bureau of Hydrology of Changjiang Water resources Commission) for their contribution to international cooperation.

### **5.4 INDONESIA**

Mr Hery Harjono described the operation of the National Committee and informed the meeting that it was in the process of restructuring activities to in the light of the IHP Phase VII program and to improve participation of key stakeholders. A number of meetings, collaborative activities and projects detailed in the country report distributed at the meeting were described. Mr Harjono highlighted the International Symposium and Workshop on Groundwater Problems in Developing Countries and the United Nation Forum on Climate Change that will be held in Bali during December. Indonesia's contribution of 2 river basins to Volume VI of the Catalogue of Rivers of Southeast Asia and the Pacific was noted as were the ongoing activities to establish the Asia Pacific Center for Ecohydrology (APCE).

### **5.5 JAPAN**

Mr Kaoru Takara referred to the development by Mr Chikamori of the format for Volume VI of the Catalogue of Rivers that was circulated during May and informed the meeting that one Japanese river has been contributed and that additional rivers are being considered for inclusion. The signing ceremony for the establishment of the UNESCO Chair in Mongolia on Sustainable Groundwater Management that occurred in June was highlighted by Mr Takara. A number of activities undertaken by ICHARM were briefly described as were some future activities: the next Nagoya Course being held during December, a Water Summit Conference and, a National Committee Working Group meeting to consider how to contribute to IHP-VII and improve co-operation both between organizations and within the region.

### **5.6 KOREA (REPUBLIC OF)**

Mr Soontak Lee described the status of some of the projects in progress that are detailed in the table in the country report; highlighting the Water Demand Management and Planning project and projects related to Asian Pacific FRIEND. The meeting was informed that the National Committee is preparing a detailed report on its involvement in IHP-VII covering all themes. Mr Lee briefly referred to contributions to university training, the organization of courses and seminars and close cooperation with ICHARM.

### **5.7 LAO PDR**

Mr Vinliam Bounlom informed the meeting that a decision regarding the formation of a National Committee had not yet been made by the government. Laos is a member of WMO, ESCAP/WMO Typhoon Committee, ASEAN and the Mekong River Commission and collaborates on projects organized by these organizations. Mr Bounlom referred to the Pilot Project on the Provision of City-Specific Numerical Weather Prediction Products to Developing via the Internet, the Pilot Project to Develop Support for Developing Countries in Aeronautical Meteorology and projects on flood forecasting as examples of such collaboration.

## **5.8 MALAYSIA**

Mr Keizrul Abdullah, reported on the operation of the National Committee comprising permanent members and members elected for a term of two years. A number of research projects undertaken as part of IHP-VI and Asian Pacific FRIEND were highlighted. Also highlighted by Mr Abdullah were the very successful National Hydrology Expedition and Water Management Awareness Programme for Middle Region of Peninsular Malaysia. This program involves students and teachers from secondary schools and now includes hydrological expeditions to two main rivers, jungle activities on flora and fauna and field water quality sampling and analysis. Mr Abdullah listed a number of courses run during the year, drew attention to a short course on urban stormwater management that was scheduled for December and informed the delegates that the publications listed in the report are all available. As future activities Mr Abdullah spoke of efforts to establish a UNESCO Chair that has a focus on stormwater management and, to increase awareness of hydrology through a Best Thesis Award for undergraduates.

## **5.9 MONGOLIA**

Mr Gombo Davaa described a number of national activities undertaken; such as the development and initial implementation of the project “Strengthening Integrated Water Resource Management in Mongolia”, the preparation of a number of reports on the hydrology and water resources of the country and, to a number of training activities such as the course scheduled for December-January at the Research and Training Centre in IWRM involving 40 senior engineers. A number of regional and international activities were detailed with Mr Davaa highlighting the establishment of the UNESCO Chair in the Institute of Geoecology established in cooperation with Japan and the collaborative program with Japan to initiate a groundwater monitoring program in the Selbe and Tuul river basin. The organization of the 16<sup>th</sup> RSC meeting in 2008 was identified as a major coming activity.

## **5.10 MYANMAR**

Ms Tin Yi described the composition of the National Committee and the operation of five working committees each responsible for an IHP-VI theme. Participation in regional meetings and collaboration with EANET (Acid Deposition Monitoring Network in East Asia) were referred to by Ms Yi who also informed the meeting of Myanmar’s participation in the 16<sup>th</sup> Nagoya training course on Oceanography Basics. Scientific meetings representatives of the National Committee participated in were listed and the hosting of the Myanmar Monsoon Forum organized in collaboration with the Asian Disaster Preparedness Centre was described by Ms Yi.

## **5.11 NEW ZEALAND**

Mr Dennis Jamieson summarized the context of IHP activities in New Zealand as; freshwater resources data collection and archiving, effects of land use intensification on water quality and quantity and, reducing the impact of weather related hazards. The Sustainable Water Programme of Action (SWOPA), a whole of government approach to address water issues was described. The meeting was informed by Mr Jamieson that New Zealand’s collaboration in the Pacific was moving away from a project focus and high level training activities towards ensuring that basic data for decision making and long term technical capability were available and that new technology was used that addressed local needs. EDNZ, a recently released online system to enable free access to near real-time environmental data was highlighted. The priorities for the future emphasized by Mr Jamieson were; snow and ice monitoring, ensuring maximum value was obtained from water used, water related hazards, climate change and increasing support in the Pacific area.



## **5.12 PAPUA NEW GUINEA**

Mr Maino Virobo briefly referred to the operation of the National Committee and difficulties with progressing water issues. A number of activities undertaken by individual agencies such as for World Environment Day with the theme “Save Our Sinking Island”, commencement of the rehabilitation of the Ramu River hydrological network with support from SOPAC and a Disaster Information Exposition with flood hazards as one of its themes that targeted school age children were described. At the regional level Mr Maino described involvement in the Pacific HYCOS project and participation in the Nagoya training course. Continuation of the Pacific HYCOS Project, Ramu River project and the Loloki River IWRM proposal were listed in a program of future activities by Mr Maino.

## **5.13 PHILIPPINES**

Mr Leonardo Liongson described the operation of the National Committee over the previous year highlighting the committee’s focus on the organization of the International Conference on Hydrology and Water Resources Management for Hazard Reduction and Sustainable Development (HRSD 2007) and the 15<sup>th</sup> RSC meeting. A number of activities were reported on by Mr Liongson. These included the Philippine Water Partnership which supported a Dialogue on Small Scale Water Providers and launching of the Philippine National Committee on Large Dams which will focus on sustainability. Other activities included the water reform and climate change projects of the National Academy of Sciences and Technology, the rainwater harvesting and river basin modeling research of the Engineering Schools Consortium and Philippine participation in the APFRIEND IDF Project.

## **5.14 THAILAND**

Ms Supranee Runghirunvirov informed the meeting of the new Chair of the National Committee and that all activities had been reviewed under the National Policy and Master Plan on Hydrology. The status of IHP activities was described and the promotion of the National Water Agenda with the current theme of “Water is Life” was highlighted. Ms Runghirunvirov described collaboration with; projects undertaken by the Mekong River Commission, the Asian Working Group on Water Resources Management and ADB projects. The ADB supported projects included a study on IWRM in Nam Yom Basin and study of a Social Model for Water Conflict in Bangpakong Basin. Three international activities hosted by Thailand, the 14<sup>th</sup> RSC meeting and conference, a workshop on water allocation and water rights and, the 1<sup>st</sup> Technical Seminar of ASEM Waternet were reported on by Ms Runghirunvirov.

## **5.15 VIETNAM**

Mr Tran Thuc presented the country report and informed the meeting that climate change has been the focus of many activities and projects. Projects described covered the study of the impact of sea level rises, benefits from use of small and medium scale hydropower and development of climate change scenarios for Vietnam and the region. Mr Tran highlighted collaboration with SEA START in the organization of the workshop “Climate Change in the 21<sup>st</sup> Century: Some initial results” held during November 2007. Mr Tran informed the meeting of five publications that had been produced and listed a range of international meetings in which Vietnam had participated.

## **5.16 PACIFIC COUNTRIES**

Mr Taboia Metutera from the Republic of Kiribati presented the report on behalf of the Pacific Island Countries. He commenced by paying tribute to Mr Filipino Taulima, Director of Public Works, Tuvalu, who passed away suddenly during the year and was a strong advocate for improved water resources management in the Pacific. Mr Taboia informed the meeting of the background to Pacific Island involvement in the RSC, the relationship between UNESCO, SOPAC and WMO,

and the arrangement for rotation of Pacific representation at RSC meetings. The Pacific Regional Action Plan with its 6 Themes and the 6 agreed Small Island Developing States (SIDS) Water Actions were described. Activities being undertaken in the Pacific such as, the recently completed three year Pacific Hydrological Training Program, groundwater monitoring and water management legislation in Niue, implementation of the Nadi River in Fiji as a HELP Basin and, the Pacific HYCOS Project were described. Mr Taboia referred to the range of organizations and funding sources involved in Pacific projects and the value of initiatives such as Pacific Island Climate Update, the work of the Australian Water Research Facility and the Pacific Resource Centre on Water and Climate at SOPAC. The meeting was informed of the establishment of four Pacific Water Focal Groups focusing on hydrology and water resources, water engineering, water quality and wastewater and the email addresses to subscribe to each of these groups. Mr Taboia presented an overview of Kiribati, its water resources and its water monitoring programmes. The major issues of water scarcity, increasing population and traditional land ownership and some strategies being implemented to tackle these issues were described. The importance of the Kiribati Adaptation Project and of external support was emphasized by Mr Taboia.

Following the completion of the country reports Mt Takara recalled that at the 14<sup>th</sup> RSC meeting in Bangkok a Resolution was passed inviting Laos and Myanmar to be members of the RSC. During the ensuing discussion, previous efforts to encourage Laos to establish a National Committee were summarized by Mr Arduino who expressed the view that nothing more could be done; it was now in the hands of the government of Laos. Mr Arduino also informed the meeting that a letter of invitation has previously been sent to Myanmar however a response has not been received. Mr Takara agreed to send an official letter to Myanmar advising of the Resolution at the 14<sup>th</sup> RSC.

⇒ **ACTION: Write to Myanmar advising of the Resolution passed at the 14<sup>th</sup> RSC meeting.**

In response to an inquiry from Mr Jayawardena regarding the possible inclusion of additional countries from South Asia, a number of participants referred to examples of collaboration across UNESCO boundaries and that this should be encouraged. Mr Takara expressed the view that current membership arrangements should be maintained with additional countries participating as necessary.

## **6 REPORT FROM UNESCO CATEGORY II CENTRES MEETING**

Mr Giuseppe Arduino presented a report on the Category II Centres meeting held in Bangkok 26-27 September 2007. This meeting was a follow-up to the earlier global meeting of Category II Centres in Delft (NL). The objectives of the meeting were to develop the roles of the centres and to enhance cooperation which involved participants from all current and establishing Category II Centres in the region.

Three areas formed the focus of discussions at the meeting: clarification of the contexts and conditions for cooperation, identification and initiation of small-scale practically achievable cooperation projects/programmes and, identification of fields of broad centre-centre-UNESCO cooperation and cooperation modalities. The actions resulting from these discussions were presented by Mr Arduino who also distributed a copy of the SWITCH Asia Project upon which collaborative project concepts developed by the Centres will be based.

## **7 REPORTS FROM UNESCO CATEGORY II CENTRES**

The Regional Humid Tropics Hydrology and Water Resources Centre for Southeast Asia and the Pacific (HTC), Malaysia

HTC Director Mr. Mohd. Nor summarised the report presented to the 11<sup>th</sup> Coordination Committee Meeting held earlier in the day and advised that this report included the Final Report from the Delft meeting of the Category II Centres. The Minutes of the HTC meeting are included as Annex 9.

Mr. Nor stressed the importance of identifying actions that the Category II Centres could take to enhance their overall profile and consistency with UNESCO future directions. Centres will need to cooperate, particularly for IHP-VII. The Centres will be subject to evaluation by UNESCO and it is likely that the HTC will be the first Centre to be evaluated.

HTC has a particular responsibility to design a web page for the combined Centres. Action on this is underway. Further information about the HTC is available from [www.htckl.org.my](http://www.htckl.org.my).

#### International Centre for Water Hazard and Risk Management (ICHARM), Japan

The background leading to the establishment of the Centre in March 2006 was presented by Mr Jayawardena. ICHARM has three aims: research, training and information networks. Mr Jayawardena outlined the organization of ICHARM its guiding principles and described the research as being initially focused on floods and water related hazards and later expansion to include drought, sedimentation etc. ICHARM is the home of the Secretariat for the International Flood Initiative (IFI). Mr Jayawardena described the Centres training and capacity building activities and informed the meeting about the increasing number of students and researchers from the region studying and working at the Centre. The meeting was also informed of activities to improve information networking and plans to improve cooperation and collaboration with a range of international organizations, programmes and projects. Further information about ICHARM is available from the [www.icharm.pwri.go.jp](http://www.icharm.pwri.go.jp).

Mr Daniel sought clarification about the IFI Secretariat. Mr Arduino confirmed that the IFI Secretariat will be at ICHARM and went on to describe a possible flood forecasting pilot study at 5 or 6 sites involving collaboration between UNESCO, HTC and ICHARM.

#### International Centre of Water for Food Security (IC WATER), Australia

Mr Shahbaz Khan gave an account of the activities of the International Centre of Water for Food Security and its progress towards establishment as a Category II Centre which is expected to be signed in April 2008. The speed of establishment over the last year has meant that not all RSC members were familiar with the Centre. This matter was raised by Mr Tran Thuc and clarified by Giuseppe Arduino.

The mission of the Centre outlined by Mr Khan is to be a centre of excellence in strategic research, water smart technologies, and capacity building in integrated water resources management for food production and environmental management. The aims, people and key strengths in research, training and consultancy were described as was the Centres involvement in leading major programs as part of the Cooperative Research Centre for Irrigation Futures. Mr Khan referred to a number of international projects being carried out by the Centre in countries such as China, Pakistan and the Philippines.

Dr Khan, who is the Chair of the HELP Steering Committee, went on to describe the relationship between IC-WATER, Charles Sturt University and the HELP programme. The HELP Program which has moved from words to action and includes over 30 river basins, has a clear plan for IHP-VII. Mr Khan advised that HELP will be calling for new basins by April 2008. A basin may be nominated at any time by contacting the Regional HELP coordinator. Formal evaluation would then take place.

Further information about IC Water may be found at [www.icwater.org](http://www.icwater.org) and for the HELP program at [www.unesco.org/water/ihp/help](http://www.unesco.org/water/ihp/help).

Mr Tran Thuc inquired why there was no report from the Indonesian Ecohydrology Centre. It was explained by Mr Giuseppe Arduino that the Indonesian Centre had not yet been established as a Category II UNESCO Centre as it awaits Indonesian government support and it is expected the necessary documentation will be submitted in 2008.

## **8 REPORT FROM UNESCO CHAIR ESTABLISHED IN MONGOLIA 2007**

UNESCO Beijing office, in collaboration with Mongolian and Japanese IHP Committees has established a joint Chair on Sustainable Groundwater Management. It was set up in June 2007 with a Mongolian and Japanese expert sharing the role. Details of this UNESCO Chair were previously presented in the Country Report from Mongolia.

## **9 CATALOGUE OF RIVERS FOR SOUTHEAST ASIA AND THE PACIFIC, VOLUME VI**

Mr Chikamori presented progress on the Catalogue of Rivers, Volume VI, informing the meeting that data for 3 new basins (1 in Malaysia and 2 in Indonesia) had been received. Considerable discussion followed regarding whether the format being proposed was consistent with the original intention of the catalogue. It was decided to refer the matter to a subcommittee to resolve at an evening side meeting with decisions being reported back to the following session of the RSC.

The side meeting determined that the work undertaken by Mr Chikamori has been done exactly as requested in Bangkok. It was agreed that volume 6 would now include new river basins and that a Catalogue of Rivers Supplement 1 would be prepared that contains updated data for basins in volumes 1-5 in the format proposed by Dr Chikamori. Countries were requested to provide updated data for basins in volumes 1-5 for inclusion in Supplement 1 by the end of February 2008 and also to provide information for 1-3 new basins for inclusion in Volume VI.

⇒ **ACTION: Countries to provide data for basins in volumes 1-5 for inclusion in Supplement 1 to Mr Chikamori by the end of February 2008.**

⇒ **ACTION: Countries to provide data for 1-3 new basins for inclusion in Volume 6**

The schedule for publication of Catalogue of Rivers Volume 6 is included in Annex 7.

## **10 REPORT ON THE ASIAN PACIFIC FRIEND**

Mr Daniell noted that the key results from the FRIEND 2006 Conference held in Cuba were published as Publication 308 of the IAHS. Looking ahead, he advised that UNESCO wants to see a plan for AP FRIEND for the next two years.

The next initiative for AP FRIEND is a document on Rainfall Intensity Duration Frequency. A template for contributions for each country has been produced and the meeting confirmed corresponding lead authors for each country and a proposed timetable for the report. Key dates are:

- Start – 22 November 2007
- Draft chapters to coordinator – 15 January 2008
- Draft returned for confirmation – 31 January 2008
- Final report – 28 February 2008
- Workshop in Vietnam – TBC. Timing: May 2008

⇒ **ACTION: All countries participating in the IFD project to respond by 25 December 2007 to the material emailed to them on 22 November 2007 by Mr Daniell**

A side meeting was held the previous evening to advance work on flood issues. This meeting resulted in the formation of a Flood Working Group with representation from Vietnam, ICHARM, Australia, Japan and China. Tasks will be developed for the Flood Working Group prior to the workshop in Vietnam in 2008 and it was agreed that the work should be linked to the International Flood Initiative. Mr Daniell requested that all countries interested in participating in the flood project send comments on the draft document forwarded to them by email back to him by 25 December 2007 and he will pass these on to the Working Group

⇒ **ACTION: All countries interested in the flood project to respond by 25 December 2007 to the material emailed to them on 22 November 2007 by Mr Daniell.**

## **11 IHP-VII AND 33 C/5 MAIN LINE OF ACTIONS**

Mr Arduino made a brief presentation showing the relationship between the IHP structure (Themes and Focal Areas) and the Main Lines of Action as identified in the UNESCO budget. Mr Arduino pointed out that IHP forms part of the Major Programme II: Natural Sciences, and is principally conducted under the Biennial Sectoral Priority 1. Under Biennial Sectoral Priority 1 the overall theme of IHP-VII 'Water Dependencies: Systems under Stress and Societal Responses' appears as MLA1. This is further broken down into a series of 'Lines of Action' under which activities are grouped. The Lines of Action 1 and 3 were more relevant for this region.

Following some discussion during which a number of points about reporting against activities were clarified, Mr Ibbitt thanked Mr Arduino for the presentation and requested that it be distributed to all members as soon as possible.

⇒ **ACTION: MLA presentation to be distributed to RSC members by Mr Arduino.**

## **12 PARTICIPATION PROGRAM GRANTS**

A presentation detailing the purpose and operation of the Participation Program (PP) was made by Mr Arduino. It was emphasized that PP was totally outside the control of IHP and was handled by the National Commissions to UNESCO. Mr Arduino described the timetable for the submission of PP proposals and the final selection of projects to be funded. He advised the meeting that the deadline for submission of proposals is often extended so there was still time to organize proposals.

Mr Tabios sought clarification of the comments in the report of the 9<sup>th</sup> Coordination Committee Meeting of the Humid Tropics Centre regarding the preparation of PP proposals for flood forecasting studies. The resulting discussion on PP rules and procedures clarified that these proposals should be submitted through the National Commission in the usual way but that proposals that include regional collaboration and endorsement are considered more favorably. Mr Liongson thanked all who supported the recent Philippine PP bid for funding to assist with the conference and RSC meeting.

Mr Thulstrup briefly showed the UNESCO Participation Programme website [portal.unesco.org/en/ev.php-URL\\_ID=32042](http://portal.unesco.org/en/ev.php-URL_ID=32042) and highlighted the explanatory material available on the site.

### **13 TECHNICAL PROPOSAL FROM THE RSC FOR IHP-VI, IHP VIII AND RELATED ACTIVITIES.**

No specific proposals were available for consideration. During discussion Mr Arduino was requested to synthesize any information on country priorities for IHP VII from the country reports and distribute it by early March.

⇒ **ACTION: Mr Arduino to synthesize IHP VII priorities from country reports and distribute by early March.**

### **14 ORGANIZATION OF THE 16<sup>TH</sup> RSC MEETING, MONGOLIA, 2008**

The meeting was informed by Mr Basandorj of the preparations for the 16<sup>th</sup> RSC meeting and conference in Ulaanbaatar. The tentative dates are 28 September – 2 October and the theme for the conference will be “Uncertainties in Water Resource Management: causes, technologies and consequences”. A general discussion included questions and answers about, inter alia, airline access, seasonal temperatures, Internet availability, visas, hotel costs and the conference themes. Discussions will continue with the local organizing committee and when arrangements have been confirmed details will be distributed.

### **15 ORGANIZATION OF THE 17<sup>TH</sup> RSC MEETING IN 2009**

Mr Liu Heng offered China as the host of the 17<sup>th</sup> RSC meeting. This offer was seconded by Malaysia and after a brief discussion was accepted by the Chair.

### **16 ADOPTION OF RESOLUTIONS**

Mr Takara informed the meeting that 3 resolutions have been prepared for consideration by the meeting.

#### **(1) RSC15-1: Promoting Flood Research in the South East Asia and the Pacific**

The presentation of the Resolution by Mr Takara prompted considerable discussion concerning its intent, whether this was properly reflected in the wording and, the need for a Resolution that was only relevant within the region versus a Resolution that was of more global relevance. Following clarification that the intent of the Resolution was to promote collaboration in flood research, a revised wording was drafted by a small group. The redrafted Resolution was presented to the meeting and following some minor modifications RSC15-1 was adopted.

Resolution RSC15-1 is included in Annex 8.

#### **(2) RSC15-2: Promotion of hydrological data exchange and research; Asia-Pacific FRIEND and Catalogue of Rivers**

Discussion of Resolution RSC15-2 presented by Mr Takara initially focused on a concern raised by Mr Jayawardena that data would be duplicated in the APF Water Archive and the new format of the Catalogue of Rivers. While there would be duplication, it was agreed that these were two different and valuable mechanisms for increasing access to the data and it should not be a problem. Other comments and questions were raised about, the location and management of the data, levels of access to the data, and the need for a reference in the text to promotion of collaborative research. Mr Takara noted the comments and informed the

meeting that he needed to further amend the text. The discussion concluded with the status of the Resolution undecided.

Resolution RSC15-2 is included in Annex 8.

(3) **RSC15-3: Cooperation with other Asian region countries**

In response to the presentation of the Resolution by Mr Takara, some questions were raised and discussed about the merit and process of including additional countries in the RSC and the geographic coverage of the Jakarta office relative to the membership of the RSC. Mr Takara noted that it was important to recognize and adapt to the changes that are occurring in the UNESCO structure. It was emphasized by a number of delegates that it is important that the RSC be open and collaborative, that we should welcome interest in the RSC by other countries and, that countries be invited to participate as required by current circumstances. Based on the discussion Mr Takara agreed to withdraw the resolution.

Resolution RSC15-3 is included in Annex 8.

During the discussion of these Resolutions Mr Daniell raised the need for a more structured process for the presentation and discussion of Resolutions so that there was sufficient time to discuss and finalize the drafting of the resolution. It was agreed that for future RSC meetings Resolutions would be presented early in the meeting and a more structured process would be followed to finalize the Resolutions.

⇒ **ACTION: At future RSC meetings Resolutions be introduced early in the meeting and a structured process by followed to ensure there is time to discuss and finalize the drafting of the resolution.**

## **17 ELECTION OF RSC CHAIRPERSON FOR 2007-2009**

In response to a nomination of Mr Liu Heng from China by Mr Virobo, Mr Liu declined the nomination and in turn nominated Mr Liongson of the Philippines. This nomination was supported by Delegates. In response Mr Liongson informed the meeting he would be honored to take on the role and was elected Chair of the RSC for the period 2007-2009.

## **18 OTHER ISSUES RAISED**

Mr Van-Thanh-Van Nguyen drew the attention of delegates to the AOGS2008 conference scheduled for 16-20 June in Busan, Korea and presented some details of the conference program.

Mr Liu Heng noted the 15 years of operation of the RSC and its excellent work over that period. With reference to the recent awarding of Chinese experts for their contributions to this work he suggested that the RSC may wish to consider establishing an achievement award. Mr Takara thanked Mr Liu and proposed that the idea will be developed further for the next RSC meeting.

⇒ **ACTION: Consider the merits of establishing a RSC Achievement Award.**

In response to a question from Mr Nor regarding the status of the two new UNESCO members Brunei and Singapore, Mr Arduino informed the meeting that he will be in contact with them regarding the next RSC meeting.

Mr Daniell thanked the outgoing RSC Chair Mr Eddy Djajadiredja for his work over the previous 2 years and welcomed the new Chair Mr Leonardo Liongson. The Delegates showed their appreciation with applause.

## 19 CLOSING OF THE MEETING

The Chairman thanked the Philippines National Committee for hosting the meeting and the excellent organization, Mr Arduino and his UNESCO colleagues for their assistance and, all the Delegates for their contributions during the meeting. The meeting was closed at 1240 on 23 November 2007.

<b>ACTION ITEMS</b>	<b>BY WHOM</b>	<b>DATE</b>
1. National Committees to help trace 'missing' participants of Nagoya courses.	Country National Committees	
2. Write to Myanmar advising of the Resolution passed at the 14th RSC meeting	Mr Takara	
3. Countries to provide data for basins being included in Volume VI to Mr Chikamori.	All countries	End Feb 2008 (??)
4. Countries to provide data for new basins for inclusion in Volume 6	All countries	??
5. All countries participating in the IFD project to respond by 25 December 2007 to the material emailed to them on 22 November 2007 by Mr Daniell	Countries participating in IFD Project	25 Dec 2007
6. All countries interested in the flood project to respond by 25 December 2007 to the material emailed to them on 22 November 2007 by Mr Daniell	Countries interested in the Flood Project	25 Dec 2007
7. MLA presentation to be distributed to RSC members.	Mr Arduino	ASAP
8. Synthesize IHP VII priorities from country reports and distribute.	Mr Arduino	Early March
9. At future RSC meetings Resolutions be introduced early in the meeting and a structured process by followed to ensure there is time to discuss and finalize the drafting of the resolution	RSC Secretary	Future meetings
10. Consider the merits of establishing a RSC Achievement Award	Mr Takara	RSC 16



**ANNEX 1**

**PARTICIPANTS, 15<sup>TH</sup> MEETING OF THE IHP  
REGIONAL STEERING COMMITTEE FOR  
SOUTHEAST ASIA AND THE PACIFIC**

**ANNEX 1**  
**PARTICIPANTS, 15<sup>TH</sup> MEETING OF THE IHP**  
**REGIONAL STEERING COMMITTEE FOR**  
**SOUTHEAST ASIA AND THE PACIFIC**

<b>NAME</b>	<b>COUNTRY</b>
ROSS JAMES	AUSTRALIA
TREVOR DANIELL	AUSTRALIA
SHAHBAZ KHAN	AUSTRALIA
MONICHOT SO IM	CAMBODIA
VAN THANH VAN NGUYEN	CANADA
ZHU XIAOYUAN	CHINA
LIU HENG	CHINA
ZONGXUE XU	CHINA
HERY HARJONO	INDONESIA
AGUNG BAGIAWAN	INDONESIA
EDDY A. DJAJADIREDJA	INDONESIA
HIDAYAT PAWITAN	INDONESIA
KAORU TAKARA	JAPAN
HIDETAKA CHIKAMORI	JAPAN
TABOIA METUTERA	KIRIBATI
VINLIAM BOUNLOM	LAO PDR
KEIZRUL ABDULLAH	MALAYSIA
MOHAMMED NOR MOHAMED DESA	MALAYSIA
MUHAMMAD AL-MUZAMMIL CHU AHMAD	MALAYSIA
D. BASANDORJ	MONGOLIA
GOMBO DAVAA	MONGOLIA
TIN YI	MYANMAR
RICHARD IBBITT	NEW ZEALAND
DENNIS JAMIESON	NEW ZEALAND
MAINO VIROBO	PAPUA NEW GUINEA
LEONARDO Q. LIONGSON	PHILIPPINES
GUILLERMO TABIOS	PHILIPPINES
NOEMI BAUTISTA	PHILIPPINES
SOONTAK LEE	REPUBLIC OF KOREA
HONGKEE JEE	REPUBLIC OF KOREA
JOONG HOON KIM	REPUBLIC OF KOREA
SUPRANEE RUNGHIRUNVIROJ	THAILAND
TRAN THUC	VIET NAM
HANS THULSTRUP	UNESCO - APIA
GIUSEPPE ARDUINO	UNESCO - JAKARTA
R. JAYAKUMAR	UNESCO - BEIJING
BHANU NEUPANE	UNESCO-NEW DELHI

**ANNEX 2**

**AGENDA, 15<sup>TH</sup> MEETING OF THE IHP  
REGIONAL STEERING COMMITTEE FOR  
SOUTHEAST ASIA AND THE PACIFIC**

## ANNEX 2

### AGENDA 15<sup>TH</sup> MEETING OF THE IHP REGIONAL STEERING COMMITTEE FOR SOUTHEAST ASIA AND THE PACIFIC

#### Thursday 22 November 2007

- 1) Opening
- 2) Election of the Rapporteur
- 3) Adoption of the Agenda
- 4) Secretariat reports
- 5) Country Reports
- 6) New RSC Memberships
- 7) Report from UNESCO Category II Centres Meeting, Bangkok, 26-27 September 2007  
(UNESCO Jakarta)
- 8) Reports from UNESCO Category II Centres (HTC, ICHARM, IC-WATER etc.)
- 9) Report from the UNESCO Chair established in Mongolia in 2007
- 10) Catalogue of Rivers, Volume VI
- 11) Report on the Asian Pacific FRIEND

#### Friday 23 November 2007

- 12) IHP VII and 34 C/5 Main Line of Actions (UNESCO Jakarta)
- 13) Participation Programme Grants (UNESCO Jakarta)
- 14) Technical Proposal from the RSC for IHP-VI (2002-2007), IHP-VII (2008-2013) and related activities
- 15) Organization of the 16<sup>th</sup> RSC Meeting in Mongolia in 2008
- 16) Organization of the 17<sup>th</sup> RSC Meeting in 2009
- 17) Adoption of Resolutions
- 18) Election of RSC Chairperson for 2007-2009
- 19) Other issues raised
- 20) Closing of the Meeting

**ANNEX 3**

**SECRETARIAT REPORT  
BY  
UNESCO JAKARTA OFFICE**

**14<sup>TH</sup> IHP REGIONAL STEERING COMMITTEE MEETING  
FOR SOUTHEAST ASIA AND THE PACIFIC  
Manila, The Philippines, 22-23 November 2007**

**UNESCO JAKARTA OFFICE  
Secretariat Report**

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## **1. ACTIVITIES CARRIED OUT SINCE THE LAST REGIONAL STEERING COMMITTEE MEETING**

### **1.1 Follow-up to the 14<sup>th</sup> IHP-RSC meeting**

A number of actions to be followed-up were identified during the 14<sup>th</sup> RSC meeting (UNESCO Office, Jakarta, 2006). Here below is a brief report on the current status:

#### *1. Investigate the creation of a Category II Centre to formalise SOPAC's Focal Point for water resources in the Pacific Islands*

At the 13<sup>th</sup> RSC held in October 2006, UNESCO Apia Office was asked to investigate the feasibility of seeking status as a UNESCO Category II Centre for the Water and Sanitation Programme of the South Pacific Applied Geoscience Commission (SOPAC).

A regional intergovernmental organization with membership of 20 Pacific countries and territories, SOPAC plays a central role in the areas of water and water science in the Pacific and is a long-standing partner of UNESCO in the region. The Water and Sanitation Programme hosts the coordinating secretariat for the Pacific Partnership Initiative on Sustainable Water Management – the principal mechanism for donor coordination and interagency cooperation on water issues in the region. SOPAC has also entered into a memorandum of understanding with UNESCO Apia Office covering the implementation of IHP activities in the Pacific.

Considering the regional position of the agency and the close partnership with UNESCO, delegates to the 13<sup>th</sup> RSC felt that attaining status as a Category II Centre would be logical extension of the already existing linkages between the two agencies. They noted that for SOPAC to attain status as a Category II Centre would help to formalize and advance SOPAC's work with UNESCO in the area of water and water science, and would be of long-term benefit to UNESCO's Pacific member states.

In September 2007, UNESCO Apia took part in a meeting of water-related UNESCO Category II Centres in Asia-Pacific held in Bangkok, Thailand. A key objective of UNESCO Apia's attendance was to follow-up the above recommendation from the 13<sup>th</sup> RSC.

Following discussions at the Bangkok meeting, as well as consultations with the Head of SOPAC's Water and Sanitation Programme, the preliminary conclusion of UNESCO Apia is that it is not feasible to pursue Category II status for SOPAC's Water and Sanitation Programme at this stage. Cooperation between SOPAC and UNESCO under the existing arrangements is already well developed and serves both organizations well, with no pressing need for more formal arrangements to be made.

Furthermore, in addition to the numerous Category II Centres already established and recognized in the region, several centres in Asia are currently pursuing Category II status. Beginning the process of adding SOPAC to this already crowded field is unlikely to yield major tangible benefits and would require a major effort which could potentially divert attention from work more immediately beneficial to the Pacific member states.

For the above reasons, UNESCO Apia does not recommend the RSC to pursue Category II Centre status for SOPAC's Water and Sanitation Programme at this time. The RSC may wish to reconsider the matter at future meetings, should developments warrant this.

2. *Advise all countries of the new format for the Catalogue of Rivers and the new time table for country submission*

In May 2007 Mr. Hidekata Chikamori sent an example of data sheets for the next volume of the Catalogue of Rivers. As an example, hydrometeorological data and other general statistics of the Shimanto River Basin in Japan have been compiled in an Excel file that was downloadable in a web site.

3. *Concerning APFRIEND IFD Project; a) Countries to submit IFD analyses as agreed in the TSC meeting, b) Prepare and distribute a project report.*

Mr. Trevor Daniell and G. Tabios to report.

4. *Proposals be submitted by 31 December 2006 to Jakarta for the use of the remaining funds*

No proposals were received by Jakarta Office.

5. *China, Japan and Mongolia decide who will host the 2008 RSC meeting.*

Mongolia has proposed to host the 16<sup>th</sup> RSC Meeting (date to be decided)

6. *Arrange the Rainfall IFD Knowledge Transfer Workshop*

The workshop was not organised, as progress in the project was not achieved.

## **1.2 Workshops, training courses, symposia**

### *1.2.1 16<sup>th</sup> IHP Nagoya Training Course "Oceanography Basics", Nagoya and Ehime, Japan, from 26 November to 9 December 2006*

The general aim of the 16<sup>th</sup> IHP short course is to help participants to develop their basic knowledge of oceanography. Being the largest reservoir of water and carbon dioxide on the earth surface, the oceans have profound influence on the water and material cycles in the earth system. A series of lectures were organized to show how land, oceans, and atmosphere are interacting, how water and materials cycles are coupled, what are the driving forces of materials cycling in the ocean, and what the causes of its variation are.

Special emphasis will be placed on the coastal regions where the land-ocean interaction is most intense and moreover influence of human activities is most significant. It was envisaged, through the lectures, to demonstrate that the ocean is highly dynamic in response to atmospheric forcing as well as land driven materials, and it is highly likely that the oceans in turn affect hydrological cycles on land surface.

It was intended that participants would have acquired new view from this short course, as even local environmental problems, which relate to hydrological cycle change on a regional scale, are resulting from a part of global cycles of water and materials including oceans

The training course was attended by 9 participants from Indonesia (3), Myanmar (1), Philippines (1), PNG (1), Sri Lanka (1) and Viet Nam (2). UNESCO office, Jakarta, through the



Japanese Fund in Trust from the Ministry of Education, Culture, Sport, Science and Technology (MEXT) was able to support the attendance of 7 participants.

### *1.2.2 Seminar on “Evaluation of the project Managing Aquifer in Binh Thuan Province, Viet Nam” 9-10 November 2006*

The Seminar “Evaluation of the Project Managing Aquifer Recharge in Binh Thuan Province, Viet Nam” held from 9 to 10 November 2006 in the Oscar Hotel, Ho Chi Minh City, Viet Nam, was attended by 37 participants from different Scientific Institutions, Ministries, the Vietnamese Academy of Science and by representatives from the Binh Thuan Province, where the project is located.

The seminar had the aim to evaluate all the scientific results of the project after 2 years of investigation to the Vietnamese Scientific Community and different stakeholders from Binh Thuan Province. The themes of the seminar included the geophysical, geological and hydrogeological investigations, drilling campaign and pumping tests, groundwater chemical and isotopes analysis, hydrogeological modelling.

Each presentation had a technical debate session, while the general discussion on the evaluation of the project, results obtained and considerations, was done in the afternoon of 10 November. Everybody agreed on the fact that in order to develop correct aquifer recharge activities the hydrogeological asset of the interested area must be intensively investigated.

The major suggestions can be summarised in what follows:

- To continue the groundwater monitoring in Bac Binh (district of Binh Thuan Province)
- To continue the meteorological observation in the 2 stations Hong Phong and Bau Noi
- Due to a difference in isotopes values obtained on the same water samples by the 2 laboratories (GEOKARST in Trieste, Italy and the Isotope Hydrology Laboratory of the Institute of Nuclear Science in Ha Noi), establish a direct connection between the 2 labs for a correct calibration
- To report in a publication in both Vietnamese and English, the papers presented during the seminar
- To continue developing the Model of MAR in the sand dune area of Bac Binh for hydrogeological investigation of Binh Thuan.

### *1.2.3 Asia-Pacific Category II Water-Related Centers Meeting, 26-27 September 2007*

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.

### **1.3 Travel grants**

UNESCO Office, Jakarta, provided several travel grants to regional scientists in the framework of the IHP Programme, within international events. In particular:

- 3 scientists attended the 5<sup>th</sup> *FRIEND World Conference “Water Resources Variability: Processes, Analyses and Impacts*, La Havana, Cuba, 27 November 1 December 2006
- 2 scientists attended the *Director’s Meeting Category II Water Related Centres*, Delft, The Netherlands, 11-15 June 2007
- 3 scientists attended the *IUGG General Assembly* to present scientific Papers, Perugia, Italy, 9-20 July 2007
- 5 scientists were granted to attend the *International Conference on Hydrology and Water Resources Management for Hazard Reduction and Sustainable Development* and the 15<sup>th</sup> RSC Meeting in Manila, 19-23 November 2007.
- 1 scientist was granted to attend the G-WADI Steering Committee Meeting in Santiago, Chile, 17-19 December 2007.

### **1.4 Asian Pacific Flow Regimes from International and Experimental Network Data (AP FRIEND)**

#### *1.4.1 UNESCO - APFRIEND Phase II*

Following discussions during the 11<sup>th</sup> RSC Meeting in Fiji, October 2003, and examination of the survey results of the member countries, it was decided that themes such as high flows and low flows (including droughts) should be continued from phase 1 to phase 2 of APFRIEND. The theme of anthropogenic effects in terms of urbanization and changing land uses would be embedded in these themes. Because rainfall analysis is an essential input to prediction of high flows, low flows and drought analysis and had been surveyed as a priority in many countries, it was proposed that activities initially be focused on rainfall, specifically in terms of:

- a) what data are available in countries in the region;
- b) how accessible is the data for research within each country;
- c) how accessible is the data for research outside the country;
- d) availability and origin of design rainfall guidelines/standards in countries; and

e) investigation of development of regionally consistent rainfall design techniques and guidelines.

The initial stage of the AP FRIEND Phase 2 has been followed by the redaction of the chapter 7 for the 5<sup>th</sup> world conference, which has been an integral part of the global FRIEND report 2006.

#### *1.4.2 Catalogue of Rivers for Southeast Asia and the Pacific*

In May 2007 Mr. Hidekata Chikamori sent an example of data sheets for the next volume of the Catalogue of Rivers. As an example, hydrometeorological data and other general statistics of the Shimanto River Basin in Japan have been compiled in an Excel file that was downloadable in a web site.

### **1.5 Regional Activities with other UNESCO Field Offices**

In 2007, approx. 33% of the Jakarta IHP budget has been used to co-support activities organised by the other field offices, as:

- Apia Office, Niue Groundwater Project
- Almaty and Beijing, International Training Workshop on Groundwater Modeling for arid and semiarid area, in the framework of G-WADI
- Tehran, the International Conference on Regulation of Water Resources and Nature Protection, Turkmenistan, December 2007

### **1.6 Activities within UNESCO Jakarta**

#### *1.6.1 Hydrogeological project for artificial aquifer recharge in Hong Phong District, Binh Thuan Province, Viet Nam*

The Binh Thuan Province, whose principal city is Phan Tiet, is located along the coastal plain in the lower part of Central East Viet Nam. It extends for approximately 8,000 km<sup>2</sup>, with a total population of one million. The Province is divided in 7 districts, each of them subdivided in further sub districts. Hong Phong sub district (Bac Binh District), located at 25 km NE from Phan Tiet and reaching a height of approximately 200 m above sea level, has an area of approximately 300 km<sup>2</sup> and comprises 3 villages.

Before 1975, the area was covered by a dense forest, which was abruptly cut to make place to rice pads which were never developed and resulted massive desertification took place. Due to an uneven rainfall distribution (1112 mm/year of average) and a three months period (from December to March) characterized by very little precipitation (23 mm in 4 months averagely), the area suffers considerable water shortage during the dry season, never experienced prior the complete removal of the land cover (forest). Due to the particular geological settings (permeable sands) and the impossibility to storage surface water during the dry season (due to rapid run-off and high evaporation rates), an artificial recharge and further water storage in the sand aquifer is envisaged.

The project consists of three major components, as follows:

1. Research and investigation carried out by Vietnamese and foreign experts
2. Development of a pilot project with the aim of supply water to the Hong Phong sub district
3. Capacity building through different international and local training courses/workshops. Participation of Vietnamese scientists to international conferences/symposium and meetings on MAR (Managing Aquifer Recharge) techniques is also envisaged.

Besides the scientific and capacity building approach, the project is now providing the delivery of 220 m<sup>3</sup>/day of fresh water to the Hong Phong communities, through a system inaugurated in November 2006.

As part of the revision and monitoring activities, The Seminar “Evaluation of the Project Managing Aquifer Recharge in Binh Thuan Province, Viet Nam” was held from 9 to 10 November 2006 in the Oscar Hotel, Ho Chi Minh City, Viet Nam, and attended by 25 participants from different Scientific Institutions, Ministries, the Vietnamese Academy of Science and by representatives from the Binh Thuan Province, where the project is located.

As part of the scientific and capacity building activities, the scientific team of the project (Vietnamese counterpart, UNESCO Jakarta and Italian Scientists) presented the Poster “*Managing Aquifer Recharge (MAR): Assessment of Groundwater Resources in the sand dune coastal area of Binh Thuan, Southeast Vietnam*” at the IUGG General Assembly, to the Session Isotope Tracing of water balance, Hydrodynamics, and Hydrological Processes HW100, Perugia, Italy, 2-14 July 2007.

#### *1.6.2 Hydrogeological investigation in the Karst area of Ninh Binh Province, Viet Nam, October 2007*

Following a request from the Ministry of Science and Technology (through its Vietnamese Academy of Science and Technology), a hydrogeological investigation was carried out in the limestone Karst area of Ninh Binh Province (100 km South of Ha Noi), for a preliminary survey and general advices on water resources occurrence and evaluation.

The Ministry of Science and Technology through the Vietnamese Academy of Science and Technology intends to request UNESCO’s assistance in the development and implementation of a project related to water resources assessment and evaluation in respect to global changes in the central and lower part of the province, where water resources are both affected and degraded by flood events and sea intrusion.

#### *1.6.3 Rainfall station in UNESCO Jakarta Office*

Since February 2007 a simple rainfall station (manual pluviometer) is operational in UNESCO Jakarta Office. The parameters acquired by the station are:

- P in mm
- T in °C
- EC in µS/cm
- TSD in mg/l
- pH

Besides the above parameters obtained on daily events, rain water monthly samples are available for isotopes analyses from February to November 2007.

This station is also operating as a contribution to the HARIMAU Project (Hydrometeorological ARray for ISV-Monsoon AUtomonitoring) by Japan EOS Promotion Program (JEPP) and implemented by JAMSTEC (Japan Agency for Marine-Earth Science and Technology), and Indonesian partners BPPT (Agency for the Assessment and Application of Technology), BMG (Agency for Meteorology and Geophysics) and LAPAN (National Institute of Aeronautics and space).

From September daily events are collected for JAMSTEC which will perform stable isotopes (18-O and 2-H) analyses on rain water. Monthly samples are also provided to BATAM (Indonesian National Nuclear Energy Agency) also interested in different rainwater sampling sites in Jakarta. Results will be available soon.

### **1.7 Review and Evaluation Meeting on IHP Activities supported by the Japanese Fund in Trust (FIT)**

An evaluation report on the activities implemented within the framework of the IHP Programme and supported by the Japanese FIT during the period 2007-2007, was presented by UNESCO Office, Jakarta, at the meeting held in UNESCO Office, Jakarta, from 23 to 24 May 2007. The report describes the activities carried out in the Asia Pacific Region within two main areas:

- the Regional Steering Committee (RSC) of IHP for Southeast Asia and the Pacific and
- the IHP Training Courses, annually organised by the Nagoya University in Japan.

The resolutions adopted during the meeting are as follows:

- 1.1. Regarding RSC activities JAK will further promote the combination of FIT with the regular budget and member country contributions
- 1.2. JAK will establish a closer contact with Nagoya University for the follow-up to the IHP Nagoya Training Courses, for example in designing the online forum.
- 1.3. JAK will make an attempt to strengthen the responsibility of IHP National Committees for the follow-up of the IHP Nagoya Training Courses, in particular in maintaining contact to participants of past training courses.
- 1.4. JAK will develop an effective, pro-active follow-up mechanism for participants of the IHP Nagoya Training Courses and for increasing the number of replies to the questionnaire.

### **1.8 IHP Nagoya Training Courses Databases**

16 IHP Nagoya Training Courses have been conducted since 1991 and were attended by around 168 participants from 25 countries representing various research institutions and governmental organizations.

In order to improve the accountability and visibility of the IHP Nagoya Training Courses and to evaluate the potential impact these courses had on participants' research and career the Hydrology Unit of UNESCO Office, Jakarta, has set up a database containing the following information of the training course participants: up-to-date contact details, scientific and professional background, and feedback on the training course attended. This information has been gained by means of an online feedback form to be filled in by training course participants

([http://www.unesco.or.id/activities/science/water\\_sci/ihp/300.php](http://www.unesco.or.id/activities/science/water_sci/ihp/300.php))

Evaluation of the feedback form showed that 45,2 % of the participants are affiliated to a university, 48,8 % to governmental organizations or government related research institutes and around 6 % percent come from other institutions or organizations such as from the private sector.

Participants reported that the Training Course has contributed to their work and professional development by having:

- improved professional knowledge,
- provided valuable input and inspiration for research, projects and lectures,
- improved career possibilities,
- enlarged the originally narrow national view, and
- provided access to international professional hydrology network.

The knowledge and experiences they have gained during the training course they shared back home through

- initiation of professional discussions,
- provision of seminars/lectures,
- presentations on conferences (e.g. Conference of the International Commission on Irrigation and Drainage), and by
- dissemination of training materials.

For the next training courses this online feedback form will be replaced by a comprehensive report which participants will have to prepare after having attended a training course. Guidelines for this report have been defined and provided to participants of the forthcoming 17th IHP Training Course on "Numerical Prediction of High-Impact Weather Systems" (Nagoya, Japan, 2 – 15 December 2007).

#### IHP Nagoya Forum

An online forum is under development which will enable participants of IHP Training Forums to

- get information on trainings courses and download training course materials,
- build up a network and exchange ideas and expertise,
- provide or update their contact details, and
- to provide feedback on the IHP Training Courses.

The domain of the online forum will be [www.ihpnagoyaforum.org](http://www.ihpnagoyaforum.org)

Yet, it still has to be decided whether this forum will be in form of a discussion forum focusing on exchange of ideas or an alumni forum focusing on cooperation and network building.

## **2. PUBLICATIONS SINCE OCTOBER 2006**

*Proceedings of the International Symposium on Managing Water Supply for Growing Demand, Bangkok, Thailand, 16-20 October 2006.* Edited by Sethaputra S., Promma K., IHP-VI Technical Documents in Hydrology, No. 6. RSC for Southeast Asia and the Pacific. UNESCO Office, Jakarta, 2005.

*14<sup>th</sup> IHP Regional Steering Committee meeting for Southeast Asia and the Pacific.* Bangkok, Thailand, 19-20 October 2006. Final Report. IHP-VI. No. 14. UNESCO Jakarta Office, 2006.

Poster “*Managing Aquifer Recharge (MAR): Assessment of Groundwater Resources in the sand dune coastal area of Binh Thuan, Southeast Vietnam*” UNESCO Jakarta Office, 2007.

### 3. CONTACT REFERENCES

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**ANNEX 4**

**SECRETARIAT REPORT  
BY  
UNESCO APIA OFFICE**

**15<sup>th</sup> IHP REGIONAL STEERING COMMITTEE MEETING FOR  
SOUTHEAST ASIA AND THE PACIFIC  
Manila, the Philippines, 22-23 November 2007**

**UNESCO Apia Office  
Secretariat Report**

**Hans Dencker Thulstrup  
Science Programme Specialist**

## **1. Introduction**

The Pacific sub-region is represented at the 15<sup>th</sup> RSC by Mr. Taboia Metutera of the Republic of Kiribati as per the agreement reached between Pacific representatives at the 11<sup>th</sup> RSC in Fiji, 2003. The main report on IHP activities in the Pacific sub-region will be delivered by Mr. Metutera. The present report of the UNESCO Apia Office (UNESCO Office for the Pacific States) should be seen as an appendix to this main account of Pacific IHP activities.

## **2. Partnerships**

The main modality of the UNESCO Apia Office IHP programme remains the development and maintenance of regional partnerships. UNESCO Apia's continues its active participation in the **Pacific Partnership Initiative on Sustainable Water Management** under which all major donors and technical agencies working in the region cooperate on addressing - in a strategic manner - urgent needs of the region related to water resources. Activities under the partnership are coordinated by SOPAC in the context of the **Pacific Regional Action Plan on Sustainable Water Management**.

UNESCO Apia Office acknowledges the substantial coordinating role of SOPAC towards this partnership, as well as the considerable contribution of the Government and research community of New Zealand through NZAID, NIWA (the New Zealand Institute for Water & Atmospheric Research), and Landcare Research.

UNESCO Apia Office is an active partner in two major projects under the partnership currently in their initial phase – the GEF-funded Integrated Water Resources Management project and the European Union-funded Pacific HYCOS project.

Further details are available in the Pacific national report, as well as on the Partnership website: <http://www.sopac.org/tiki/tiki-index.php?page=CLP+Pacific+Partnership>

### **3. Key Activities**

#### **3.1 Groundwater Monitoring, Management and Legislation in Niue**

Following Niue's attendance at the 12th RSC meeting of the International Hydrological Programme, Niue's Department of Water Works received confirmation of support by UNESCO for a groundwater monitoring programme.

The objectives of the programme are, besides the establishment of a groundwater resources assessment and monitoring programme, to obtain a clear understanding of the hydrogeology of Niue, to determine possible and potential contamination of the groundwater from land-based activities, to adopt effective measures to address the vulnerability of the freshwater supply during natural disasters such as droughts, to assist in establishing Government approval of a Water Resources Regulation that legalises and enforces the Water Resources Act of 1996, and to develop effective education and awareness programmes for communities in protecting the island's main water source from contamination and include these in school curricula.

The results of the groundwater assessment and monitoring programme will be disseminated to other Pacific Island Countries, specifically to benefit other uplifted limestone islands such as Nauru, Kiribati (Banaba) and Tonga . Potentially, a publication on the project could be developed as contribution to the IHP.

Drilling in Niue commenced in October 2005 accompanied by a geophysical survey, water quality monitoring and the installation of the first borehole loggers.

A project is currently under implementation supported by the UNESCO Offices in Jakarta and Apia and SOPAC for the development of a legal framework for water resources. The main objectives of this project are as follows:

1. Review current Niue Water Resources Act 1996 and Water Resources Regulations 1996
2. Provide the Government of Niue with draft documentation highlighting proposed alterations to current Water Resources Act and Water Resources Regulations, ensure appropriate linkages to other existing Acts and Policies
3. Prepare in consultation with the Government of Niue an amended draft Water Resources Act and draft Water Resources Regulations.
4. Identify impediments to approval of the Water Resources Act and Water Resources Regulations in consultation with The Government of Niue.
5. Facilitate stakeholder meetings to assist in the review of the revised draft Water Resources Act and draft Water Resources Regulations, and provide recommendations from stakeholder meetings to draft a document to assist

with Cabinet approval of the Water Resources Act and Water Resources Regulations.

6. Submit draft the Water Resources Act and Water Resources Regulations to Government of Niue and the Crown Law office for review, and endorsement of Water Resources Act and Water Resources Regulations by Cabinet

For more information on the groundwater monitoring programme please contact Andre Siohane, Director of Water Works (waterworks@mail.gov.nu).

### **3.2 HELP in the Pacific**

UNESCO Apia Office and Landcare Research, Ltd jointly organized the Pacific HELP Symposium during 7-11 November 2005. Additional financial support was provided by the UNESCO Jakarta Office and the UNESCO Division of Hydrological Sciences.

The Pacific HELP Symposium marked the first formal event to take place under the HELP programme in the Pacific sub-region. The Symposium was hosted jointly by UNESCO Apia Office and Landcare Research, Ltd., and was held in Nelson, New Zealand, adjacent to the Motueka Demonstration HELP Basin.

UNESCO Apia Office and Landcare Research, Ltd. published the Pacific HELP Symposium proceedings document in early 2007. Comprised of a booklet containing the Framework for Action mentioned above as well as a CD-Rom with all presentations made throughout the week, the document will be a useful resource allowing Pacific island countries to benefit from HELP in the context of the implementation of two major water resources projects now under implementation in the region - the Integrated Water Resources Management project and the Pacific HYCOS project.

### **3.3 New HELP initiative in Fiji: The Nadi River Basin**

As a follow-up action to the Pacific HELP Symposium, Landcare Research Ltd. has been working closely with the Fiji Department of Land and Water Resources Management on the development of the Nadi River catchment on the island of Viti Levu as a UNESCO HELP Basin, and on the integration of these efforts with relevant regional activities to secure sustainable funding for the site. The initiative includes the following components:

1. Visits by Landcare Research Ltd. specialists to the Nadi River Catchment and Suva to meet with key stakeholders and government departments for consultations on the development of the project
2. Complete the application for the Nadi River Catchment to become a candidate basin within the global UNESCO-HELP network (Hydrology for the Environment, Life and Policy and is a network of 77 global

catchments sharing information about Integrated Water Resource Management, (IWRM))

3. Development and completion of a whole catchment IWRM proposal to be integrated into the GEF-IWRM project
4. Identification of potential funding sources for further development of the Nadi River Catchment
5. Assistance and suggestions to the Government of Fiji and SOPAC for the completion of the GEF IWRM project application

### **3.4 UNESCO-SOPAC JFIT project on Biosphere Reserves for Sustainable Community-Driven Management of Natural Resources in Micronesia**

In 2005 the Pacific sub-region's first Biosphere Reserve was established in the Federated States of Micronesia (FSM), the Utwe Biosphere Reserve in Kosrae State. An additional Biosphere Reserve, Ahnd Atoll in Pohnpei, is currently under preparation.

As contribution to UNESCO's MAB-IHP Joint Programme on **Biosphere Reserves for Sustainable Community-Driven Management of Natural Resources in Micronesia**, a national freshwater resource management study was developed by UNESCO Apia Office and submitted through UNESCO Jakarta Office for funding by the Government of Japan. The project was initiated in early 2005 in cooperation with SOPAC.

UNESCO and SOPAC worked with key partner agencies in the four states of FSM to undertake a national assessment of FSM's freshwater resources and their management. The resulting document will serve as a guideline for future UNESCO-IHP action in FSM and the wider Micronesian sub-region. The study is closely linked to the emerging Ahnd Atoll and Utwe Biosphere Reserves, which will serve as pilot sites for follow-up action on integrated water resources management. Based on the experiences of the Ahnd Atoll and Utwe Biosphere Reserve establishment process, the study will furthermore offer comments on the potential of the Biosphere Reserve format for freshwater resource management in the small island context. It is expected that this work – and the Biosphere Reserves in FSM – will be linked to the FSM component of the regional Integrated Water Resources Management project currently under development in the context of the Pacific Partnership.

### **3.5 World Water Day**

World Water Day 2007 was dedicated to theme "Coping with Water Scarcity". The lead agency for the event within the UN system was FAO. In the Pacific, UNESCO partners SOPAC and Live and Learn Environmental Education organised a Pacific World Water Day campaign. With the slogan "Our Islands with Water", the Pacific's pledge fitted well with the World Water Day theme. It challenged the Pacific to better

manage its current water resources in terms of usage, access, supply, demand and quality and responsibility.

Globally, water use is increasing at more than twice the rate of population growth, and more people than ever are learning first-hand about coping with water scarcity. Scarcity could mean an absolute shortage of water or lack of access to safe water supplies. Both SOPAC and Live & Learn developed awareness materials comprising student activity booklets and stickers.

#### **4. Publications**

- HELP in the Context of the Pacific Regional Action Plan on Sustainable Water Management - a Framework for Action.

A proceedings document containing all presentations and discussions from the November 2005 Pacific HELP Symposium (see above) entitled “HELP in the Context of the Pacific Regional Action Plan on Sustainable Water Management – A Framework for Action” will be published by UNESCO Apia Office in cooperation with Landcare Research, Ltd. (New Zealand) within the coming weeks.

- Hydrology and Water Resources of Small Islands: A practical guide - UNESCO IHP Studies and Reports in Hydrology 49, Editor: A. Falkland

Dr. Falkland’s guide was originally prepared in 1994 with the objective of assisting technicians, hydrologists, engineers and managers in the identification, assessment, development, management and protection of water resources of islands. It is intended as a guide to the selection of methods and practices appropriate to the special conditions of small islands.

During the past five years, many requests have been received by UNESCO Apia and SOPAC for this publication, which has long been out of print. In response to these requests, UNESCO Apia Office arranged for and funded a (150 copy) reprinting by UNESCO Publishing. The book was distributed to the attendees of be used at the SOPAC/WMO/UNESCO hydrological training programme in April 2005.

Copies of this publication can be obtained from the SOPAC Secretariat ([arieta@sopac.org](mailto:arieta@sopac.org)) or UNESCO Apia Office ([hans@unesco.org.ws](mailto:hans@unesco.org.ws)).

#### **5. Partnership contributions and advisory services**

During 2006-2007, UNESCO Apia contributed to a number of activities in the context of the Pacific Partnership. Five key activities are listed and detailed in the following.

##### **5.1 Pacific HYCOS**

Pacific HYCOS, a regional initiative to improve the management and protection of Pacific Island Countries’ freshwater resources held its first Steering Committee

meeting in Brisbane on 17 April 2007. The project was launched in conjunction with a workshop on flood and drought forecasting hosted by the Australian Bureau of Meteorology (BOM) and organised by the World Meteorological Organization (WMO) and SOPAC. UNESCO and the Fiji Meteorological Office are Associate Partners in the Pacific HYCOS project.

The launch was attended by the focal points from the participating 14 countries, with representatives with WMO Geneva, NIWA, the Regional Association V Working Group on Hydrology members, and SPREP. The launch also hosted the first steering committee meeting with participation by all attendees. Some of the components of the project were discussed, including flood forecasting, groundwater monitoring, drought forecasting, and databases and information sharing. Also discussed was the workplan of the project with feedback from the participating countries on their needs as to how the project could help them.

The Steering Committee suggested appropriate linkages to be made to other global observation systems and regional capacity building programmes such as the Pacific Islands Global Ocean Observing System (PI-GOOS); the Pacific Islands Global Climate Observing System (PI-GCOS); and the AusAID-funded Pacific Island Climate Prediction Programme (PI-CPP), as well as discussed the information to be shared with the Steering Committee on bi-annual basis.

## **5.2 Reducing vulnerability of water services in the Pacific**

The Global Research Alliance (GRA) and the Australian Commonwealth Scientific and Research Organization (CSIRO - Australia's national science agency) are bringing together local stakeholders, funding agencies and experts to address the issue of vulnerability of water services in the Pacific.

This is done in a stepwise process with the main components being a Delphi consultation, which will be followed by a workshop. The Delphi consultation, which is email based, engages about 45 participants from around the world, including a number of major funding agencies, as well as representatives from countries such as Kiribati, Samoa, Tonga, Cook Islands, Papua New Guinea and Tuvalu. Via an iterative process, different panels have identified the following as the most important issues:

1. Experts: Appropriate technology: innovation, selection and uptake
2. Local stakeholders: Adjusting services to local contexts
3. Funding agencies: Ownership issues
4. GRA: Community participation

It has also been acknowledged that solutions depend on the context and that there is no one single solution for all nations, but rather a wide range of inter-related issues that need to be addressed, within a particular context. This reinforces the need for IWRM. As an output of this project, solutions to meet the needs of individual nations or groups of nations are anticipated.

To this end, subsequent to the Delphi consultation, a workshop is planned where participants will aim at taking the issues developed in the Delphi consultation forward

as fully funded projects. Originally scheduled for September 2007 but postponed due to unavailability of several key partners, the workshop is now tentatively scheduled for February 2008.

For more information, please see [www.csiro.au](http://www.csiro.au) and [www.research-alliance.net/](http://www.research-alliance.net/)

### **5.3 Pacific Water Virtual Learning Centre (WVLC)**

The University of the South Pacific has signed a Memorandum of Understanding with the United Nations University - International Network on Water, Environment and Health (UNU-INWEH) to formalise the establishment of a Regional Centre of the UN Water Virtual Learning Centre (WVLC) in the Pacific. The programme of the WVLC Regional Centre will focus on improving water resource management and water services of developing countries, and to improve training and education in the water sector. In the context hereof, Applications are invited for persons wishing to enrol for study towards a **Postgraduate Diploma in Integrated Water Resources Management (IWRM)**. The course will be offered by the University of the South Pacific (USP) in Distance and Flexible Mode as a pilot project on behalf of the United Nations University (UNU). The course will run on a part-time basis for approximately 18 months, coordinated through the UN Water Virtual Learning Centre (WVLC), newly established at USP. Ten fully funded scholarships or study positions are available for suitably qualified postgraduate students from the 12 member countries of the USP region. Upon successful

### **5.4 GPA and UNESCO-IHE Pacific Wastewater Training Course**

A training course for wastewater management has been jointly developed by UNEP's Global Programme for Action for the Protection of the Marine Environment from Land-based Sources of Pollution (GPA/UNEP) with the UNESCO-IHE Institute for Water Education. The wastewater training course addresses one of the Guiding Principles of the Pacific Wastewater Policy and Framework for Action and will be implemented in the Pacific region in 2005-2006 by a consortium of SOPAC, USP- IAS, IOI, in collaboration with SPREP, UNESCO-IHE, GPA/UNEP and UN/DOALOS.

## **6. Follow-up to request from the 14<sup>th</sup> RSC**

At the 14th RSC held in October 2006, UNESCO Apia Office was asked to investigate the feasibility of seeking status as a UNESCO Category II Centre for the Water and Sanitation Programme of the South Pacific Applied Geoscience Commission (SOPAC).

A regional intergovernmental organization with membership of 20 Pacific countries and territories, SOPAC plays a central role in the areas of water and water science in the Pacific and is a long-standing partner of UNESCO in the region. The Water and



Sanitation Programme hosts the coordinating secretariat for the Pacific Partnership Initiative on Sustainable Water Management – the principal mechanism for donor coordination and interagency cooperation on water issues in the region. SOPAC has also entered into a memorandum of understanding with UNESCO Apia Office covering the implementation of IHP activities in the Pacific.

Considering the regional position of the agency and the close partnership with UNESCO, delegates to the 13th RSC felt that attaining status as a Category II Centre would be logical extension of the already existing linkages between the two agencies. They noted that for SOPAC to attain status as a Category II Centre would help to formalize and advance SOPAC's work with UNESCO in the area of water and water science, and would be of long-term benefit to UNESCO's Pacific member states.

In September 2007, UNESCO Apia took part in a meeting of water-related UNESCO Category II Centres in Asia-Pacific held in Bangkok, Thailand. A key objective of UNESCO Apia's attendance was to follow-up the above recommendation from the 13th RSC.

Following discussions at the Bangkok meeting, as well as consultations with the Head of SOPAC's Water and Sanitation Programme, the preliminary conclusion of UNESCO Apia is that it is not feasible to pursue Category II status for SOPAC's Water and Sanitation Programme at this stage. Cooperation between SOPAC and UNESCO under the existing arrangements is already well developed and serves both organizations well, with no pressing need for more formal arrangements to be made.

Furthermore, in addition to the numerous Category II Centres already established and recognized in the region, several centres in Asia are currently pursuing Category II status. Beginning the process of adding SOPAC to this already crowded field is unlikely to yield major tangible benefits and would require a major effort which could potentially divert attention from work more immediately beneficial to the Pacific member states.

For the above reasons, UNESCO Apia does not recommend the RSC to pursue Category II Centre status for SOPAC's Water and Sanitation Programme at this time. The RSC may wish to reconsider the matter at future meetings, should developments warrant this.

**ANNEX 5**

**SECRETARIAT REPORT  
BY  
UNESCO BEIJING OFFICE**

# **15<sup>th</sup> IHP Regional Steering Committee Meeting for Southeast Asia and Pacific**

## **UNESCO Office Beijing Report of activities 2007**








### **1. Capacity Building activities:**

#### **1.1. International Advanced Training Workshop on Reservoir Sedimentation Management, Oct. 10-16, 2007, IRTCES Beijing, China**

Within the framework of UNESCO's International Hydrological Programme (IHP-VI) activities under International Sediment Initiative (ISI), UNESCO Beijing Office in collaboration with International Research and Training Centre on Erosion and Sedimentation (IRTCES) organized International Advanced Training Workshop on Reservoir Sedimentation Management during October 10-16, 2007 at IRTCES, Beijing, China.

In order to have wider participation, dissemination of knowledge and promote inter-cluster cooperation UNESCO Office Beijing offered equal number of participation to other cluster offices within Asia and Pacific region as well from Arab and African Region. The participants received from Afghanistan, DPRK, India, Iran, Madagascar, Malawi, Mongolia, Philippines, Russian Federation, Sudan, Uzbekistan and China, also we received experts from ISI Steering Committee as expert to conduct training course. These kinds of inter-cluster activity are more welcomed by the member states in terms of sharing knowledge and experience with other cluster countries as well we are using the expertise available with the UNESCO International Centres.

The topics and contents of the training workshop included:

-  Sedimentation in reservoirs and its impact on reservoir function
-  Management for sedimentation in reservoirs and techniques for capacity restoration
-  Flood management and reservoir operation
-  Ecological Environment in Water Reservoirs and the Restoration Techniques
-  Introduction of typical reservoirs as cases
-  Laboratory and field study
-  Exchanging information and experiences among participants

The training workshop included lectures in classroom, demonstrations in laboratories of Institute of Water Resources and Hydraulic Research, Beijing, China (lab has one of the world class facility within China).

In the internal evaluation done by UNESCO Office Beijing, the results were very much encouraging, which leads to the plan to repeat in the coming years.

#### **1.2. National Workshop on National Training Workshop on Hydraulic Projects Construction and Ecological Environment, Oct 21 – Nov. 8, 2007, in Hangzhou, Zhejiang Province, China**

As China is one of the sediment laden countries in the world and the National Government Proposed to organize a National Training Workshop on Hydraulic Projects Construction and Ecological Environment, within the framework of the UNESCO's International Hydrological Programme (IHP-VI), under International Sediment Initiative (ISI). The workshop was sponsored by Ministry of Water Resources, Government of People's Republic of China. The Workshop was organized by IRTCES in cooperation with UNESCO.

### **1.3. Training workshops under UNESCO Chair on Sustainable Water Management**

The UNESCO Chair in “Sustainable Water Management” was established in 2005 at Hohai University, Nanjing, China and is coordinated by UNESCO Office Beijing. Activities are mainly sponsored by Schlegel GmbH & Co.KG, Munich Germany and also during the first year by WASY GmbH, Institute for Water Resources Management and Systems Research.

The UNESCO Chair in “Sustainable Water Management” aims to establish a scientifically sound, but simple Decision Support System (DSS) to select cost-effective best water management options and update the knowledge of practicing water resources engineers in companies and public authorities to cope with the new developments in water management. It also intends to update educational materials in sustainable water management suitable for briefing decision makers, upgrading university education and installing continuous education courses improving in-depth knowledge of staff in water companies and public authorities. Finally it promotes pilot studies, assists in preparing related proposals for financing, and provides a discussion platform on sustainability in water management.

#### ***2<sup>nd</sup> UNESCO training course on Sustainable Groundwater Management for North China-***

The purpose of the 2nd UNESCO training course on "Sustainable Groundwater Management for North China" at Jinan University is to introduce advanced technologies to reach sustainability, and exchange recent experience and information on sustainable groundwater management among Chinese engineers and scientists, foreign experts and decision makers, planners and design engineers on water issues are welcome to join this training course.

- held at Jinan University, Shandong Province from March 19<sup>th</sup>, 2007 to March 24<sup>th</sup>, 2007
- 100 participants, 30 participants special training, 16 resource persons
- Workshop example: protection of Jinan's underground springs
- 2 day special training on Advanced Groundwater Modelling (FEFLOW)
- Study tours to Groundwater monitoring system in Jinan and Yuxiu creek restoration project

#### ***3<sup>rd</sup> UNESCO training course on Water Pollution and Environment Protection in Agriculture***

The purpose of the 3rd UNESCO Training Course is to introduce advanced theories and technologies on water pollution and environment protection in agriculture in the world by the nearly 20 lectures who enjoy the honours regionally and internationally, to improve the sustainable development among scientists, experts and engineers in the field of water management are welcome to join this training course.

- to be held at Nanchang University, Nanchang, Jiang from October 29<sup>th</sup>, 2007 to October 31<sup>th</sup>, 2007
- 60 participants, 16 resource persons
- Workshop example: source pollution and its control

### **1.4. International Training Workshop on Groundwater Modelling for Arid and Semi-Arid Regions and Asian G-WADI network meeting, Lanzhou, China, June 11-17, 2007**

The workshop under G-WADI programme was held in Lanzhou, China, on June 11-15, 2007, followed by an Asian G-WADI member meeting on June 16-17, 2007 in the same venue. UNESCO-IHP, G-WADI Global Steering Committee, UNESCO Cluster offices (Almaty,

Beijing, New Delhi and Tehran), and CAREERI/CAS extended financial contribution to organize this training programme.

56 Participants, including 9 invited experts from 22 countries (Afghanistan, Australia, Chile, China, India, Iran, Jordan, Kazakstan, Kingdom of Saudi Arabia, Kyrgyz, Mexico, Mongolia, Morocco, Nambia, Pakistan, Spain, Sudan, Switzerland, Tajikistan, UK, USA, and Uzbekistan) attended the 5-day training workshop.

### ***2nd G-WADI Asia Meeting (June 16-17, 2007)***

In Lanzhou/China, 28 representatives of the Asian G-WADI members from Ten Asian member countries (Afghanistan, China, India, Iran, Kazakhstan, Kyrgyzstan, Mongolia, Pakistan, Tajikistan, and Uzbekistan), as well as representatives of UNESCO Offices (Beijing/New Delhi/Tehran), members of the Steering Committee of the Global G-WADI Programme and observers from other regions of the world met, presented country reports and discussed various issues related to the Asian G-WADI Network. Part of Asian G-WADI UNESCO helped the project secretariat to develop a web site, brochure and poster on Asian G-WADI. The details can be found at [www.asian-gwadi.org](http://www.asian-gwadi.org)

### **1.5. International Workshop on Water Management through Forest Management – Chinese Academy of Forestry, 12-16 November 2007**

UNESCO in cooperation with FAO, International Union of Forest Research Organization (IUFRO) and Chinese Academy of Forestry jointly organized Workshop during 12-16 November 2007 at Beijing, China. As a main outcome of this workshop is that all the organizations are agreed to have International Network of Forest Ecohydrological Research (INFEHR) either independent or attached with IUFRO. Experts from 11 countries (Australia, Austria, China, Croatia, Finland, France, Germany, Netherlands, Spain, UK and USA) and three international organizations attended this workshop.

### **1.6. 10th International Symposium on River Sedimentation (10th ISRS), August 1-4 2007 in Moscow, Russia.**

As part of UNESCO-ISI programme, UNESCO joint hands with ISRS Secretariat, WASER and IRTCES in organizing 10<sup>th</sup> ISRS Symposium at Moscow, Russia. This Symposium has provided IRTCES and ISI technical secretariat with a good opportunity to establish more linkage with well-known organizations, institutions and scientists, engineers in the fields of erosion and sedimentation in the world, in order to strengthen capacity building of IRTCES and accumulate its experiences in carrying out international activities.

### **1.7. UNESCO Chair on Groundwater**

As committed by Mr. Matsuura, the Director General of UNESCO, the UNESCO Chair on Sustainable groundwater management has been installed at Institute of Geo-ecology, Mongolian Academy of Sciences and Tsukuba University, Japan. The Chair-holder is from Mongolia and Co-chair holder is from Japan, both the institutions will jointly carry out research work in setting up groundwater monitoring system for Mongolia. In addition both the side will have exchange of experts and students. The Chair activities are financially supported by Japanese Funds in Trust for first two years.

## **1.8. Water Science Education at School level – contribution to Decades on Education for Sustainable Development and Water for Life – Supported jointly by Ministry of Environment, Land and Sea Government of Italy and Ministry of Water Resources, Government of People’s Republic of China**

Education for Sustainable Development has crystallised as a result of international agreements and the global call to actively pursue sustainable development. Originally perceived as education about sustainability it is being increasingly recognised, through the influence of Agenda 21 and the more recent World Summit on Sustainable Development at Johannesburg (2002), as more than the dissemination of knowledge.

Under the existing bilateral agreement between Government of Italy and Government of People’s Republic of China on Sustainable Water Integrated Management (SWIM) project UNESCO Proposed to develop education and learning materials for school children in Chinese language to enhance the future generations understanding on water, without which we may not be able to achieve sustainable development.

The main objective of this project is to

- ✚ Develop a comprehensive teaching and learning material on basic principles of water sciences and water resources condition of China for school children
- ✚ Increase teachers, school students and community knowledge on water resources management and conservation within the context of sustainable development, stressing the importance of water.
- ✚ Provide support for teachers in the form of programmes, training, teaching materials and a support network to integrate water resources of China, its conservation and management learning into school programmes
- ✚ Develop systems and resources to allow schools and communities to monitor and record water resources of the country
- ✚ Set up a partnership dialogue in order to fully recognize the principles and values that the ESD promotes: a humane, equitable and caring society

The project launching workshop on Water Education in China was jointly organized by China Institute of Water Resources and Hydropower Research (IWHR) and UNESCO on July 13, 2007. During this event national and international experts presented various aspects of water education and what could be done to enhance the water education in China. The proceeding volume in Chinese has been published and in addition under this project learning and teaching materials for Chinese schools will be prepared (at the level of middle and secondary school) and based on this materials the training workshop for teachers will be organized to improve the water education in China.

## **2. Research Projects:**

### **2.1. Groundwater for Emergency Situation (GWES) a Case study for Beijing**

Beijing, located in the northwestern part of the China northern plain, is regularly influenced by the typical continental climate with semi-humid monsoon. Such climate results in the annual average rainfall of around 601mm, which is often unevenly allocated in terms of time and space. In the aspect of Beijing urban water supply, the groundwater resource accounts for 2/3 and the surface water resource is 1/3. Since 1999, there is serious consecutive drought year in Beijing, until 2007, the annual rainfall is below the annual average during the 8 years by now which shows the serious water shortage.

To address the serious water shortage, the Chinese State Council (2001) compiled a plan for the sustainable development of the Capital's water resources at the beginning of 21st century. According to the suggestions and measures presented by the State Council (2001) of China, Beijing takes measures to effectively release the water supply crisis including water saving techniques, recycled water utilization, rain water and flood water collection, diverting water outside Beijing and the construction of the emergency well field.

UNESCO in close cooperation with China Institute for Geo-environmental Monitoring and the Beijing Geo-environmental Monitoring Station prepared a report under GWES Programme of UNESCO in the consecutive drought year in Beijing to provide the reference of the emergency water supply.

On the basis of the analysis of the natural geography, geological and hydro-geological background and the water resource in Beijing, this report summarizes the suggestion and measures of releasing the water supply crisis during the consecutive drought year in Beijing and presents the suggestion and measures of sustainable management of water resource after the completion of the Nanshui Beidiao project aiming at the Beijing status.

## **2.2. Integrated Physical and Ecological Management of Rivers – with Particular Reference to the East River**

The East River, 520 km long and with drainage area of 27,040 km<sup>2</sup>, is one of the three major rivers of the Pearl River system – the largest river system in South China. The river is a main source of water supply for Hong Kong, Shenzhen, Guangzhou and Dongguan. It currently supplies 0.78 billion m<sup>3</sup> per year to Hong Kong; and this is projected to increase to over 1 billion m<sup>3</sup> in 2010. The integrated management of the East River is of foremost importance in the sustainable development of Hong Kong and the Pearl River Delta yet an integrated understanding is lacking on key water environment issues related to river dynamics, water quality, river ecology, river-coast interaction, and trans-boundary environmental material flows.

Under this project IRTCES is carrying out field investigations, basic laboratory studies and numerical modeling on watershed management, river dynamics, river eco-system, and water quality control, with particular reference to the East River. A comprehensive river health index will be developed based on the following 10 indices: (1) flood disaster, (2) watershed vegetation and erosion, (3) mountain tributaries channel morphology, (4) stem river channel stability, (5) sediment transportation, (6) working index (power generation, water supply, navigation, recreation and land creation), (7) water quality, (8) habitat and biodiversity index, (9) human-induced stresses, (10) restoration.

This project is for two year duration 2006-2007 and jointly supported by UNESCO Office Beijing and Ministry of Water Resources, Government of People's Republic of China and executed by IRTCES.

## **2.3. Urban Rainwater Harvesting - Case Study in Shenzhen City**

UNESCO Office Beijing in cooperation with Beijing Normal University and Shenzhen city authority carrying out a pilot research aimed at to develop urban hydrological cycle model, in order to prevent the flooding during peak rainfall season and reduce water shortage during dry season, by harvesting and storing rainwater for dry season.

Shenzhen City, first city opened up for foreign countries and has important strategic representation in the development of nation economy. Shenzhen City is faced with extreme water shortage because of its special geographic location, in which the annual mean precipitation is above 1837 mm, but the value of water resources availability per capita is less

than 200 m<sup>3</sup> resulting from rapid economic developing and quick increase of population in Shenzhen City. The cross-basin water diversion account for 80% of the whole utilization of water resources, and the problem of water resources is one of factors restricting development and is much more severe inevitably, with increasing of population, accelerating of urbanization, improvement of living standard, especially with the decrease of water resources and increasing of water use per capita in Shenzhen City. It is predicted that Shenzhen City will face the serious conflict between supply and demand of water resources in 2010. The water supply will be difficult to support water demand for the development of society and economy. The exploitation and utilization of the cross-basin water diversion and the unconventional water resources will alleviate the condition of water shortage and is a primary measure. Research on the approaches to exploit and utilize the unconventional water resources including urban rainwater should be referred to the schedule, facing the future serious water resources shortage in Shenzhen City.

#### **2.4. Research on sustainable development of society, economy and environment in Heihe River Basin, Northwestern China**

The Heihe River Basin (HRB) is the second largest inland river basin, with an area of 140 thousand km<sup>2</sup>, in arid and semi-arid area of Northwest China. There are diverse landform units, complex water resources transformation mechanism, vulnerable ecological environment and serious water problems in the HRB. To understand the water resources transforming processes, to rationally and effectively utilize and allocate water resources, and to harmonize economic development and environmental protection, are some of main challenges in front of local hydrologists. From the inception of over 20 years ago, the research in the HRB has begun to incorporate more fields, e.g., hydrological modeling, integrated basin research, and development of decision support system, etc. A broad range of data have been collected during past research activities. Due to its specific location in the developing West part of China as well as the deterioration of ecological environment in the downstream area, the HRB has been a concern of the national Chinese government. Under the supervision of the national government, the water diversion from the upstream and midstream areas of the Heihe River to the downstream area has been carried out once a year to satisfy the need of ecological demand in tail region. UNESCO jointly working with Chinese Academy of Science and other provincial authorities to come up with IWRM of Heihe River Basin under G-WADI network.

### **3. Participation in the International Initiative of IHP and cooperation with other cluster offices in the region:**

#### **3.1. Cooperation with International Sedimentation Initiative (ISI) a Global Initiative of UNESCO IHP**

IRTCES has been identified as ISI Project Technical Secretariat and UNESCO Office Beijing working together for implementing ISI activities, organizing ISI project steering committee, development of web site and information portal for ISI.

The ISI Portal has the sediment database network for representative basins and we are developing data sharing protocol with interested countries to share the sediment and erosion data under ISI.

#### **3.2. Cooperation with World Water Assessment Programme (WWAP) for World Water Development Report 2 – Water a Shared Responsibility**



World Water Assessment Programme is UN-wide programme seeking to develop the tools and skills needed to achieve a better understanding of those basic processes, management practices and policies that will help improve the supply and quality of global freshwater resources.

During 2007 UNESCO in cooperation with WWAP and Sustainable Water Resources Research Centre, KICT started a case study to be published under WWDR-3.

Efforts are under way in carrying out a case study from China for WWDR-3.

### **3.3. Asian G-WADI (UNESCO's Global network for Water and Development Information for arid lands)**

UNESCO recognised the needs of arid areas as a global priority and established G-WADI in 2003 to support networking between centres and individuals across the arid and semi-arid regions of the world. The strategic objective is to strengthen the global capability to manage the water resources of arid and semi-arid regions.

Across Asia, UNESCO Cluster Offices (Almaty, Beijing, New Delhi and Tehran) have joint hands and formulated G-WADI Asia. So far jointly organized three regional training programmes on various aspects of water management in Arid and Semi-arid regions and planning to organize one such event in China during 2007 on groundwater modelling for arid and semi arid regions.

Part of G-WADI Asia published two research reports on Managed Artificial Recharge and Water harvesting for arid and semi arid regions and Asian-GWADI experimental basins report.

The following products of the Global G-WADI are available for every one at [www.gwadi.org](http://www.gwadi.org)

- A **news watch feature** highlighting water issues related to arid and semi-arid regions
- Educational and knowledge-based modules related to water resources issues of the dryland regions and tools and techniques e.g. **Isotopic and Chemical Tracers in Hydrology**
- Provision of data sources, e.g. **HyDIS** satellite-based precipitation data
- Educational modules prepared for short course and seminar purposes, e.g. 2005 Roorkee Workshop on **Hydrological Modelling in Arid and Semi-Arid Areas**, and Cairo workshop on **Climate Change in North Africa and the Middle East**.
- Software tools provided through the SAHRA **Hydroarchive**
- Educational information provided through SAHRA's **Globe education and science programme**.

Part of Asian G-WADI UNESCO helped the project secretariat to develop a web site, brochure and poster on Asian G-WADI. The details can be found at [www.asian-gwadi.org](http://www.asian-gwadi.org)

### **3.4. Transboundary Aquifers in Asia**

UNESCO-IHP 14<sup>th</sup> Intergovernmental Council passed resolution XIV-12., by Member States, to promote studies in regard to internationally shared aquifers and subsequently launched the Project on **Internationally Shared Transboundary Aquifer Resources Management (ISARM)**. Already there is cooperation in American states, Africa, Europe and Balkan countries in operation.

With a view of starting ISARM-Asia UNESCO office Beijing initiated a pilot project on Heilongjiang-Amur River basin between China and Russian Federation with support from Chinese Geological Survey.

During next biennium efforts are underway to carryout pilot case studies from other countries.

### **3.5. Spanish MDG Achievement Funds**

Government of Spain has donated US \$ 720 Million to UNDP in order to carryout joint UN projects in five thematic area on selected 52 countries around the world to study the achievement of MDGs. China is one of the beneficiary country under the first thematic window on Climate Change and Environment UN 10 UN Agencies jointly submitted biding and the same has been approved by Funds steering Committee.

UNESCO is taking the lead role in Water Related issues. UNESCO in cooperation with UNCIEF will be undertaking projects on impact of climate change in water with special reference to Yellow River Basin.

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## NATIONAL REPORT ON IHP RELATED ACTIVITIES AUSTRALIA

### 1. ACTIVITIES UNDERTAKEN IN THE PERIOD OCTOBER 2006 – SEPTEMBER 2007

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

#### 1.1 Meetings of the IHP National Committee

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

#### 1.1.1 Decisions regarding the composition of the IHP National Committee

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

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

#### 1.1.2 Status of IHP-VI activities

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

- *Theme 1 - Global Changes and Water Resources*

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

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

- *Theme 2 – Integrated Watershed and Aquifer Dynamics*

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

- *Theme 3 - Land Habitat Hydrology*

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

- *Theme 4 – Water and Society*

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

- *Theme 5 Water Education and Training*

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

eWater CRC (<http://www.ewatercrc.com.au/>)

CRC for Water Quality and Treatment (<http://www.waterquality.crc.org.au/>)

CRC for Irrigation Futures ([www.irrigationfutures.org.au/](http://www.irrigationfutures.org.au/))

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

Centre for Groundwater Studies (<http://www.groundwater.com.au> )

The purpose of the centre is to provide research, education and specialist services for Australian and International land and water industries with the objective of improving the management of resources affected by groundwater processes.

Centre for Environmental Applied Hydrology (<http://www.civag.unimelb.edu.au/ceah> )

The Centre for Environmental Applied Hydrology is a research centre within the Departments of Civil and Environmental Engineering and Geography and Environmental Science at the University of Melbourne. Specific expertise covers all aspects of surface and groundwater hydrology, hydraulics and geomorphology.

Centre for Resource and Environmental Studies, Australian National University (<http://cres.anu.edu.au>) conducts research and postgraduate training in spatial-temporal variability and characterisation of climate, integrated catchment management, groundwater modelling and hydrology, floods and droughts, coastal hydrology and land use, salinity, water and land policy and related socio-economic impacts, ecological economics.

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

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

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

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

- *Crosscutting Program Components – FRIEND and HELP*

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

### **1.1.3 Decisions regarding contribution to/participation in IHP-VII**

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

#### ***Theme I- Global Change, Watersheds and Aquifers***

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

#### ***Primary Focal Area:***

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

- The Great Australian Artesian basin and associated research activities.

- Frameworks for determining sustainable yield of aquifers

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

- Research activities involving the Pacific Island Countries

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

- The Murray Darling River Basin and GEWEX related research activities

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

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

## **Theme II: Governance and Socio-Economics**

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

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

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

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

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

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

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

Focal Area II-4: Shared Water resources and conflict

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

## **Theme III: Ecohydrology and Environmental Sustainability**

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

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

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

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

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

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

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

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

- Biodiversity and climate change

#### **Theme IV: Water Quality, Human Health and Food Security**

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

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

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

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

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

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

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

- Climate variability and change and water resources for agriculture

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

### **1.2.1 National/local scientific and technical meetings**

- 30<sup>th</sup> Hydrology and Water Resources Symposium, 4-7 December 2006 Launceston, Tasmania
- 9<sup>th</sup> Australasian Environmental Isotope Conference and 2<sup>nd</sup> Australasian Hydrogeology Research Conference with the theme *Integrating research and Innovation*, 13-15 December 2006, Adelaide (<http://groundwater.com.au/aust-isotope-and-hydro-conferences.html>).
- The biennial convention of the Australian Water Association (AWA) ([www.awa.asn.au](http://www.awa.asn.au)) is the Australian water industry's largest and most prestigious event. It is an internationally recognised and well attended occasion, attracting delegates from across Australia and around the globe. The Ozwater 2007 Convention & Exhibition, was held 4-8 March 2007 in Sydney.
- 5<sup>th</sup> Australian Stream Management Conference, 21-25 May 2007, Albury, NSW.
- 3rd AWA WATER REUSE AND RECYCLING CONFERENCE 16th - 18th July 2007. University of New South Wales.
- RAINWATER & URBAN DESIGN 2007, 21-23 August 2007, Sydney. This event incorporated the 13th International Rainwater Catchment Systems Conference, 5th International Water Sensitive Urban Design Conference and 3rd International water Association Rainwater Harvesting and Management Workshop.
- 10th INTERNATIONAL RIVERSYMPIOSIUM & ENVIRONMENTAL FLOWS CONFERENCE, Brisbane 3 - 6 September 2007. The symposium includes the Thiess International Riverprize.
- Water for Life Forum 2007: Leading practice in water education was held on 19 September 2007 in Sydney.
- National Water Week, 21-27 October 2007 ([www.nationalwaterweek.org.au](http://www.nationalwaterweek.org.au))
- A number of meetings of the National Committee on Water Engineering, Institution of Engineer's have been held during this period. Some of the key purposes of these meetings are to coordinate and organise hydrology and water resources symposia and conferences, to coordinate the ongoing revision to the national hydrological design guidelines Australian Rainfall and Runoff, prepare Position Papers on key hydrological issues and to manage the



publication of Australian Journal of Water Resources. Position Papers are now all available on the Institution of Engineers, Australia web site:  
(<http://www.eng.newcastle.edu.au/~ncwe/ncwePosPaper/ppHome.htm>).

### **1.2.2 Participation in IHP Steering Committees/Working Groups**

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

Prof Shahbaz Khan is Chair of the International Steering Committee of the Hydrology for the Environment, Life and Policy (HELP) Program and the Regional Coordinator for the Australasian region.

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

Prof Trevor Daniell was elected Chairman of the Friend Inter-Group Coordinating Committee at its meeting in Havana, Cuba in December 2006.

### **1.2.3 Research/applied projects supported or sponsored**

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

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

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

#### **1.2.4 Hydrology for Environment, Life and Policy (HELP)**

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

##### **Lower Murrumbidgee Catchment**

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

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

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

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

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

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

#### **1.2.6 National Plan for water security**

As a result of 10 years of drought across a large portion of the country, in recognition that past management of water resources has not been affective, and that the recent National Water Initiative was not achieving sufficiently rapid progress in improving water management, the

Australian government has embarked upon a National Water Security Plan. The plan has funding of \$10B, will run for 10 years and includes the following components.

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

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

### **1.2.7 Other initiatives**

## **1.3 Educational and training courses**

### **1.3.1 Contribution to IHP courses**

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

### **1.3.2 Organisation of specific courses**

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

### **1.3.3 Participation in IHP courses**

### **1.3.4 Other**

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

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

The Brisbane-based International Water Centre announced a new Masters of Integrated Water Management course in December 2006. The course brings together expertise from Australia's

leading universities to build capacity for today's water resource managers MIW website. The course starts August 2007.

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

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

## **1.4 Publications**

Khan S. (2004) Integrating hydrology with environment, livelihood and policy issues – the Murrumbidgee Model. Special Volume on Hydrology for the Environment Life and Policy. Water Resources Development Vol. 20, No. 3: 415-429.

White I. and Falkland A. (2004). Effects of Pumping from Infiltration Galleries on Crop Health and Production in Low Coral Islands: Groundwater Impacts. ACIAR Project LWR1/2001/050, Equitable Groundwater Management for the Development of Atolls and Small Islands, prepared for the Australian International Agency for Agricultural Research, November 2004.

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

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

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

IHP papers presented at the International Conference on Water Sensitive Urban Design 'Cities as Catchments', Adelaide, Australia 22-23 November 2004. Edited by R. James, T. Daniell and K. Takara. IHP-VI Technical Documents in Hydrology No. 3. UNESCO Jakarta Office.

Daniell T., and White I. (2005) Bushfires and their Implications for Management of Future Water Supplies in the Australian Capital Territory. *In Proceedings Of The International Seminar On: Climatic And Anthropogenic Impacts On The Variability Of Water Resources Umr Hydrosociences Montpellier / UNESCO / OMM, Montpellier, 22 - 24 November 2005.*

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

## **1.5 Participation in international scientific meetings**

### **1.5.1 Meetings hosted by Country**

See Section 1.2.1 of this report for international conferences hosted.

### **1.5.2 Participation in meetings abroad**

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

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

## **1.6 Other activities at a regional level**

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

The Pacific HYCOS Project proposal developed by WMO in 2001 has received funding through the European Union. The Pacific HYCOS Project was launched at a workshop in Brisbane, Australia 16-19 April 2007 organized Bureau of Meteorology (BOM) Australia, World Meteorological Organisation (WMO), National Institute for Water and Atmosphere Research (NIWA), and Pacific Islands Applied Geoscience Commission (SOPAC). The meeting and workshop was funded by WMO, BOM and SOPAC.

### **1.6.1 Institutional relations/co-operation**

No information available at this time.

### **1.6.2 Completed and ongoing scientific projects**

Refer section 1.2.3 re ongoing Pacific Island projects.

## **2. Future Activities**

### **2.1 Activities foreseen until December 2008**

- Hydrological consequences of climate change symposium, November 15-16, Canberra. brings together Australia's leading climate and water scientists to improve understanding of the likely hydrological consequences of future climate. Details and online registrations ([www.csiro.au/events/HydroConsequences.html](http://www.csiro.au/events/HydroConsequences.html)).
- 5th National Waterwatch Conference ([www.waterwatch.org.au](http://www.waterwatch.org.au)) will be held in Canberra, 26-29 November 2007.
- Greenhouse 2007 convened by CSIRO will be held 12-5 October 2007 in Sydney and has the theme Projections, Probabilities People, Perceptions.
- MODSIM2007, 8-16 December 2007, Christchurch, New Zealand. International Congress on Modelling and Simulation.

- Securing Groundwater Quality in Urban and Industrial Environments. Fremantle, Western Australia, 2-7 December 2007. Registration at ([www.clw.csiro.au/conferences/GQ07/index.html](http://www.clw.csiro.au/conferences/GQ07/index.html))
- 3rd NATIONAL WATER EDUCATION CONFERENCE, WATER EFFICIENCY 2008 and WICD 2008. All three conferences will be held 30 March - 2 April 2008 on Queensland's Gold Coast. Education website ([Website 1](#)), Efficiency website ([Website 2](#)), WICD website ([website 3](#)).
- 31st Hydrology & Water Resources Symposium, 15 to 18 April 2008, Adelaide ([www.plevin.com.au/waterdownunder2008](http://www.plevin.com.au/waterdownunder2008)).
- FIGCC Meeting in Adelaide on the 20<sup>th</sup> April 2008
- ENVIRO08 A conference and exhibition for showcasing the Australian environment industry. Will be held 5-7 May 2008, Melbourne ([www.enviroconvention.com.au/](http://www.enviroconvention.com.au/)).
- 11th INTERNATIONAL RIVERSYMPOSIUM & ENVIRONMENTAL FLOWS CONFERENCE, Brisbane, September 2008.
- National Water Week, October 2008

## **2.2 Activities Planned for 2007-2008**

- Continuation of assistance to Pacific Island Projects.
- Continuation of involvement in Asian Pacific FRIEND.
- Participation in the HELP Southern Symposium 2007, Pretoria, South Africa 4-9 November 2007.

## **2.3 Activities envisaged in the long term**

No information available at this time.

# ***NATIONAL REPORT ON IHP RELATED ACTIVITIES. CAMBODIA***

## **1. Introduction**

The Royal Government of Cambodia has implemented a policy of promoting economic growth and social development through the introduction on market economy. The development of water resources is deemed to play the key role in economic growth, as contributes to agricultural and industrial development.

The ministry of Water Resources and Meteorology (MOWRAM) was established in 1999, the main duty is respond for facilitation hydro-meteorological data collection, archiving and exploitation of data and information of water resources development, for the benefit of the people of Cambodia.

Since 1997, the National Committee for IHP was established and head by H.E. Mr. LIM KEAN HOR is Minister of Ministry of Water Resources and Meteorology.

## **2. Activities at National Level in the Framework of IHP**

Activities undertaken in the period of November, 2006 – October, 2007

Today, the main activities in framework of IHP has some limited because of human resources, capacity building in the field of water (Hydrologist) and finance support. However, in National Programs on Water Resources have prepare some legislation, strategy, water profile, etc. Now day under national assembly processing.

- Join Study on Integrated Watershed Management Plan Kbal Chay River Basin.
- Join Study on Comprehensive Agricultural Development of Prek Thnot River Basin.
- To establish the National Model group to studies for the water resource in the Cambodia part
- To establishing the two pilot site for river basin studies in the Pursat river basin in Pursat Province and the Mekong River in Cambodia on the flood plant from 01/01/2006 to 30/12/2006
- To continues establishing the two pilot site for river basin studies in the Sungker river basin in Battabong Province and Sesan River from 01/01/2007 to 30/11/2007 by using the three models hydrological SWAT and hydraulic ISIS and river basin IQQM models that support by Mekong River Committee MRC.

### **National/Local scientific and technical meeting**

The technical meeting are generally held in framework national activities cooperate with NGO's, MRC, WB, ADB, etc. to carry out the activities and plan for short, medium, long terms for sustainable of development of water resources in Cambodia and in Lower Mekong Basin as well.

### **Participation in IHP Steering Committee / Working group**

One representative from Cambodia attended the 13<sup>th</sup> Regional Steering Committee Meeting for Southeast Asia and the Pacific in conjunction with the International Symposium on Ecohydrology Ramada Bintang Bali Resort, Denpasar, Bali, Indonesia, 21-25 November, 2005.

### **Collaboration with other national and international organizations/ programs**

The chairman of Cambodia National Committee for IHP(CIHP) is a Permanent Representative of WMO, so he has contact and coordination with WMO' s activities.

The member of CIHP have participated and contributed to many national and international organizations councils in Cambodia related to water resources management and development, environment, natural resources etc. especially flood management and flood forecasting.

World Water Day was celebrated in Phnom Penh as National Level that involve from many ministries, organizations.

The CIHP cooperation with Mekong River Committee to establishing for Hydro-Meteorologic data collection and information sharing under HYCOS project that funded by EU

Research/applied projects sponsored

Flood Forecasting and Flood Information for Vulnerable Communities

### 3. Educational and Training Courses

- More then forty representatives attended National Seminar on Flood Forecasting and Flood Information for Vulnerable Communities
- Training on Flood Emergency Management Strengthening and Flood Management and Mitigation.
- National Seminar on case studies for river basin studies the participant to attending from each line agency and Ministry
- Training Courses/Organization of Specific Courses for three models hydrology SWAT and hydraulic ISIS and river basin IQQM models that support by Mekong River Committee MRC.

#### 3.1 Contribution to IHP Courses/Organization of Specific Courses.

None

#### 3.2 Participation in IHP Courses.

None.

#### 4. Plan for 2008

- To collaborate IHP activities and meeting as possibility.
- To facilitate the collection, archiving, and exploitation of Hydro-meteorological data and information.
- To build CIHP's capacity to collect, archiving, and exploitation of Hydro-meteorological data and information.
- To standards of quality and timeliness appropriate to the needs of their users.
- Procedures for all stages of data collection.
- Management systems in place to ensure sustainable.
- To celebrate World Water Day 2008.
- To continues to establish the pilot site for river basin studies
- To continues cooperation with the data collection and sharing information



# **CHINA**

## **National Report on IHP Related Activities**

*for*

the 15<sup>th</sup> RSC-IHP meeting for the Southeast Asia and the Pacific

at Manila, Philippines, 19-23 November 2007 .

**Chinese National Committee for the IHP**

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1. This report is submitted to the 15<sup>th</sup> RSC meeting for the IHP at Manila, Philippines, 19-23 November 2007 .

# National Report on IHP Related Activities

## Chinese National Committee

### 1. ACTIVITIES UNDERTAKEN IN THE PERIOD October 2006 — November 2007

#### 1.1 Meetings of the Chinese National Committee for IHP

##### 1.1.1 Decision regarding the composition of the Chinese National Committee

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

Some former members were promoted or retired. New members have been recommended by the National Committee and will be approved by Ministry of Water Resources soon.

##### 1.1.2 Status of IHP-VI activities

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

**5<sup>th</sup> China Water Issues Forum and China Engineering Academy Academician Forum** was held from 10-12 November in Nanjing. The forum was organized by National Key Laboratory of Hydrology and Water Resources, IHP National Committee and other institutions. About 200



participants from universities, institutions and hydrological organizations attended the forum.

The forum focused on research and progress of water problem complexity and uncertainty.

Some common understandings were listed: (1)

water problems complexity and uncertainty need hydrological experiments and new technology application; (2) New technology and methodology research are key to solve the problems; (3) enhancement of PUB should be related with China water problems. Chinese National Committees of IAHS and IHP co-organized the forum.

##### 1.1.3 Decision regarding contribution to/participation in IHP-VII

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

version is available through internet)

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



## 1.2 ACTIVITIES AT NATIONAL LEVEL IN THE FRAMEWORK OF THE IHP

### 1.2.1 National/local scientific and technical meetings

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

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

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

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



### 1.2.2 Participation IHP Steering Committees/Working Groups

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

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

### 1.2.3 Research/applied projects supported or sponsored

Chinese Homepage of IHP on Internet has been supported by UNESCO Beijing office and has been updated regularly. It was updated regularly for distributing messages to the public.

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

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

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

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



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

### 1.2.5 Other initiatives

### 1.3 EDUCATION AND TRAINING COURSE

#### 1.3.1 Contribution to IHP courses

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



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

#### 1.3.2 Organization of specific courses

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

#### 1.3.3 Participation in IHP courses

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

Ms Dong Xiuying from the bureau of hydrology, ministry of water resources will participate in the “International Training Course on Urban water resources management” to be held in Regional Humid Tropics Hydrology and Water Resources Centre (HTC), Kuala Lumpur, Malaysia, early December 2007.

### 1.4 PUBLICATION

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

### 1.5 PARTICIPATION IN INTERNATIONAL SCIENTIFIC MEETINGS

#### 1.5.1 Meeting hosted by the country

**Workshop on Ecological Effect of Hydro-Engineering**, 11-12 November 2007 was held in Nanjing.. this is a participation programme with financial support from UNESCO headquarter. 80 participants attended the workshop, 30 papers were collected and included in the proceeding. Chinese National Committee awarded two persons and one group for their outstanding contribution



to international cooperation. Mr. Zhang Hailun got permanent achievement for China-IHP for his long-term working as Secretary-general in IHP National Committee. Mr. Xu Zongxue got outstanding contribution award for international hydrological cooperation. Bureau of Hydrology of Changjiang Water Resources Commission was awarded for their long-term supporting for national and international hydrological cooperation.



The information was distributed in the official websites of Ministry of Water resources and some key national water organization. Such as: <http://www.nhri.cn/tpxw/20071113083959bdcf05.aspx>, CHINA-IHP: [www.chinaihp.org](http://www.chinaihp.org)

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



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



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

### **Sino-Spanish Water Forum held in Dongying**

, Shandong Province, on October 15th, 2007. More than 160 representatives from the Ministry of Water Resources, Ministry of Environment of Spain, river basin commissions, provincial water resources departments and companies took part in the meeting.



Mr. Jiao Yong, Vice Minister of Water Resources, on behalf of the Ministry of Water Resources welcomed the Spanish government delegation led by H.E. Ms. Narbona, Minister of Environment as well as the preventatives from Spanish companies. Ms. Narbona delivered a speech at the opening ceremony of the Forum. She also held meetings with Vice Premier Hui Liangyu and Miniters Chen Lei in Beijing before the forum.

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

### **1.5.2 Participation in meetings abroad**

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



disasters”.

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

## **1.6 OTHER ACTIVITIES AT A REGIONAL LEVEL**

### **1.6.1 Institutional relations / co-operation**

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

### **1.6.2 Completed and ongoing scientific projects**

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

## **2. FUTURE ACTIVITIES**

### **2.1 ACTIVITIES PLANNED TO UNTIL DECEMBER 2007**

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

### **2.2 ACTIVITIES FORESEEN FOR 2008-2009**

More projects related to IHP-VI themes will be supported by Ministry of Water Resources through IHP national Committee. IHP National will continue to encourage scientific and technical symposia and workshops. Meanwhile, some initiatives for IHP-VII themes will be encouraged and arranged by the National Committee. Cooperation among the Southeast Asia and the Pacific will be top priority.

### **2.3 ACTIVITIES ENVISAGED FOR THE LONG TERM**

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



**REPORT OF THE  
INDONESIAN IHP NATIONAL COMMITTEE  
MANILA, THE PHILIPPINES  
NOVEMBER 2007**

**1. ACTIVITIES UNDERTAKEN IN THE PERIOD NOVEMBER 2006 –  
OCTOBER 2007**

**1.1 Meetings of the IHP National Committee**

**1.1.1 Decisions regarding the composition of the IHP National Committee**

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

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

The present composition of the National Committee is:

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

Members:

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

The committee hold bimonthly coordination meetings and in addition several technical meetings as needed for the planning and implementation of seminars and workshops organized under coordination of the committee. The committee routine meetings is attended by the Chairman of the Indonesian Committee for

UNESCO and by Program Specialist of the UNESCO Jakarta Office. Members of the national committee through regular meetings distribute informations gathered during the meeting as well as report to the meeting hydrological and related activities in their organizations.

The mailing address is as follows :

Dr. Gadis Sri Haryani  
Indonesian National Committee for IHP  
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### **1.1.2 Status of IHP-VI activities:**

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

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

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

## **1.2 Activities at national level in the framework of the IHP**

### **1.2.1 National/local scientific and technical meetings:**

- The Asia Pacific Center for Ecohydrology (APCE) in Cibinong has held various activities since 2001 attended by regional participants in the region. The speed of physical developments in the country did put more attention to local single structures while less to its surroundings as well as to upstream and downstream related problems. This was the result of (an only) sector or departmental approach where coordination with other disciplines and sectors was forgotten. This mistake was lately recognized and better coordination through understanding of the very close relation between hydrological

dynamics and ecological function has been understood. The formalization of APCE as a 2<sup>nd</sup> category UNESCO institute is being prepared under the LIPI organization.

- The Research Institute of Water Resources organized national hydrological training program every year. The RIWR is planning to strengthen it through national activities. In conjunction with WMO who endorsed and supported the Indonesian proposal it will conduct a Regional Hydrology Training Center for Asia Pacific. It will be held in Indonesia in conjunction with the national training program.

### **1.2.2 Participation in IHP Steering Committees/Working Groups:**

- Annual meetings of the Regional Steering Committee for IHP in the Asia Pacific region is held in a rotational base locations. Indonesia have always participate in this yearly meetings.
- Mr. Eddy A. Djadjadireja participated in the 17<sup>th</sup> session of IHP Intergovernmental Council, UNESCO, 3-7 July 2006

### **1.2.3 Research/applied projects supported or sponsored:**

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

- Mapping to flood forecast potentials at 11 district (activity on 2007)

#### **1.2.4 Collaboration with other national and international organizations and/or programmes:**

- JSPS-DGHE Joint Research Project FY 2007-2009 on *Watershed Management for Sustainable Water Resources Development in a Humid Tropical Regions*, implemented in Indonesia side by Bogor Agricultural University, Research Centre for Geoteknologi- LIPI, and Research and Development Agency - Department of Agriculture, started April 2007 to March 2010.
- Establishment of National Guidelines of Quality Assurance for Hydrological Management that is done in collaboration among hydrology operator in Indonesia (c.q. Directorate General of Water Resources, Research Center of Water Resources, Agency for Meteorology and Geophysics, Department of Energy and Mineral Resources, Department of Agriculture, Department of Forestry, Indonesian Institute of Science, Agency for Research and Technology Dissemination, etc).
- Study on Intensity Duration Frequency (APFRIEND), The result has been submitted to Prof. Tabios (Philippine)
- Preparing data and analysis for River Catalog Publication

#### **1.2.5 Other activities:**

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

### **1.3 Educational and training courses**

#### **1.3.1 Contribution to IHP courses:**

- -

#### **1.3.2 Organization of specific courses:**

- The Research Institute for Water Resources RIWR held Hydrological Training Course every year two times. This year is held in Bandung, from July 29 – 3

August 2007 with the Topic of Hydrological Operational. Participants came from all provinces in Indonesia. The next training course will be held in November 2007 with the Topic of Applied Hydrology.

- Directorate of Water Resources Management, Directorate General of Water Resources has conducted meeting in order to establish concept of National Guidelines of Quality Assurance for Hydrological Management in 3 phases on November 2007.
- Directorate of Water Resources Management, Directorate General of Water Resources in cooperation with Research Center of Water Resources has conducted hydrology training for central hydrology operation staff on 4 – 6 December 2006.

### **1.3.3 Participation in IHP courses:**

-

## **1.4 Publications**

- The Research Institute for Water Resources RIWR published material for training course for operational and applied hydrology

## **1.5 Participation in international scientific meetings**

### **1.5.1 Meetings hosted by the country:**

- Department of Public Work organized an event on International Joint Workshop on Water and Climate on 23 – 24 May 2007 that is held in Jakarta
- The RIWR supported MHI (Indonesian Hydrological Society) in several seminar related to hydrological activities such as “ Monitoring of Hydrological data in Trans-boundary River Basin”, August 2007.
- The RIWR and the related agency will organized the International Symposium and Workshop on Groundwater Problems in Developing Countries which will be held in Bali, Indonesia, on 4 – 8 December 2007.
- Government of Indonesia will host the UNFCCC, United Nation Forum on Climate Change to be held in Bali, December 2007.

### **1.5.2 Participation in meetings abroad:**

- o Prof. Jan Sopaheluwakan, and Dr. Gadis Sri Haryani represented Indonesia in the RSC Meeting 16 – 20 October 2006, in Bangkok, Thailand
- o Mr. Eddy A. Djadjadiredja, Agung B. Ibrahim, Rahmat S.L, Samuel Johnson participated UNESCO IHP 14<sup>th</sup> RSC Meeting for Southeast Asia & The Pacific, Bangkok, Thailand, 15 – 20 October 2006 in conjunction with the 3<sup>rd</sup> Asia Pacific Association of Hydrology and Water Resources Conference.
- o Prof. Peter Hehanussa attend a workshop on Water Management in Islamic Countries, 23 – 26 February 2007, in Tehran, Iran.
- o Prof. Hehanussa attended the meeting of Directors of UNESCO’s Water Related Centers, in IHE Delft The Netherlands, 11 – 16 June 2007
- o Prof. Hehanussa attended a meeting of the Directors of UNESCO’s Water Related Center, 22 – 26 September 2007, Bangkok Thailand.
- o Dr. Hery Harjono attended General Conference 34 of UNESCO in Paris, October 2007.

## **1.6 Other activities at regional level**

### **1.6.1. Institutional relations/co-operation:**

#### **1.6.2 Completed and ongoing scientific projects:**

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

## **2. FUTURE ACTIVITIES**

### **2.1 Activities planned until December 2008**

- Preparing Report on IFD Analyses by using Indonesian method's. The report has been sent to Prof. G. Tabios.
- Preparing River catalogue Vol VI and sent it to UNESCO Jakarta. The name of the river K. Ciujung-Kragilan dan K. Ciliman-Leuwikopo.
- International Symposium cum Workshop on Groundwater Problems in Developing Countries, Indonesia Society of Hydrology in cooperation with RIHN Japan, Bali 3-8 December, 2007
- Legislation for Indonesia National Standard for National Guidelines of Quality Assurance for Hydrological Management
- Prepare Guidelines of Quality Inspection for Hydrology Management
- Prepare Guidelines of hydrology data validation
- Prepare Guidelines of Water Balance Condition.

### **2.2 Activities foreseen for 2008-2009**

- participate in RSC activities including Asian Pacific FRIEND and Catalogue of Rivers
- send staffs for joining the Training course in 2008 and 2009 at Nagoya University
- send staffs for joining program at the International Center for Water-related hazards and risk management (ICHARM)
- propose to UNESCO for supporting and arranging a joint Research on Climate Changes among the IHP member countries.
- welcome the members of UNESCO-IHP to make use of the Indonesian Hydrological Training Program as a Regional Hydrological Training Program for Southeast Asia and The Pacific region.

### **2.3 Activities envisaged in the long term**

- The Indonesian National Committee for IHP has actively promote activities related to public participations at national level to augment awareness through educations and trainings on hazards by global warming and hazards

related to geological and volcanological events, in which Indonesia is one of the most prone areas. These include sea level rise, flood and drought hazard, volcanic debris control, earthquakes, tsunamis, water and food security. Area of priorities are mega cities and coastal areas. Considering that Indonesia is an archipelago nation (over 17.508 islands), inhabited by more than 220 million people, this is a huge task. The objective is to promote people's preparedness, communities as well as governments institutions, in facing the oncoming hazards.

- The Asia Pacific Center for Ecohydrology (APCE) is being set up in the campus of Cibinong Science Center LIPI in close cooperation with the Research Center for Limnology, the Indonesian Institute of Sciences. It has prepared a demo-site located in the upper Citarum Basin. The reservoirs is filled by surface water from the Upper Citarum River or the Bandung Basin, where urban and industrial untreated waste water is still a major problem. Eutrophication of the reservoir is being studied, to identify alternatives to reduce or control inflow of the pollutants. Water cycle related to erosion and sedimentation is also studied in a small Cililin Basin. Results of studies will be shared as study cases with other Asia – Pacific scientists interested in ecohydrology implementation.

**NATIONAL REPORT ON IHP RELATED ACTIVITIES**  
**JAPAN**

Various activities of UNESCO have been implemented under the support of the Japanese National Commission for UNESCO with financial contribution in the form of Japanese Fund-in-Trust (JFIT) for the Promotion of Science for the Sustainable Development. The following summary includes the activities of Japanese National Committee for the International Hydrological Programme (IHP) of UNESCO undertaken during September 2006 to November 2007.

Members of the IHP National Committee as of November 2007.

	Name	Position	E-mail
Chair *	TAKEUCHI Kuniyoshi	Director, ICHARM	kuni.t@pwri.go.jp
*	NAKANISHI Hisae	Prof., Nagoya Univ.	nakanishi@gsid.nagoya-u.ac.jp
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	TAKARA Kaoru	Prof., DPRI, Kyoto Univ.	takara@mbox.kudpc.kyoto-u.ac.jp
	TAKEMON Yasuhiro	Assoc. Prof., DPRI, Kyoto Univ.	takemon@wrcc.dpri.kyoto-u.ac.jp
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	TERAKAWA Akira	Division Head, ICHARM	terakawa@pwri.go.jp
	KURAJI Koichiro	Lecturer, Univ. of Tokyo	kuraji@uf.a.u-tokyo.ac.jp

Notes : \* indicates member of the Japanese National Commission for UNESCO.

ICARM: The International Centre for Water Hazard and Risk Management (UNESCO Category II Centre)

RIHN: Research Institute for Humanity and Nature

HyARC: Hydro-Atmospheric Research Center

DPRI: Disaster Prevention Research Institute

**Secretariat of the Japanese National Committee for IHP, UNESCO**

c/o Mr. AKIYAMA Kazuo

Japanese National Commission for UNESCO

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## 1. ACTIVITIES UNDERTAKEN IN THE PERIOD SEPTEMBER 2006 - NOVEMBER 2007

Since the International Hydrological Decade (IHD, 1965-1974) and the beginning of IHP (1975- ) Japan has played important roles in the IHP Intergovernmental Council (IGC) as a Council member for many years. In particular, Prof. Takeuchi had been the Chairperson of the Council and Bureau of IHP from 1998 to 2000. Japan participated in the establishment of the Regional Steering Committee (RSC) for Southeast Asia and the Pacific in 1993. The first RSC chairperson was Prof. Yutaka Takahashi (Univ. of Tokyo). Since then at least a couple of members of the National Committee for IHP have participated actively in all of the annual meetings of the RSC. The Chairman of the National Committee for IHP, Prof. Takeuchi, had served as the RSC Secretary (1993-1999) and the Chairman of the Technical Sub-Committee (TSC) for Asian Pacific FRIEND (APF) Phase I (1997-2001) in the framework of the RSC, while Prof. Takara is playing roles of the RSC Secretary (1999-2008) and a member of TSC-APF Phases I and II (2002- ).

The Japanese National Commission for UNESCO provides UNESCO with financial contribution in the form of Fund-in-Trust (JFIT) for the Promotion of Science for the Sustainable Development. Using JFIT, the UNESCO Jakarta Office organizes the UNESCO-IHP Regional Steering Committee (RSC) for Southeast Asia and the Pacific and IHP Training Courses in collaboration with the Ministry of Education, Culture, Sports, Science and Technology of Japan (MEXT), Japanese Universities and Research Institutes.

### 1.1 Meetings of the IHP National Committee

#### 1.1.1 Decisions regarding the composition of the IHP National Committee

N/A.

#### 1.1.2 Status of IHP-VI activities

- (1) **Catalogue of Rivers:** The format of the Catalogue of Rivers for Southeast Asia and the Pacific, Vol. 6 was discussed by Dr. Chikamori with the former editors Prof. Takara and Dr. Tachikawa. It was presented at the 15th Session of IHP Regional Steering Committee (RSC) for Southeast Asia and the Pacific (SEAP) in Manila, the Philippines, on 22-23 November 2007.
- (2) **Asian Pacific FRIEND:** Prof. Takeuchi, Prof. Takara and Dr. Chikamori attended the Asian Pacific FRIEND Technical Sub-Committee (TSC) on 21 November 2007 at the occasion of the 15th Session of RSC in Manila, the Philippines. Prof. Takara would submit a report the current status of IDF analysis and practice in Japan by the end of February 2008, based on an action item decided at the TSC.
- (3) **Hydrology for Environment, Life and Policy (HELP):** Dr. Koichiro Kuraji (Univ. of Tokyo), Dr. Junpei Kubota (RIHN) and Ms. Hirakawa (Hiroshima Univ.) participated in the Workshop on Integrated Catchment Management (ICM) in the Motueaka River basin held in Nelson, New Zealand on 7-11 November 2005. This workshop is a Pacific regional meeting of UNESCO-IHP-HELP.

### 1.1.3 Decisions regarding contribution to/participation in IHP-VII

The Japanese National Committee for IHP has sent comments on IHP-VII Draft Plan to the UNESCO-IHP Secretariat. The IHP NatCom will have a meeting on 15 December 2007 in Tokyo to further discuss actions for IHP-VII. Japan has indicated their intention to contribute to the following Themes and Focal Areas (FA) in the Updated Draft Strategic Plan for the 7<sup>th</sup> Phase of the IHP (2008-2013), IHP/Bur-XL/11, Paris, 2 May 2007:

THEME 1: Adapting to the Impacts of Global Changes on River Basins and Aquifer Systems

FA 1.1 – Global Changes and feedback mechanisms in hydrological processes in stressed systems

FA 1.3 – Hydro-hazards, hydrological extremes and water-related disasters

FA 1.4 – Managing groundwater systems' response to global changes

THEME 3: Ecohydrology for Sustainability

FA 3.1 – Ecological measures to protect and remediate catchments process

THEME 4: Water and Life Support Systems

FA 4.3 – Achieving sustainable urban water management

THEME 5: Water Education for Sustainable Development

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

### 1.2.1 National/local scientific and technical meetings

- (1) ICHARM Inauguration Symposium: "Alliance for Localism" was held at the United Nations University (UNU), Tokyo, Japan on 14 September 2006. Mr. Kazuo Kitagawa, the Minister of Land, Infrastructure and Transport of Japanese Government gave a message. Several representatives gave keynote speeches such as from US Army Corp of Engineers, UN-ISDR, WMO, UNESCO, Brazil, and DPRI of Kyoto University.
- (2) IHP Training Course Working Group Meeting was held in Tokyo on 26 March 2007. The course for FY 2006 was reported; the plan of the 2007 course was explained and discussed.
- (3) The JFIT Annual Review Meeting on Science Sector Activities of UNESCO Office Jakarta was held in the conference room of the UNESCO Jakarta Office from 23 to 24 May 2007. Prof. Takeuchi, Prof. Iwatsuki (MAB), Mr. Akiyama attended. The status and progress of the UNESCO science programmes in the region were reported and evaluated. A new JFIT for solving global issues and its future perspective is also discussed.
- (4) Signing Ceremony of the Memory of Understanding between the University of Tsukuba and the Institute of Geo-ecology, Mongolian Academy of Sciences (Mongolia) for the establishment of UNESCO Chair in Sustainable Groundwater Management (783): on 22 June 2007. The purpose of the Chair shall be to promote an integrated system of research, training, information and documentation in the field of groundwater management. Prof. Tadashi Tanaka, Terrestrial Environmental Research Center, Graduate School of Life and Environmental Sciences, University of Tsukuba will be the co-chair. The UNESCO Chair will serve as a means of facilitating collaboration between high-level, internationally recognized researchers and teaching staff of the University and

other institutions in Mongolia and Japan and neighbouring East Asian countries such as China and the Republic of Korea.

#### 1.2.2 Participation in IHP Steering Committees/Working Groups

##### **(1) Regional Steering Committee (RSC)**

- a) The 14<sup>th</sup> RSC was held in October 2006 in Bangkok, Thailand. The cost for some participants from Asia and the Pacific was financially supported by JFIT. The Review of the Catalogue of Rivers and maintenance of the current system of RSC were decided in the RSC. Prof. Takara was re-elected as the Secretary of RSC.
- b) The 15<sup>th</sup> RSC was held in November 2007 in Manila, the Philippines. Prof. Takara and others participated in the meeting. The RSC adopted a resolution for encouraging Lao PDR and Myanmar to officially participate in the RSC in the near future.

#### 1.2.3 Research/applied projects supported or sponsored

N/A

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

The Japanese IHP National Committee has been closely collaborating with:

- (1) The Liaison Committee on Hydrological Science, Science Council of Japan (SCJ).
- (2) The national government and its branches relating to hydrology and water resources administration.
- (3) Nagoya University for IHP Training Courses and graduate school. Other universities and research institutes.
- (4) The Japan Water Forum (JWF).
- (5) World Meteorological Organization (WMO).
- (6) International NGOs/NPOs such as the International Association of Hydrological Sciences (IAHS), the International Water Resources Association (IWRA) and the International Consortium on Landslides (ICL).

#### 1.2.5 Other initiatives

N/A

### **1.3 Educational and training courses**

#### 1.3.1 Contribution to IHP courses

- (1) Doctor of Science degree on atmospheric and hydrospheric science:

The Graduate School of Science and the Graduate School of Environmental Studies of Nagoya University accepts students from Asia and the Pacific region, with the financial support from the Ministry of Education, Culture, Sports, Science and Technology of Japan (MEXT).

(2) IHP Training Courses:

The Hydrospheric Atmospheric Research Center (HyARC) of Nagoya University offers IHP Training Courses for both foreign students of Graduate School of Science, Nagoya University and trainees chosen by UNESCO Regional Science Bureau for Asia and the Pacific in Jakarta. The training courses are financed by the Japanese Fund-in-Trust (JFIT) for IHP.

The 16<sup>th</sup> Training Course was held with a theme *Oceanography Basics*, from 26 November to 9 December 2006, at the Hydrospheric Atmospheric Research Center (HyARC), Nagoya University, Nagoya, Japan. The course comprised a series of lectures and practice sessions in English. It also included an overnight field observation cruise in Ise Bay on a training vessel Sei-Sui Maru of Mie University, and a technical tour to the Center for Marine Environmental Studies, Ehime University. Nine participants were 7 from the Philippines, Vietnam, Indonesia, Myanmar, Sri Lanka, Papua New Guinea recommended by the UNESCO Jakarta Office and 2 from the Special Graduate School at Nagoya University.

### 1.3.2 Organization of specific courses

In cooperation with the Mongolian National Committee for UNESCO-IHP and the UNESCO Beijing Office, the Japanese National Committee for UNESCO-IHP co-organized the Mongolian National Training Workshop “Groundwater Hydrology and Management” in Mongolia on 14 and 15 June 2006. Five Japanese experts participated in the Training Workshop at their own expense as lecturers. The Japanese experts are: Prof. Dr. Kaihotsu (Hiroshima Univ.), Prof. Dr. Takara (Kyoto Univ.), Prof. Dr. Jinno (Kyushu Univ.), Dr. Tsujimura (Univ. of Tsukuba) and Dr. Hamaguchi (Kyoto Univ.). The Mongolian National Committee for IHP, the organizer of the workshop, supported staying expenses for the lecturers.

### 1.3.3 Participation in IHP courses

N/A

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

**ICHARM:** International Centre for Water Hazard and Risk Management under the auspices of UNESCO was established in Tsukuba, Japan in March 2006, after getting accreditation by the member

states of UNESCO at the 33<sup>rd</sup> General Conference of UNESCO. Dr. Kuniyoshi Takeuchi, the chairman of the Japanese National Committee for UNESCO-IHP, was assigned as the founding Director of ICHARM. ICHARM was established as the core of research, training, and information networking activities on water-related disasters at global levels. The activities are expected to contribute in the prevention and reduction of water-related disasters, such as floods. It is important to cooperate with existing UNESCO Centers such as IHE in the Netherlands, IRTCES in China, CATHALAC in Panama and HTC in Malaysia, etc. The outline of ICHARM is as follows.

- 1) Objectives: The objective of the Centre is to be the world centre of excellence to provide and assist implementation of best practicable strategies to localities, nations, regions and the globe to manage the risk of water related disasters including flood, drought, landslide, debris flow, storm surge, tsunami and water contamination. The Centre conducts research, capacity building and information networking activities in an integrated manner for preventing and mitigating the impacts of water related disasters and thus to achieve sustainable and integrated river basin management.
- 2) Functions:
  - (i) to promote scientific research and to undertake effective capacity-building activities at the institutional and professional levels;
  - (ii) to create and reinforce networks for the exchange of scientific, technical and policy information among institutions and individuals;
  - (iii) to develop and coordinate cooperative research activities, taking advantage particularly of the installed scientific and professional capacity of the IHP networks, WWAP, the IFI/P and relevant programmes of non-governmental organizations, international institutions and networks;
  - (iv) to conduct international training courses for practitioners and researchers on the global level; and
  - (v) to organize knowledge and information transfer activities including international symposia or workshops, and to engage in appropriate awareness-raising activities;
- 3) Structure: The center is established as a part of the Public Works Research Institute (PWRI) and be operated under the responsibility of its Chief Executive, with the advice from the Advisory Board.

## 1.5 Publications

1. « IHP Papers presented at the International Conference on Water Sensitive Urban Design ‘Cities as Catchment’ », IHP-VI Technical Documents in Hydrology No. 3, UNESCO Jakarta Office, (Eds.) R. James, T. Daniell and K. Takara, November 2004.
2. « MPMD-2005: Monitoring, Prediction and Mitigation of Water-Related Disasters », Proceedings of International Conference on Monitoring, Prediction and Mitigation of Water-Related Disasters, (Eds.) K. Takara, K. Tachikawa and NMNS B. Nawarathna, January 2005.
3. Catalogue of Rivers for Southeast Asia and the Pacific Vol. 1 (1995) and Vol. 2 (1997) CD-ROM version (March 2005).
4. « IHP », Newsletter on IHP activities of Japan, No.18, June 2005 (in Japanese).

5. The booklet of the Portfolio of Water Actions (PWA) was published in March 2005 to show the current progress of the PWA created by Japanese Government. 98 plans of action or commitments are listed in the PWA. The booklet was used for facilitating efforts to initiate concrete actions, and bring desirable results.
6. T. Oki, C. Valeo and K. Heal (Eds.), *Hydrology 2020: An Integrating Science to Meet World Water Challenges*, IAHS Publication 300, 190 +xxxii pp., 2006.

## **1.6 Participation in international scientific meetings**

### 1.6.1 Meetings hosted by the country

- (1) The 2<sup>nd</sup> Asian Water Cycle Symposium took place at the University of Tokyo on 9-10 January 2007; 18 Asian countries (Bangladesh, Bhutan, Cambodia, China, India, Indonesia, Japan, Korea, Laos, Mongolia, Myanmar, Nepal, Pakistan, the Philippines, Sri Lanka, Thailand, Uzbekistan, and Vietnam) adopted the basic plans, sharing the same goals to solve water-related issues, such as water damages (flood, landslide, drought), water shortage, water quality, river and water management, and effects on the climate changes. The meeting designated demonstration river basin per each country and a basic outline for standardization of a target river basin, data policy, and data collection schedule.
- (2) Japan is managing PUB (Prediction in Ungaged Basins) activities of IAHS. Asian PUB is developing quite well under Dr. Yasuto Tachikawa's initiative. A domestic PUB meeting was held in Mie Prefecture on 8-10 November 2006.
- (3) A Post-GAME project, MAHASRI led by Dr. Jun Matsumoto (Univ. of Tokyo) is now activated with many participants from Asian countries. They are collaborating with IHP FRIEND as well as with PUB.

### 1.6.2 Participation in meetings abroad

- (1) A PUB session was organized by at the APHW meeting held on 16 October 2006 in cooperation with IHP RSC meeting in Bangkok. Prof. Takeuchi, Dr. Tachikawa and others visited Myanmar to investigate the Irrawaddy River basin and water resources management in Myanmar on 9-15 October 2006.
- (2) UK-Japan Workshop on Flood and Coastal Defence: Risk Management under Climate and Social Change was held at the University of Newcastle upon Tyne, UK, on 21-24 February 2007 with a support of UK Foreign and Commonwealth Office Global Opportunity Fund. Attended are Prof. Enda O'Connell, Dr. J. Bathurst, Prof. I. Cluckie (Bristol), Prof. R. Falconer (Cardiff), Prof. K. Shiono (Loughborough) and others from UK, and Prof. Takara, Dr. Tachikawa, Dr. Sayama and others from Japan.
- (3) PUB Sessions at IUGG, Perugia, Italy on 9-14 July 2007. A PUB database management system for the Mae Chaem basin in Thailand which was established by the RID Thailand and ICHARM was introduced. Its web site is <http://www.icharm.pwri.go.jp/html/network/index.html>

- (4) A PUB Session was convened by Dr. Tachikawa at the 4<sup>th</sup> Meeting of AOGS in Bangkok, Thailand on 31 July 2007.

## **1.7 Other activities at regional level**

### **1.7.1 Institutional relations/cooperation**

N/A.

### **1.7.2 Completed and ongoing scientific projects**

N/A.

## **2. FUTURE ACTIVITIES**

### **2.1 Activities planned until December 2008**

- 1) The 1<sup>st</sup> Asia-Pacific Water Summit will be held in Beppu, Oita Prefecture, Japan on 3-4 December 2007, with the participation of top-level decision makers from the Asia-Pacific region. ICHARM will organize a session for mitigation of water-related disasters {ICHARM, Prof. Nakayama}.
- 2) The 3<sup>rd</sup> Asian Water Cycle Symposium (2-4 Dec. 2007) will be held at Oita Kokusai Koryu Kaikan (Oita International House), Beppu, Oita Prefecture, Japan.
- 3) The 17<sup>th</sup> IHP Training Course with the theme “Numerical Prediction of High-Impact Weather Systems” will be held in Nagoya, Tokyo and Yokohama, Japan, on 2-15 December 2007. Expected participants are eight from Indonesia (2), Laos, Malaysia, Nepal, Vietnam, the Philippines, and Thailand supported by UNECO Jakarta Office; two from Malaysia and Laos with self-support; and three from China, Bangladesh and Nepal attending the Special Graduate School Course at Nagoya University.
- 4) Japan PUB meeting in Kyoto on 3-4 March 2008.
- 5) The 5<sup>th</sup> Workshop on Rio de La Plata Basin at Itaipu Binacional, Brazil on 11-14 March 2008, organized by UNESCO-IHP LAC, UN Water Decade, UNEP GEMS/Water, ICHARM and Japan Water Forum [Dr. Yamashiki (Nihon Univ.)].
- 6) Asian Pacific FRIEND Workshop in Hanoi, Vietnam, in May 2008 (to be confirmed).
- 7) The 9<sup>th</sup> IHP/IAHS George Kovacs Colloquium, Paris, 6-7 June 2008 [Profs. Takeuchi and Takara]
- 8) The 18<sup>th</sup> Session of IHP Intergovernmental Council (IGC), UNESCO, Paris, 9-13 June 2008. [Prof. Takeuchi, Prof. Takara and others].
- 9) The 16<sup>th</sup> Session of the IHP Regional Steering Committee (RSC) for Southeast Asia and the Pacific will be held in Ulan Bator, Mongolia on 29 September to 3 October 2008.
- 10) ICHARM 2<sup>nd</sup> Advisory Board meeting in Tsukuba in October 2008.
- 11) The 1<sup>st</sup> World Landslide Forum will be held at UNU Tokyo on 18-21 November 2008. ICHARM and other UNESCO-related organizations will attend it as well as a pre-event on 17 November.

12) APHW2008 meeting in Beijing in November 2008 (to be confirmed). A PUB Session will also be convened.

## **2.2 Activities foreseen for 2009-2010**

- (1) Participation in RSC activities including Asian Pacific FRIEND and the Catalogue of Rivers.
- (2) Nagoya University IHP Training Courses in 2009 and 2010.
- (3) Implementation of projects related to IHP-VII.
- (4) Activities related to the International Center for Water-related Hazards and Risk Management (ICHARM).
- (5) Research on HELP basins.
- (6) Collaboration with UNESCO-MAB and UNESCO-IOC activities.
- (7) The 5<sup>th</sup> World Water Forum will be held in Istanbul, Turkey, from 16 to 22 March 2009.
- (8) The 17<sup>th</sup> Session of the IHP Regional Steering Committee (RSC) for Southeast Asia and the Pacific will be held in China in 2009.

## **2.3 Activities envisaged in the long term**

- (1) Participation in IHP-VII projects and RSC activities.
- (2) Nagoya University IHP Training Courses.
- (3) Information dissemination through a web page of the National Committee.



NATIONAL REPORT ON IHP RELATED ACTIVITIES  
IN  
REPUBLIC OF KOREA

November, 2007

Korean National Committee  
for  
The International Hydrological Programme  
Republic of Korea

## **1. ACTIVITIES UNDERTAKEN IN THE PERIOD SEPTEMBER 2005-NOVEMBER 2007**

### **1.1 Meetings of the IHP National Committee**

#### **1.1.1 Decisions regarding the composition of the IHP National Committee**

For the solution of water problems and the protection of mans welfare and the quality of human life, a UNESCO Resolution in 1964 created the International Hydrological Decade(IHD). Korea as a participant in the program, then appointed within its Ministry of Construction a IHD National Committee(later, IHP National committee), which undertook pioneer hydrologic surveys of selected representative basins in three major river systems during the program period, and embarked in 1975 on a 6-year International Hydrological Programme (IHP) project as the first step toward an extension of surveys of domestic river basins in order to fulfill its responsibilities in the world's consolidated efforts to cope with the water problem. After the completion of the first phase of IHP in 1980, the second phase of IHP project(1981~1983), the third phase of IHP project(1984~1989), the fourth phase of IHP project(1990~1995), the fifth phase of IHP project(1996~2001) and the sixth phase of IHP project(2002~2007) followed for the continuation of representative basin studies, the adoption of new techniques of water resources development and water quality control, the hydrological evaluation of urbanization and variations of watershed including sustainable development in a changing environment, hydrology and water resources development in a vulnerable environment, and education and training in hydrology and water resources.

In the beginning of the New Millennium and this year(2007), Korean National Committee for the IHP was reorganized and strengthened to fulfill the IHP activities more effectively and actively. All members of the Committee were from every part of water related organizations in the country and executive functions are carried out within the Water Resources Bureau, Ministry of Construction and Transportation.

Decisions regarding most of IHP related activities are made by this committee which is held regularly and on request in special occasion.

#### **1.1.2 Status of IHP-VI activities**

During the sixth phase(2002~2007) of IHP, the Korean National Committee for the IHP is paying its efforts to achieve the objectives set by UNESCO for this phase of IHP and the following projects are being and be executed in Korean river basins and in the field of hydrology and water resources in Korea.

- (1) Global changes and water resources
- (2) Integrated watershed and aquifer dynamics
- (3) Land habitat hydrology
- (4) Water and society
- (5) Water education and training

Based on these projects(themes), more practically-oriented-projects for Korean hydrologic and water resources conditions have been and will be executed and their detailed information are listed in Table-1.

**Table-1 IHP National Events in IHP-VI**

Projects/Activities	Brief Description	IHP-VI Subprogram	Location and Duration	Supporting Body	Gov. Input	Output
1. 2005 IHP Representative Basin Studies	<ul style="list-style-type: none"> <li>· Comprehensive analyses on climate change and its effect on water resources</li> <li>· Evaluation of drought and its measures</li> <li>· Distribution of hydrological data by electronic publication(IV)</li> <li>· Study of urbanization effect on river water and sewage quality(II)</li> <li>· Water conflict factors and solution in Korean river basins(II)</li> <li>· Development of image education system for water resources education and training(II)</li> <li>· Collection and fundamental analysis of hydrological data of the Representative basins</li> <li>· Preparations of River Catalogue-Vol.12</li> </ul>	Theme 1, 2, 4 and 5	Korean rivers	MOCT	Major Gov. input	Report and Papers
2. 2006 IHP Representative Basin Studies	<ul style="list-style-type: none"> <li>· Water demand management planning and its studies</li> <li>· Runoff characteristics change and runoff reduction studies according to large-scale housing area development</li> <li>· Runoff analyses by future landuse and climate change</li> <li>· Int'l river management examples investigation and development of management strategy of South-North Korean co-boundary river basins</li> <li>· River basin management manual for Integrated River Basin management(IRBM)</li> <li>· Optimal water resources use and its management technique development in island and coastal region</li> <li>· Groundwater variation characteristics in urban areas</li> <li>· River and culture/civilization studies in river basin</li> <li>· Selection and design of new Representative basins for hydrological data collection</li> <li>· Review of study results and future direction of present Representative basins</li> </ul>	Theme 1, 2, 4 and 5	Korean rivers	MOCT	Major Gov. input	Report and Papers
3. 2007 IHP Representative Basin Studies	<ul style="list-style-type: none"> <li>· Water demand management planning and its studies(cont'd)</li> <li>· Runoff characteristics change and runoff reduction studies according to large-scale housing area development(cont'd)</li> <li>· Runoff analyses by future landuse and climate Change(cont'd)</li> <li>· River basin management manual for Integrated river Basin management(IRBM)(cont'd)</li> <li>· Optimal water resources use and its management technique development in island and coastal region(cont'd)</li> <li>· Groundwater variation characteristics in urban areas(cont'd)</li> <li>· River and culture/civilization studies in river basin(cont'd)</li> <li>· Electronic publication and distribution of hydrologic and water quality data</li> <li>· New representative basin operation and studies</li> </ul>	Theme 1, 2, 4 and 5	Korean rivers	MOCT	Major Gov. input	Report and Papers
4. Asian/Pacific FRIEND Studies	<ul style="list-style-type: none"> <li>· Basic hydrologic analyses in AP FRIEND river basins</li> <li>· Comparative regional analyses of hydrology and water resources in AP FRIEND regions</li> </ul>	Theme 1 Area 1.1	Korean rivers	MOCT		Report and Papers
5. Special program on the low-flow management	<ul style="list-style-type: none"> <li>· Low-flow management system simulation</li> <li>· River water quality variation</li> <li>· Changing climate and runoff conditions</li> </ul>	Theme 1 and 2	Korean rivers	MOCT MOE MOA		Report and Papers
6. Water resources management during extreme flood and drought	<ul style="list-style-type: none"> <li>· Extreme flood and drought modeling</li> <li>· Water resources management techniques during extreme hydrologic periods</li> </ul>	Theme 1, 2 and 3	Korean rivers	MOCT MOA		Report and Papers
7. Special program of regional hydrology	<ul style="list-style-type: none"> <li>· FRIEND basin studies</li> <li>· HELP studies</li> <li>· PUB studies</li> </ul>			MOCT MOE		

MOCT : Ministry of Construction and Transportation  
 MOE : Ministry of Environment

MOA : Ministry of Agriculture

In the beginning of the sixth phase of IHP (2002~2007), the Korean National Committee for the IHP has prepared the research programme of IHP-VI phase as given in Table-2 to achieve the objectives set by UNESCO for this phase of IHP.

**Table-2 Planned Research Programme of IHP-VI Phase**

Theme	Title	Potential Contribution and Research Activities	Executing Milestone						Remark
			2002	2003	2004	2005	2006	2007	
<b>Theme 1</b>	<b>Global Changes and Water Resources</b>								
Focal Area 1.1	Global estimation of resources : water supply and water quality	<ul style="list-style-type: none"> <li>· Low-flow management in consideration of water quality improvement and changing environment in river systems</li> <li>· Developing environmentally sound – sustainable development and management strategies of water resources</li> <li>· Development of water archive and contribution of Korean hydrological data and water quality data to global and regional studies</li> <li>· Comparative global and regional analyses of water resources</li> <li>· Developing national water quality management strategies</li> </ul>							
Focal Area 1.2	Global estimation of water withdrawals and consumption	<ul style="list-style-type: none"> <li>· Comprehensive studies of alternative means to save and conserve water resources for future demand</li> <li>· Evaluation of national water use and demand</li> <li>· Evaluation of groundwater resources and developing suitable management strategies for their withdrawals and consumption</li> </ul>							
Focal Area 1.3	Integrated assessment of water resources in the context of global land based activities and climate change	<ul style="list-style-type: none"> <li>· Integrated studies of water resources changes due to man-made activities</li> <li>· Comprehensive analyses of climate change and its effect to water resources</li> <li>· Assessment of water resources due to land use change</li> </ul>							
<b>Theme 2</b>	<b>Integrated Watershed and Aquifer Dynamics</b>								
Focal Area 2.1	Extreme events in land and water resources management	<ul style="list-style-type: none"> <li>· Hydrological studies of extreme events in Korean river basins</li> <li>· Developing the best flood warning systems and the use of radar-based rainfall information</li> <li>· Evaluation of national drought characteristics and their alternative measures</li> <li>· Water resources management during extreme flood and drought</li> </ul>							
Focal Area 2.2	International River Basins and Aquifers	<ul style="list-style-type: none"> <li>· Developing strategies of international river basin management</li> </ul>							
Focal Area 2.3	Endorheic Basins								
Focal Area 2.4	Methodologies for integrated river basin management	<ul style="list-style-type: none"> <li>· Development of integrated river basin management systems in Korean river basins</li> <li>· Integrated urban water management</li> <li>· Assessment of surface water and groundwater resources in watershed and aquifers</li> </ul>							
<b>Theme 3</b>	<b>Land Habitat Hydrology</b>								
Focal Area 3.1	Drylands								
Focal Area 3.2	Wetlands								
Focal Area 3.3	Mountains	<ul style="list-style-type: none"> <li>· Studies of hydrological processes in mountain watershed</li> <li>· Flash flood and runoff characteristics in mountain hillslope basins</li> </ul>							
Focal Area 3.4	Small islands and coastal zones	<ul style="list-style-type: none"> <li>· Studies of hydrology and water management in small islands and coastal zones</li> <li>· Assessment of groundwater resources in small and volcanic islands</li> <li>· Studies of water supply and alternate water resource systems in small islands and coastal zones</li> </ul>							

Focal Area 3.5	Urban areas and rural Settlements	<ul style="list-style-type: none"> <li>· Development of stormwater management model in urban areas</li> <li>· Studies of change of urban rivers to environmentally sound – natural rivers</li> <li>· Studies of decreasing methods of urban runoff</li> <li>· Assessment of urban stormwater quality systems</li> </ul>							
<b>Theme 4</b>	<b>Water and Society</b>								
Focal Area 4.1	Water, civilization and ethics	<ul style="list-style-type: none"> <li>· Studies of relationship of water with culture and civilization in Korean river basins - - - characteristics of water culture</li> </ul>							
Focal Area 4.2	Value of water	<ul style="list-style-type: none"> <li>· Assessment of water price for effective consumption</li> <li>· Studies of water consumptive habit in the society</li> </ul>							
Focal Area 4.3	Water conflicts – prevention and resolution	<ul style="list-style-type: none"> <li>· Evaluation of water conflict problems in Korean river basins : case studies</li> </ul>							
Focal Area 4.4	Human security in water – related disasters and degrading environments	<ul style="list-style-type: none"> <li>· Review and assessment of prevention activities in water – related disasters</li> <li>· Studies of environmental impacts by water – related disasters</li> </ul>							
Focal Area 4.5	Public awareness raising on water interactions	<ul style="list-style-type: none"> <li>· Development of public awareness and participation programs in water resources project</li> <li>· Studies of public awareness in water resources</li> </ul>							
<b>Theme 5</b>	<b>Water Education and Training</b>								
Focal Area 5.1	Teaching techniques and material development	<ul style="list-style-type: none"> <li>· Evaluation and development of teaching and training techniques in water – related education</li> <li>· Development of internet-based teaching materials for water resources education</li> </ul>							
Focal Area 5.2	Continuing education and training for selected target groups	<ul style="list-style-type: none"> <li>· Development of continuing education and training programs for practicing hydrologists and water – related engineers</li> </ul>							
Focal Area 5.3	Crossing the digital divide	<ul style="list-style-type: none"> <li>· Development of the internet program of water education &amp; information</li> </ul>							
Focal Area 5.4	Institutional development and networking for WET	<ul style="list-style-type: none"> <li>· Access to hydrological and water resources educational expertise within Korea</li> </ul>							

### 1.1.3 Decisions regarding contribution to / participation in IHP-VII

Upon having received the progress report on the seventh phase of the international hydrological programme(IHP-VII, 2008-2013), the Korean National Committee for the IHP decided to prepare the potential contribution and research programme of IHP-VII during the IHP-VI period(2002-2007) based on the proposed concept and structure of IHP-VII as the followings ;

Water Dependencies : Systems under Stress and Societal Responses

Theme1: Adapting to the Impacts of Global Changes on River Basins and Aquifer Systems

Theme2: Strengthening Water Governance for Sustainability

Theme3: Ecohydrology for Sustainability

Theme4: Water and Life Support Systems

Theme5: Water Education for Sustainable Development

Cross Cutting Programmes : FRIEND and HELP

Associated Programmes :

IFI(International Flood Initiative)

ISI(International Sediment Initiative)

PCCP(Water for Peace:From Potential Conflicts to Cooperation Potential)

JIIHP(Joint International Isotope Hydrology Programme)

ISARM(Internationally Shared Aquifer Resources Management)

G-WADI(Global Network on Water & Development Information in Arid Lands)

UWMP(Urban Water Management Programme)

WHYMAP(World Hydrogeological Map)

Focal Areas :

Theme 1 :

Focal Area 1.1 – Global changes and feedback mechanisms of hydrological processes in stressed systems

Focal Area 1.2 – Climate change impacts on the hydrological cycle, and consequent impact on water resources

Focal Area 1.3 – Hydro-hazards, hydrological extremes and water-related disasters

Focal Area 1.4 – Managing groundwater systems’ response to global changes

Focal Area 1.5 – Global change and climate variability in arid and semi-arid regions

Theme 2 :

Focal Area 2.1 – Cultural, societal and scientific responses to the crises in water governance

Focal Area 2.2 – Capacity development for improved governance; enhanced legislation for wise stewardship of water resources

Focal Area 2.3 – Governance strategies that enhance affordability and assure financing

Focal Area 2.4 – Water as a shared responsibility: managing water across geographical and social boundaries

Focal Area 2.5 – Resolving the water and energy nexus

Theme 3 :

Focal Area 3.1 – Ecological measures to protect and remediate catchments process

Focal Area 3.2 – Improving ecosystem quality and services by combining structural solutions with ecological biotechnologies

Focal Area 3.3 – Risk-based environmental management and accounting

Focal Area 3.4 – Groundwater dependent ecosystems identification, inventory and assessment

Theme 4 :

Focal Area 4.1 – Protecting water quality for sustainable livelihoods and poverty alleviation

Focal Area 4.2 – Augmenting scarce water resources, especially in SIDS

Focal Area 4.3 – Achieving sustainable urban water management

Focal Area 4.4 – Achieving sustainable rural water management

Theme 5 :

Focal areas – In line with UNESCO-wide work in this field

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

### **1.2.1 National / local scientific and technical meetings**

Annual regular or many special scientific and technical meetings in the framework of the IHP were held in collaboration with International Hydrologic Environmental Society(IHES), Korea Water Resources Association(KWRA), Korean Society of Civil Engineers(KSCE), ICOLD Korean National Committee (KNCOLD), IWRA Korea Geographic Committee(IWRA-KGC), Korea Federation of Water Science and Engineering Societies(KFWSES), Korea Water Resources Corporation, and other water-related organizations in Korea. In those meetings, national/local hydrologic issues and water resources problems were dealt with special solution measures and their results were published in the form of scientific or technical reports and papers.

### **1.2.2 Participation in IHP Steering Committees / Working Groups**

Republic of Korea was one of most active member countries in IHP Regional Steering Committee's activities for Southeast Asia and the Pacific. Republic of Korean delegates actively participated in the IHP Regional Steering Committee and Working Group meetings held in the period of 2005~2007.

### **1.2.3 Research / applied projects supported or sponsored**

Research projects supported by the Government in the framework of the IHP in the period of 2005~2007 are listed in Table-1. Some other research or applied projects were also supported or sponsored by the Government and other water-related organizations such as Korea Water Resources Corporation during this period.

The following projects have been and are being implemented for the Asian Pacific FRIEND in the three representative river basins chosen as the Korean Asian Pacific FRIEND basins(Pyungchang-gang, Wichun, Bochungchun river basins).

- Basic hydrologic analyses and data collection
- Comparative regional flow regimes analyses
  - Rainfall models and design storm
  - Flood models and design flood
- FRIEND river basin review and selection
- HELP river basin selection and studies

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

The Korean National Committee for the IHP is functioning in the execution of IHP activities in collaboration with the following national and international organizations/or programmes; Korea Water Resources Corporation; Korea Water Resources Association; Korean Society of Civil Engineers; Korean Society of Agricultural Engineers; Korean Meteorological Society; ICOLD Korean National Committee; IWRA Korean Geographic Committee; International Hydrologic Environmental Society(IHES); Korea Federation of

Water Science and Engineering Societies; Korea Institute of Construction Technology; Korean Universities Hydrology and Water Resources Programmes.

### **1.3 Educational and training courses**

#### **1.3.1 Contribution to IHP courses**

The Korean National Committee for the IHP is contributing to the Korean Universities hydrology and water resources courses in the framework of the IHP in which graduate students and engineers are mostly involved with IHP projects and also educated or trained through the formal courses.

#### **1.3.2 Organization of specific courses**

Special workshops and seminars in the field of hydrology and water resources are annually organized by the Korean National Committee for the IHP in collaboration with above mentioned organizations in 1.2.4. In these specific courses, special topics are dealt with practical application in river basins.

#### **1.3.3 Participation in IHP courses**

The Korean National Committee for the IHP has actively been participating in IHP courses which were held in Asia-Pacific regions such as Japan, China and Malaysia by sending highly qualified hydrologists or proper candidates.

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

The Korean National Committee for the IHP had particularly close cooperation with International Center for Water Hazard and Risk Management (ICHARM) under the auspices of UNESCO in its preparatory activities for the establishment during last two years through the participation in workshops and strong support at the UNESCO Council and regional meetings.

### **1.5 Publications**

The Korean National Committee for the IHP is publishing IHP Annual Research Report and the Catalogue of Rivers in Korea every year in the form of Government Publication since 1975. These reports are distributed to all water-related organizations and IHP-KNC members and research results are published on the journals of academic societies or organizations.

Some other technical reports, proceedings of scientific meetings and specific course's materials are also published by the IHP-KNC.

### **1.6 Participation in international scientific meetings**



### **1.6.1 Meetings hosted by the country**

The following IHP meetings were hosted and organized by the IHP-KNC, IHES and Yeungnam University.

- 2005 International Symposium on Hydrological Environment
- 2006 International Symposium on Hydrological Environment(in Sri Lanka)

These meetings were held at the Yeungnam University and Inter-Burgo Hotel, Taegu, Republic of Korea in 2005 and in Sri Lanka in 2006.

### **1.6.2 Participation in meetings abroad**

The Korean National Committee for the IHP actively participated in the IHP Inter-Governmental Council meeting as well as the regional IHP meetings such as Meetings of IHP Regional Steering Committee for Southeast Asia and the Pacific, Asian Pacific FRIEND Project and its workshops, working Group meetings and etc.

## **2. FUTURE ACTIVITIES**

### **2.1 Activities planned until December 2007, foreseen for 2008-2009 and envisaged in the long term**

From the beginning of 2002, IHP-KNC prepared concrete national plan for the sixth phase of IHP and began to implement this plan in Korean river basins. IHP-KNC will also actively continue and participate in the Asian Pacific FRIEND project to complete with successful results for the Southeast Asia and the Pacific.

IHP-KNC will also prepare the potential contribution and research programme of IHP-VII by the end of IHP-VI period(2007) and organize some international and regional activities within this period.

The following international symposium and workshop will be organized until December 2007 as the IHP-VI activities of IHP-KNC.

- 2007 International Symposium on Hydrological Environment
- Korean Workshops of FRIEND, HELP and PUB

# **Country Report On IHP Related activities of Lao PDR**

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#### **1.1 Meeting of the IHP National committee**

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- 1.2.3 Research / applied project supported or sponsored
- 1.2.4 Collaboration with other national and international organization and / or programmes
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#### **1.3. Education and Training Courses**

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- 1.5.1 Meeting hosted by the country
- 1.5.2 Participation in meeting abroad

#### **1.6 Other activities at Regional level**

- 1.6.1 Institutional relation / cooperation
- 1.6.2 Completed and ongoing scientific projects

### **2. Future Activities**

#### **2.1 Activities planned until/December 2008**

## **1. Activities undertaken in the period November 2006-October 2007**

### **1.1 Meeting of the IHP National committee**

#### 1.1.1 Decision regarding the composition of the IHP National Committee

The Lao National Committee for IHP has been not organized but Lao PDR has been UNSCO-IHP-RSC-SEAP member as observer, has nominated Mr. Nitharath Somsanith as IHP Lao PDR.

#### 1.1.2 Status of IHP-VI Activities

Lao PDR (DMH) Plays an important role in coordinating and formulating proposals for research projects and shared the knowledge and experiences to the national organizations.

#### 1.1.3 Decision regarding contribution to/ participation in IHP - VI

### **1.2 Activities at National Level in the framework of the IHP**

#### 1.2.1 National local scientific and technical meeting

-

#### 1.2.2 Participation in IHP steering committees/working groups

Participant attended the UNESCO-IHP Regional Steering Committee Meeting for Southeast Asia and Pacific during 2005-2007

#### 1.2.3 Research / applied project supported or sponsored

-

#### 1.2.4 Collaboration with other national and international organization and / or programmes

- Collect and exchange meteorological and hydrological data in accordance with WMO regulations.

- Provide meteorological and hydrological data, information, forecasts and warning to support activities of various sectors of the community

- Lao PDR is a Member of WMO, ESCAP/WMO Typhoon Committee, ASEAN and the Mekong River Commission.
- DMH participates in the WMO World Weather Information Service, which provides three day weather forecasts of four cities of Lao PDR.
- DMH participates in two new Pilot Projects of WMO RA II
  - Pilot Project on the Provision of City-Specific Numerical Weather Prediction Products to Developing via the Internet.
  - Pilot Project to Develop Support for Developing Countries in Aeronautical Meteorology Programme.
- France and Vietnam had provided equipment and related training.
- VCP of WMO, China, France, Japan, UK had contributed Meteo-telecommunication equipment.

- Japan is currently assisting DMH: Doppler Radar, Satellite ground reception station.

#### 1.2.5 Other Initiatives

None

### **1.3. Education and Training Courses**

#### 1.3.1 Contribution to IHP courses

None

#### 1.3.2 Organization of specific courses

None

Participation in IHP courses

International Workshop for Earth Observation in Water Management Services, 26 – 28 September 2006, Rama garden Hotel, Bangkok, Thailand

### **1.4 Publication**

None

### **1.5 Participation in International Scientific Meeting**

#### 1.5.1 Meeting hosted by the country

None

#### 1.5.2 Participation in meeting abroad

Annual Regional Steering Committee Meeting of the UNESCO-IHP for Southeast Asia and the Pacific

### **1.6 Other activities at Regional level**

#### 1.6.1 Institutional relation / cooperation

None

#### 1.6.2 Completed and ongoing scientific projects

None

## **2. Future Activities**

### **2.1 Activities planned until/December 2008**

- To seek opportunity for organizing National Committee for IHP (LMC-IHP)
- DMH of Lao PDR will attend to implement the water related activities in line with the IHP
- DMH of Lao PDR will attend the annual Regional Steering Committee for Southeast Asia and the Pacific
- The Member of IHP, Lao PDR will participate in the international and national activities of IHP

15<sup>th</sup> REGIONAL STEERING COMMITTEE MEETING  
FOR  
UNESCO-IHP SOUTHEAST ASIA AND THE PACIFIC

**19 - 23 NOVEMBER 2007  
MANILA , PHILIPPINES**

COUNTRY REPORT  
OF  
MALAYSIAN NATIONAL COMMITTEE FOR IHP  
**( NOVEMBER 2006 – OCTOBER 2007 )**

**BY  
DATUK Ir. HAJI KEIZRUL BIN ABDULLAH  
CHAIRMAN  
MALAYSIAN NATIONAL COMMITTEE FOR IHP**

**COUNTRY REPORT 2007  
OF  
MALAYSIAN NATIONAL COMMITTEE FOR IHP**

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    - 1.2.4 COLLABORATION WITH OTHER NATIONAL AND INTERNATIONAL ORGANISATIONS / PROGRAMMES
    - 1.2.5 OTHER INITIATIVES
  - 1.3 EDUCATION AND TRAINING COURSES**
    - 1.3.1 CONTRIBUTION TO IHP COURSES
    - 1.3.2 ORGANISATION OF SPECIFIC COURSES
    - 1.3.3 PARTICIPATION IN IHP COURSES
  - 1.4 PUBLICATIONS**
  - 1.5 PARTICIPATION IN INTERNATIONAL SCIENTIFIC MEETINGS**
    - 1.5.1 MEETING HOSTED BY THE COUNTRY
    - 1.5.2 PARTICIPATION IN MEETING ABROAD
  - 1.6 OTHER ACTIVITIES AT A REGIONAL LEVEL**
    - 1.6.1 INSTITUTIONAL RELATIONS / CO – OPERATION
    - 1.6.2 COMPLETED AND ON-GOING SCIENTIFIC PROJECTS
- 2.0 FUTURE ACTIVITIES**
  - 2.1 ACTIVITIES PLANNED UNTIL DECEMBER 2008
  - 2.2 ACTIVITIES ENVISAGED IN THE LONG TERM

## 1. ACTIVITIES UNDERTAKEN IN THE PERIOD NOVEMBER 2006 – OCTOBER 2007

The Malaysian National Committee for IHP was formed in 1975, and comprises 30 governmental agencies and institutions of Higher Learning as listed in Appendix A.

### 1.1 Meetings of the IHP National Committee

a) The EXCO meetings were held as follows:-

Year 2007      3<sup>rd</sup> July 2007  
in Kuala Lumpur, Malaysia

b) The Annual General Meeting were be held as follows:-

Year 2007      37<sup>th</sup> AGM on 10<sup>th</sup> September 2007  
in Kota Kinabalu, Sabah, Malaysia

EGM on 5<sup>th</sup> November 2007  
in Kuala Lumpur, Malaysia

#### 1.1.1 Decisions regarding the composition of the IHP National Committee

The 37<sup>th</sup> Annual General Meeting held on 5<sup>th</sup> November 2007 elected new EXCOs to serve for another two (2) year term as follows:

- i) Universiti Sains Malaysia, (USM)
- ii) Universiti Tun Hussein Onn Malaysia (UTHM)
- iii) Malaysian Nuclear Agency (MNA)
- iv) National Hydraulic Research Institute of Malaysia (NAHRIM)

The permanent EXCO members are:-

- i) Department of Irrigation and Drainage Malaysia (DID)
- ii) Malaysian Meteorological Department (MMD)
- iii) Department of Minerals and Geosciences (DMG)
- iv) Malaysian National Commission for UNESCO (NATCOM)

MIHP plans its activities through its Executive Committee, and they are carried out by the three standing committees and their working groups. The three standing committees comprise:

- (i) Committee on Research (CoR) under the chairmanship of the Director of Humid Tropics Center, Kuala Lumpur (HTC KL).
- (ii) Committee on Education, Training and Public Information (CoETPI) headed by the University of Technology Malaysia (UTM).
- (iii) Committee on Standardization of Hydrological Practices (CoSHP) headed by the Department of Irrigation and Drainage (DID) Malaysia.

#### 1.1.2 Status of IHP-V and IHP-VI activities

MIHP through its Standing Committee on Research plays an important role in coordinating and formulating proposals for research projects. The members of this Standing Committee consist of engineers and researchers from various government departments, universities and research institutions. Meetings were periodically held to discuss and implement research projects in line with the IHP-VI UNESCO project plan (2002 – 2007).

MIHP Standing Committee on Research has carried out several research projects through the respective lead agencies (*see Table 1*).

### **1.1.3 Decisions regarding contribution to/participation in IHP-VI**

Chairman of MIHP on his capacity as Vice Chairperson of IGC IHP attended the 40<sup>th</sup> Session of the International Hydrological Programme (IHP) Bureau at IHE Institute for Water Education, Delft, Netherlands.

## **1.2 Activities at national level in the framework of IHP**

### **1.2.1 National/local scientific and technical meetings**

Several scientific and technical meetings were organized in association with the Malaysian Hydrological Society, the Water Resources Division of the Institution of Engineers Malaysia (IEM), the International Commission on Irrigation & Drainage (ICID), and the Malaysian National Committee on Irrigation & Drainage (MANCID).

### **1.2.2 Participation in Regional IHP Steering Committee**

The 14<sup>th</sup> RSC Meeting for IHP UNESCO for South East Asia and the Pacific in Bangkok, Thailand from 16 - 20 October 2006 were attended by the Chairman of MIHP, Secretary of MIHP, the Director of HTC Kuala Lumpur and the Assistant Secretary of MIHP.

### **1.2.3 Research projects sponsored**

See Table 2 and Table 3.

### **1.2.4 Collaboration with other national and international organizations/programmes**

1.2.4.1 National Hydrology Expedition and Water Management Awareness Programme for Middle Region of Peninsular Malaysia.  
Collaboration with Ministry of Education, Universiti Teknologi Malaysia, Department of Environment, Forestry Research Institute of Malaysia, Malaysian Meteorological Department and many others.

1.2.4.2 East And South-East Asia Regional Seminar On Flood Hazard Mapping.  
Collaboration with the JICA, ICHARM, HTCKL and DID



### 1.2.5 Other initiatives

MIHP organised the World Water Day 2007 Celebration in collaboration with government agencies, NGOs and private sectors. The activities carried out include national seminar, national exhibition, drawing and coloring contest, Poem Recital Night of Water Scarcity, articles and feature writings in the electronic and mass media (see Table 4).

## 1.3 Educational and training courses

Talks on hydrology and environment to students of secondary schools were organised.

Other educational programmes organised are as follows:

- i) **Sustainable Water Resources Management Seminar and Camp** – MIHP in collaboration with CoETPI and Ministry of Education and in conjunction with 2007 World Water Day Celebration from 11 – 14 April 2007 in Kuala Terengganu organised a Sustainable Water Resources Management Seminar and Camp. It consists of practical activities in hydrology, seminars and educational visit to water treatment plant. About 100 secondary students and 25 teachers from the state of Terengganu participated in this programme.
- ii) **National Hydrology Expedition and Water Management Awareness Programme for Middle Region of Peninsular Malaysia**  
The programme was held from 17 until 20 August 2007 in Kuala Lumpur organised by MIHP in collaboration with the Ministry of Education Malaysia with participations from DID and other government agencies. This programme was participated by 62 students and 15 teachers from secondary schools within the Middle Region (Wilayah Persekutuan, Selangor dan Negeri Sembilan states). New activities which complimented this programme include hydrological expeditions at two main rivers, jungle activities on flora and fauna and field water quality sampling and analysis. This programme received overwhelming response from students and teachers and will be continued in the future activities.
- iii) **Workshop on Preparation of Programme and Activity for Malaysian National Commission for UNESCO (NATCOM) and Permanent Sub-Committees**  
The workshop was organised by the Malaysian National Commission for UNESCO from 26 - 30 June 2007 in Subang, Selangor. The aim of the workshop was to prepare and plan the upcoming programmes and activities for NATCOM for the next two years. Among the topics covered were ASPnet, IHP, Disaster Management and others.

### 1.3.1 Contribution to IHP courses

1.3.1.1 Frequency Analysis for Flood and Drought  
March 2007 | Kuala Lumpur

- 1.3.1.2 Flood Forecasting using Computer Modelling  
April 2007 | Kuala Lumpur
- 1.3.1.3 Hydrological Operation and Application  
June 2007 | Kota Bharu, Kelantan
- 1.3.1.4 River Discharge Calculation using Hydrological Procedure  
July 2007 | Kuala Lumpur
- 1.3.1.5 Flood Forecasting  
August 2007 | Kota Bharu, Kelantan

### 1.3.2 Organisation of specific courses

- 1.3.2.1 **East And South-East Asia Regional Seminar On Flood Hazard Mapping (ICHARM).** The seminar was held for the first time in Kuala Lumpur from 7 – 9 February 2007. It was jointly organised by the Government of Japan and MIHP. The seminar was attended by 18 participating countries and 15 technical papers were presented.
- 1.3.2.2 **Regional Short Training Course on Urban Stormwater Management** will be held from 3 – 7 December 2007 in Kuala Lumpur. It will be organised by HTCKL and UNESCO Jakarta and supported by MIHP, ICHARM, JCUD and other agencies.

### 1.3.3 Participation in IHP courses / seminars

- 1.3.3.1 Participation from MIHP and DID Malaysia in the International Conference on Hydrology and Water Resources Management for Hazard Reduction and Sustainable Development (HRSD 2007) in Manila, Philippines from 19 – 23 November 2007.
- 1.3.3.2 Participation from MIHP for the Seventeenth IHP Training Course “Numerical Prediction of High-Impact Weather Systems” in Nagoya, Japan from 2 – 15 December 2007.

## 1.4 Publications

Publications contributed by MIHP are as follows:

- 1.4.1 The Proceedings of The International Conference on Urban Hydrology for 21<sup>st</sup> Century edited by Dr. Mohd. Nor Desa. The proceedings become IHP–VI – Technical Document in Hydrology No. 1 UNESCO Jakarta Office, 2002 .
- 1.4.2 The Proceedings of The International Symposium on Comparative Regional Hydrology Mission for IHP - VI of UNESCO edited by Dr. Mohd. Nor Desa and became IHP–VI Technical Document in Hydrology No. 1 UNESCO Jakarta Office, 2002.
- 1.4.3 Standardisation of Practices and Techniques of Water Quality Sampling in Malaysia (manual) by CoSHP.
- 1.4.4 The Proceedings of Seminar of Water Resources and Environment – Application of Nuclear and Related Technologies.

## 1.5 Participation in international scientific meetings

### 1.5.1 Meetings hosted by the country

Southeast Asia Ministerial Meeting on Water was held in Putrajaya from 25-27 October 2007. The meeting was also attended by Ministers and Senior Officials in related field from respective countries.

### 1.5.2 Participation in meetings abroad

MIHP Chairman and the acting Secretary attended the 40<sup>th</sup> Session of the International Hydrological Programme (IHP) Bureau at IHE Institute for Water Education, Delft, Netherlands from 13 - 16 June 2007. Datuk Ir. Keizrul Abdullah is currently the Vice Chairperson of IHP Bureau for Asia and the Pacific Region (Group IV).

## 1.6 Other activities at a regional level

Application for a participation programme grant to carry out a project on “River Eco–Expedition” for S.E.A. regional student exchange programme on Hydrological and Environmental Expedition has been re-submitted to the Malaysian National Commission for UNESCO for consideration.

### 1.6.1 Institutional relations/co-operation

None

### 1.6.2 Completed and on-going scientific projects

Refer to Table 2.

## 2. FUTURE ACTIVITIES

### 2.1 Activities planned for 2008 and beyond

- 1) The implementation of the proposed project on “River Eco-Hydrology Expedition for S.E.A. Regional Student Exchange Programme” to be held in 2008 is very much dependent on the availability of financial sponsorship from UNESCO.
- 2) The second “National River Expedition” is planned to be carried forward to 2008 under the sponsorship of MNCU and that other local agencies who are members of the standing committee (CoETPI) will be participating in this event.
- 3) On the Job Training on Flood Forecasting using Modified Tank Model is planned to be held in January 2008 in Kuala Lumpur. It will be organised by DID and the participants for this programme will be selected by the Typhoon Committee Secretariat in Macau.

Other proposed activities are listed in Table 5.

## **2.2 Activities envisaged in the long term**

- 2.2.1 Proposal to establish a UNESCO Chair on Science of Hydrology for this region to define UNESCO’s priorities and strategy in hydrology for a long term.
- 2.2.2 Best Thesis Award for University Undergraduate  
MIHP is in the intention of creating more awareness on hydrology within the university students in Malaysia. The purpose of this programme is to encourage more young generation to have profound knowledge and understanding in hydrology and at the same time honouring those who excel in this field.

**Table 1. Research projects by MIHP/DID under Experimental Applied Research (EAR), IRPA in conjunction with IHP phase VI**

Theme / Focal Area	Title	Status	Agencies Involved	Impl. period	Funding Agency Project Cost
<i>Theme 2</i>					
<i>Integrated Watershed Dynamics</i>					
Focal Area 2.2	a) Development of Runoff Generation and Catchment responses in Forest and Agricultural sites	Literature review - Phase I completed. Purchasing of equipment and installation. Project is already 98.4% completion. Preparing the final report.	UTM, MNA, USM, FRIM, JMG	2004 - 2007	IRPA RM 298,000
	b) Modelling of Convective Rain for Predicting Flash Flood	The modelling is already 80% completed and preparing the results prediction.	UTM		IRPA RM 186,000
<i>Theme 3</i>					
<i>Regional Perspective</i>					
Focal Area 3.1	a) Development of Temporal Pattern for Urban Areas and PMP Derivation for Peninsular Malaysia	Project is completed and preparing the publication in CDROM format.	HTC, MMS	2004 - 2006	IRPA RM 166,000
Focal Area 3.5	a) Detailed Hydrological Balance Study of Paya Indah Wetlands, Selangor	Literature review - Phase I partially completed. Phase II – Study of historical data on rainfall, geological, hydrological, meteorological and topographic maps and flow path between the lakes in the Wetlands is on-going. 75% completion.	HTC, DID, UTM, FRIM, MNA, MMS, JMG	2004 - 2007	IRPA RM 277,00
Focal Area 3.7	a). Development of runoff characteristics to validate Manual Saliran Mesra Alam (MASMA)	Literature review completed. i. Checking data reliability for Kerayong River. ii. Separation of rainfall volume and runoff volume. iii. Determination of hydrograph separation.	USM, DID, MNA KUitTHO, HTC	2004 - 2007	IRPA RM 241,000
	b) Development of Urban Stormwater Management Model (SWMM) and GIS for Decision Support System	i. Development of USM SWMM Main Engine has already completed. ii. Redevelopment of USM tools.	USM, JPS	2004 - 2007	IRPA RM 163,000

**Table 2: Malaysian IHP Research Activities Under IHP Phase VI**

No .*	Title	Status	Agencies Involved	Completion Date	Funding Agency
1. (6.1/6.2)	Effects of Logging on the Muda/Pedu Reservoirs.	Late start of logging activity of modified logging compartment. Continue with hydrological data collection including sediment transport for post-logging assesment.	DID , UPM , UTM , JPSM , MNA , MADA , FRIM , LESTARI , UKM , JPNK , DOA	On going	DID and MADA

\* - Numbers in bracket refers to IHP-V theme and project number

**Table 3: Asian Pacific FRIEND Research Project**

No .	Title	Status	Agencies Involved	Completion Date	Funding Agency
1.	Water Archive	On going	DID	tba	M'sian Govt.
2.	Catalogue of Rivers for South East Asia & the Pacific.	Volume VI completed.	DID	2007	M'sian Govt.
3.	AP FRIEND – IDF Project and Design Flood Project	Preliminary analysis of rainfall data from countries	DID , NAHRIM , UNITEN , HTC , UTM	2007	M'sian Govt.

**Table 4 : Activities Carried Out by Malaysian IHP for 2006/2007  
(from November 2006 - October 2007)**

Item	Activities	Period and Venue	Lead Agency
<b>1.</b>	<b>World Water Day 2007 celebration</b>	11 - 15 April 2007 Kuala Terengganu	MIHP
i.	Launching by The Honourable Datuk Idris Jusoh, Chief Minister of Terengganu.	14 April 2007 Kuala Terengganu	MIHP
ii.	National Exhibition	12 – 15 April 2007 Kuala Terengganu	DID Terengganu
iii.	Drawing and Colouring Contest	15 April 2007 Kuala Terengganu	MOE
iv.	Publicity	During the World Water Day Celebration	Radio & TV Malaysia, local newspapers and bulletin
v.	Open Day of Water Treatment Plant	1– 26 April 2007	JBA / KTAK
vi.	National Seminar on Coping With Water Scarcity	15 - 16 April 2007 Kuala Terengganu	DID / MOA
vii.	Sustainable Water Resources Management Seminar & Camp	11 - 15 April 2007 Kuala Terengganu	CoETPI
viii.	Poem Recital Night – Water Scarcity	13 April 2007 Kuala Terengganu	CoETPI
<b>2.</b>	<b>Courses / Seminars</b>		
i.	East And South-East Asia Regional Seminar On Flood Hazard Mapping (ICHARM)	7 -9 February 2007 Kuala Lumpur	DID / MIHP
ii.	National Hydrology Expedition and Water Management Awareness Programme for Middle Region of Peninsular Malaysia	17 – 20 August 2007 Kuala Lumpur	DID / MIHP
<b>3.</b>	<b>Talks to Secondary school students on Hydrology and Environment Issues.</b>	On going	MIHP Members

**Table 5: Future Activities by Malaysian IHP for 2006 – 2008**

## A) Research

No	Research Title/Focal Area	Project Leader	Co Project Leader	Researches	Remarks
1.	Leachate Problem in Landfills Area - Drainage System of Landfill	Dr. Mohamed Roseli bin Zainal (DID)	En. Ahmad Darus (DID)	En. Mohd Norli Abdullah (DOE)	In the process of writing proposal
2.	Roles of Constructed Wetlands for Storm Water Management	Cik Anita Ainan (DID)	Prof. Madya Dr. Ismail Abustan (USM)	Dr. Zainuddin Othman (Malaysian Nuclear Agency) Dr. Wan Roslan Wan Ismail Pn. Hezrin Haslinda Hashim (HTCKL)	In the process of writing proposal
3.	Threshold of Stormwater Parameters on Hillside Drainage System - Development of Mudflows Warning System	Pn. Norlida Mohd Dom (DID)	Prof. Dr. Roslan Zainal Abidin (UiTM)	Dr. Wan Zakaria Wan Mohd Tahir (Malaysian Nuclear Agency) Cik Norazizah Abdul Kadir (HTCKL)	Will be submitted through UiTM
4.	Even Mean Concentration (EMC)	En. Rodzman Mohamed (DID)	Prof. Madya Zulkifli Yusop (UTM)	Dr. Zelina Zaiton Ibrahim (UPM) En. Muhammad Khairuddin (DID)	In the process of writing proposal
5.	Effectiveness of Erosion and Sediment Control Measures	Dr. Md. Nasir Mohd Noh (DID)	Prof. Madya Zulkifli Yusop (UTM)	Prof. Ruslan Hassan Pn. Janmaizatulriah Jani (UTM)	In the process of writing proposal
6.	Gross Pollutant Trap (GPT)	Ir. Dr. Lariyah Sidek (UNITEN)	Ir. Dr Mohd Nor Mohd Desa (HTCKL)	Prof. Madya Dr. Aminuddin Abdul Ghani (USM)	Approved under UNITEN
7.	Bio- Remediation Media for Storm Water Management	En. Nasehir Khan E.M. Yahya (DID)	Prof. Madya Dr ismail Abustan (USM)	Prof. Madya Zulkifli Yusop (UTM) Dr. Md. Nasir Mohd Noh (DID)	In the process of writing proposal
8.	The Application of X-Moz Controlled Released Block in Drainage System Against Mosquito Breeding.	Dr. Mohamed Roseli bin Zainal (DID)	Puan Mastura Dr. Idayati	Juliana binti Abdullah (DID) Dr. Lee (IMR) Mohd Onn Abdullah (MAGNA SPECTRUM)	In the process of writing proposal



**B) Meeting / Seminar / Conference / Workshop / Talks**

Item	Activity	Period and Venue	Lead Agency	Funding Agency
1	World Water Day 2007	March 2007	MIHP	Government of M'sia
2	Talks on Hydrology to Schools	2006 - 2008 Kuala Lumpur	CoETPI	Government of M'sia
3	Seminars and Workshops on MIHP research projects.	2006 - 2008 Kuala Lumpur	HTC , DID	Government of M'sia
4	National Hydrology Expedition and Water Management Awareness Programme for Middle Region of Peninsular Malaysia	August 2007 DID / MIHP	MIHP-CoETPI	Government of M'sia
5	ICHARM (International Conference on Flood Hazard Mapping)	April 2007 K. Lumpur	MIHP	Government of Japan / MIHP
6	Technical Visit to Universiti Putra Malaysia on Water Sampling and Field Water Quality Analysis Study.	August 2007 Kuala Lumpur	MIHP-CoSHP	Government of M'sia
7	Workshop on Wetland Hydrology	2008 Kuala Lumpur	MIHP-CoSHP	Government of M'sia
8	IRPA Seminar on Urban Hydrological Characteristics of Sg. Kerayong	2008 Kuala Lumpur	MIHP-CoSHP	Government of M'sia

## Appendix A

### CURRENT MEMBERS OF THE MIHP

1.	DID * <sup>1</sup>	-	Department of Irrigation and Drainage (Secretariat)
2.	DOA	-	Department of Agriculture
3.	DOE * <sup>2</sup>	-	Department of Environment
4.	DOF	-	Department of Forestry
5.	EPU	-	Economic Planning Unit
6.	FELDA	-	Federal Land Development Authority
7.	FRIM * <sup>2</sup>	-	Forest Research Institute of Malaysia
8.	DMG * <sup>1</sup>	-	Department of Minerals and Geosciences
9.	MACRES	-	Malaysian Center for Remote Sensing
10.	MMS * <sup>1</sup>	-	Malaysian Meteorological Service
11.	MNCU * <sup>1</sup>	-	Malaysian National Commission for UNESCO
12.	MOA	-	Ministry of Agriculture
13.	MOE	-	Ministry of Education
14.	MOF	-	Ministry of Finance
15.	MOH	-	Ministry of Health
16.	MNA * <sup>2</sup>	-	Malaysian Nuclear Agency
17.	PWD	-	Public Works Department
18.	TNB	-	Tenaga Nasional Berhad
19.	UKM	-	Universiti Kebangsaan Malaysia
20.	UM	-	University of Malaya
21.	UPM	-	Universiti Putra Malaysia
22.	USM * <sup>2</sup>	-	Universiti Sains Malaysia
23.	UTM	-	Universiti Teknologi Malaysia
24.	KUiTTHO	-	Kolej Universiti Teknologi Tun Hussein Onn
25.	UiTM	-	University Institute of Technology MARA
26.	NAHRIM	-	National Hydraulics Research Institute of Malaysia
27.	HTC	-	The Regional Humid Tropics Hydrology and Water Resources Center for Southeast Asia and the Pacific
28.	MHLG	-	Ministry of Housing and Local Government
29.	JBA	-	Department of Water Supply , Ministry of Energy, Water and Communication
30.	MOSTI	-	Ministry of Science, Technology and Innovation

Note: \*<sup>1</sup> - Permanent EXCO Member

\*<sup>2</sup> - Elected EXCO Member

## IHP country report, Mongolia, 2007

### I. Main activities and outputs in 2007:

#### A. In national level:

- Organized and participated numbers of meetings /surface and ground water management, industrial, mining and agricultural water supply, improvement water governance and institution at the national level, water sector legislation and human capacity in water sector of Mongolia/ in development project “Strengthening Integrated Water Resource Management in Mongolia”. April- June 2007. Completed Inception phase of the project on “Strengthening IRBM” and implementation of IRBM in particular basin (Orkhon River) and started the project implementation by Government of Mongolia and Government of Netherlands, financed by Government of Netherlands.
- Participated in Consultation and development UN Joint Program /JP/ in “Water & Sanitation” /UNDP, UNISEF and WHO in Mongolia/ July 2007
- Co-organized international workshop within the “MoMo” project “Kharaa River basin” sponsored by Germany, April 2007
- Developed report “Water loss and sewage system in Erdenet city” northern part of Mongolia. October 2007.
- Participated in Consultation and constructions 8 water treatment units for southern Gobi provinces /aimags/. October 2007.
- Organized Case study report industrial water treatment technology in cashmere factory “Gobi”, August 2007.Ulaanbaatar.
- Developed report “Assessment water supply distribution lines in mining industry “Erdenet” September 2007.
- Participated and presented 2 presentations in International symposium IFOST-2007, Mongolia “Energy and Environment.”
- Organized students tour for “Big dams and hydropower stations in western Mongolia”, July 2007.
- 3 engineer invited by Chinese Hydropower association and shared experience in hydropower technology in China, November 2007.

- Within the MoMo project funded by Germany in Liminei University of Germany 2 master students will be studying from Mongolian University of Science and Technology.
- Organized the Meeting with Japanese professor to exchange and visiting 10 students from Japanese University in Mongolia in March 2008.
- Participated in the project formulation “Integrated water resource management- Lake Baikal”, August- September 2007.
- Conducted and prepared World Bank report in groundwater resource in southern Gobi region for new copper and mining industry /Ouytolgoi and Taban tolgoi mining region/, November 2007. Ulaanbaatar, Mongolia
- Established Organization Committee for 16<sup>th</sup> RSC Meeting for UNESCO-IHP for SEAP in 2008 Ulaanbaatar, Mongolia.
- Trained 3 participants from different water related institutions Mongolia to International training course “Transportation, Sedimentation and Modeling”, UNESCO, Beijing Office, Beijing, China. October 2007.
- Organized Consultative meeting with UNDP, UNISEF and WHO on case study service delivery water supply and sanitation in rural areas Mongolia. UNDP office, Ulaanbaatar, November 2007.
- It is planned to train 40 senior engineers from 15<sup>th</sup> December 2007 – 7<sup>th</sup> January 2008 in Research and Training Center in IWRM.
- Conducted a case study and issued report on “Causes and consequences of drying process in the Ongi River basin, Mongolia” and organized national workshop by Centre of Ecology and Sustainable development, University of Science and Technology,
- National Inventory of water sources was carried out by Water agency, Ministry of Nature and the Environment of Mongolia.
- Ministry of Nature and the the Environment committed to establish river basin council in the Selenge River basin.
- Started implementation of the research oriented MoMo project “IWRM in the Kharaa River basin” in April, 2007, by the Ministry of Nature and the Environment with Government of Germany.
- Participated and organized national Workshop on Integrated River Basin Management in Mongolia, 22-23, March, 2007.
- Proposal National programme on “Conservation of runoff formation zones of river systems and water sources” has been developed by

the National IHP Committee of Mongolia and National Water Committee.

B. Regional and International activities:

- Visit to Netherlands was organized in inception phase project “Development IWRM in Mongolia”, 15-20<sup>th</sup> January 2007
- Participated in International conference “Rainwater management in Asia” Seoul, Korea, March, 2007
- Participated in Regional UN meeting “Decentralization and service delivery implementation MDGs” , Bangkok, Thailand, 16-18<sup>th</sup> October 2007.
- Participated in International Conference on Hydrology and Water Resource Management for Hazard Reduction and Sustainable Development /HRSD2007/ and the 15<sup>th</sup> RSC meeting for UNESCO-IHP for Southeast Asia and Pacific Manila, Philippines. 19-23 November 2007.
- Long-term Water balance experimental study in the Selbe river basin jointly organized by Mongolian (G. Davaa, Institute of Meteorology and Hydrology) and Japanese (Prof. I. Kaihotsu, Hiroshima University) IHP committees, since 2000 till present.
- Planned to jointly conduct and initiate “Ground water monitoring in the Selbe and Tuul river basin” by the University of Tsukuba, Tsukuba, Japan (Dr. M. Tsujimura) and Institute of Meteorology and Hydrology, Ulaanbaatar, in 2008
- IHP, NC, Mongolia was informed on establishment UNESCO Chair in Institute of Geoecology under Mongolian Academy of Science
- Signed Mongolia and Netherland joint project on “Strengthening IWRM in Mongolia” in 2007 -2010
- Have been initiated preparatory activities to organize and host International Symposium, 16<sup>th</sup> SEAP, RSC Meeting, Ulaanbaatar, Mongolia, in 2008.
- Improvement of capacity building in Water sector of Mongolia is ongoing process and 12 students have been trained in various foreign Universities in Netherland, Japan and China and etc;

### C. Presented and prepared papers:

1. "Main aspects and current conditions water and sanitation in Mongolia", IFOST2007, Ulaanbaatar, Mongolia, 3-5<sup>th</sup> October 2007.
2. "Pollution assessment Orkhan-Selenge River subbasin" , International conference, Moscow, October 2007.
3. Presentation on "Technological policy pasture land water supply and reconstruction old irrigation systems in Mongolia", National meeting for "World water day". 22<sup>nd</sup> March 2007. Government house, Ulaanbaatar.
4. G. Davaa, P. Gomboluudev "Climate change impact on water resources and regime in Mongolia", National meeting for "World water day". 22<sup>nd</sup> March 2007, Ulaanbaatar, Mongolia
5. G.Davaa, R.Mijiddorj, S. Khudulmur, D. Erdenetuya, T. Kadota and N. Baatarbileg, "Responses of the Uvs lake regime to the air temperature fluctuations and the environment changes", International CliC symposium, 22-25, Oct., Lanzhou, China

### D. General objectives and Conclusions

- Planning to successfully organize 16<sup>th</sup> IHP Meeting in Mongolia in 2008.
- Improvement capacity building and legal mandate in water sector of Mongolia within the support PP, UNESCO;
- Conduct pilot case studies focused to reveal reasons of changes in hydrological regimes river, lake and glacier systems;
- Improve cooperation in regional and international level, especially for implementation IHP phases;

National Committee for IHP, Mongolia

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**NATIONAL REPORT ON IHP RELATED ACTIVITIES**  
**MYANMAR**

**1. ACTIVITIES UNDERTAKEN IN THE PERIOD November 2006 - October 2007**

1.1 Meeting of the IHP National Committee

1.1.1 Decision regarding the composition of the IHP National Committee

1.1.2 Status of IHP-VI Activities

1.1.3 Decision regarding contribution to/ participation in IHP-VII

1.2 Activities at National Level in the framework of the IHP

1.2.1 National/local scientific and technical meetings

1.2.2 Participation in IHP steering committees/working groups

1.2.3 Research / applied projects supported or sponsored

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

1.2.5 Other initiatives

1.3 Educational and Training Courses

1.3.1 Contribution to IHP courses

1.3.2 Organization of specific courses

1.3.3 Participation in IHP courses

1.4 Publication

1.5 Participation in International Scientific Meeting

1.5.1 Meetings hosted by the country

1.5.2 Participation in meetings abroad

1.6 Other activities at regional level

1.6.1 Institutional relation / cooperation

1.6.2 Completed and ongoing scientific projects

**2. FUTURE ACTIVITIES**

2.1 Activities planned until / December 2007

2.2 Activities foreseen for 2008-2009

# NATIONAL REPORT ON IHP RELATED ACTIVITIES

## MYANMAR

### 1. ACTIVITIES UNDERTAKEN IN THE PERIOD November 2006 - October 2007

#### 1.1 Meeting of the IHP National Committee

##### 1.1.1 Decision regarding the composition of the IHP National Committee

The Myanmar National Committee for IHP (MNC-IHP) has been organized on 24 March 2003 comprising a Chairman, a Vice Chairman, a Secretary and (17) members from 8 Ministries and 2 City Development Committees. The present composition of MNC-IHP is as follow;

Chairman: Major General Thein Swe, Minister for the Ministry of Transport

Vice Chairman: Colonel Nyan Tun Aung, Deputy Minister for the Ministry of Transport

Secretary: Mr. Tun Lwin, Director General of Department of Meteorology and Hydrology

Members: Representatives from departments and committees concerned are as follows;

1. Deputy Minister for the Ministry of Science and Technology
2. Deputy Minister for the Ministry of Agriculture and Irrigation
3. Director General of Directorate of Water Resources and Improvement of River System
4. Professor of Civil Engineering, Department of Yangon Institute of Technology
5. Professor of Civil Engineering, Department of Mandalay Institute of Technology
6. Director General of Irrigation Department
7. Director General of Water Resources Utilization Department
8. Director General of Department of Forestry
9. Secretary of National Commission for Environmental Affairs
10. Director General of Department of Progress of Border Areas and National Races
11. Director General of Department of Hydroelectric Power
12. Director General of Department of Health
13. Professor of Department of Mathematics, Yangon University



14. Vice-Mayor of Yangon City Development Committee
15. Head of Department of Engineering (Water & Sanitation), Yangon City Development Committee
16. Mayor of Mandalay City Development Committee
17. Head of Department of Engineering (Water & Sanitation), Mandalay City Development Committee

Under MNC-IHP, the (5) Working Committees (WC) were organized according to the (5) Themes of IHP-VI. Each working committees consists of (10) members from the member departments and committees. The MNC-IHP normally held one session each for the National Committee (NC) and Working Committee (WC) during 2003-2005. The session could not be hold during 2006 and 2007. But the MNC-IHP will continue to implement the water related activitiec in line with the themes of IHP.

#### 1.1.2 Status of IHP-VI Activities

Activities related to the themes of IHP-VI are implemented by the members of the working committees. The WC prepared the (27) research papers and shared the knowledge and experiences to the other national committee members during 2003-2005.

#### 1.1.3 Decision regarding contribution to/ participation in IHP-VII

MNC-IHP welcome the themes of IHP-VII and will participate with utmost thrust in the implementation of the themes.

### **1.2 Activities at National Level in the framework of the IHP**

#### 1.2.1 National/local scientific and technical meetings

-

#### 1.2.2 Participation in IHP steering committees/working groups

Two participants attended the UNESCO-IHP 13<sup>th</sup> and 14<sup>th</sup> Regional Steering Committee Meetings for Southeast Asia and Pacific during 2005 and 2006

#### 1.2.3 Research / applied projects supported or sponsored

-

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

Myanmar is the member country of EANET (Acid Deposition Monitoring Network in East Asia) since 2005. So Myanmar collaborate with EANET's activities.

#### 1.2.5 Other Initiatives

-

### **1.3 Educational and Training Courses**

#### 1.3.1 Contribution to IHP courses

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#### 1.3.2 Organization of specific courses

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Participation in IHP courses

One participant attended the 16<sup>th</sup> IHP Training Course on Oceanography Basics, Nagoya University, Japan, 26 November to 9 December 2006.

### **1.4 Publication**

-

### **1.5 Participation in International Scientific Meeting**

#### 1.5.1 Meetings hosted by the country

STM-7 (7<sup>th</sup> Senior Technical Manager Meeting) was held on 1<sup>st</sup> to 3<sup>rd</sup> August 2006 at Yangon, Myanmar. This meeting was organized by EANET and DMH.

Myanmar Monsoon Forum (2006-2007) was held on 26-27 April 2007 at Nay Pyi Daw, Myanmar. This forum was organized by ADPC (Asian Disaster Preparedness Centre) and DMH of Myanmar. Mr. Tun Lwin, Secretary of MNC-IHP carried out as the Chairman for this forum. The representatives of MNC-IHP attended to this forum.

#### 1.5.2 Participation in meetings abroad

The Secretary of MNC-IHP is a Permanent Representative of WMO and also Chairman of ADPC , so he has contact and coordinate with WMO's and ADPC's activities.

The representatives of MNC-IHP participated in

- The Second Asian Water Cycle Symposium and GEOSS Symposium on Integrated Observation for Sustainable Development in the Asia-Pacific, Japan, 9-12 January 2007

- The Fourth Session of the Intergovernmental Coordination Group for the Indian Ocean Tsunami Warning and Mitigation System, Kenya, 28<sup>th</sup> February to 2<sup>nd</sup> March 2007
- 5<sup>th</sup> Annual Mekong Flood Forum, Vietnam, 17-18 May 2007
- Fifteenth World Meteorological Congress, Switzerland, 16-25 May 2007
- Eight Senior Technical Manager's Meeting of EANET, Indonesia, 1-3 August 2007
- Fourth Sentinel Asia Joint Project Team Meeting, Philippines, 5-7 September 2007
- Regional Workshop on Innovative Approaches to Flood Risk Reduction in the Mekong Basin, Thailand, 17-19 October 2007

## **1.6 Other activities at regional level**

### 1.6.1 Institutional relation / cooperation

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### 1.6.2 Completed and ongoing scientific projects

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## **2. FUTURE ACTIVITIES**

### **2.1 Activities planned until / December 2007**

-

### **2.2 Activities foreseen for 2008-2009**

- The MNC-IHP will continue to implement the water related activities in line with the themes of IHP
- The members of MNC-IHP will attend the 16<sup>th</sup> Regional Steering Committee for Southeast Asia and the Pacific.
- The members of MNC-IHP will participate in the international and national activities of IHP.

15<sup>th</sup> IHP REGIONAL STEERING COMMITTEE MEETING  
FOR  
SOUTH EAST ASIA AND THE PACIFIC  
MANILA, PHILLIPINES  
(19 – 23 November 2007)

**NATIONAL REPORT OF NEW ZEALAND**

**1. ACTIVITIES UNDERTAKEN IN THE PERIOD OCTOBER 2006 – SEPTEMBER 2007**

**1.1 Meetings of the IHP National Committee**

**1.1.1 Decisions regarding the composition of the IHP National Committee**

Dr Richard P Ibbitt and Mr R J (Bob) Curry continued as Chairman and Secretary respectively on the IHP National Committee during the reporting period. However Mr Bob Curry has, due to his pending retirement, handed over the position of Secretary to Mr Dennis Jamieson with effect from 1 October 2007. Bob would like to take this opportunity to thank colleagues in the RSC for their support and cooperation over the years and wishes the RSC members every success in their continued collaboration towards furthering the IHP goals and aspirations in the region.

Mr Dennis Jamieson, who will be attending the RSC meeting in Manila, has had a long association with South East Asia, beginning with water resources development projects in Northeast Thailand associated with approaches developed at Khon Kaen University in the 1980's, and continuing with other projects in the region over the years.

**1.1.2 Status of IHP-V activities**

The following projects continue to be funded:

- WG 1.1 (Information on New Zealand's Freshwaters: Water Resources Archive);
  - WG 2.7 (Land Use Intensification: Sustainable Management of Water Quality and Quantity);  
and
  - WG 2.8 (Reducing the Impacts of Weather Related Hazards)
- (refer IHP-V Technical Documents in Hydrology No.2 UNESCO Jakarta Office 1999 for details).

While WG 1.1 is an on-going long-term project, projects WG 2.7 and 2.8 have undergone name changes to reflect changes in research direction and the way research projects are now organised in New Zealand. Funding for WG 2.7 now extends to the end of June 2009, while that for WG 2.8 extends to the end of 2008. Both projects are subject to periodic review.

WG 1.1 – "Information on New Zealand's Freshwaters: Climate and Water Resources Archives" was reclassified some years ago as "Nationally Significant Databases" with guaranteed long-term funding. Since reclassification funding levels have been static, and have been eroded by inflation. Although advances in technology and operating efficiencies have offset some of this inflation, both the climate and hydrometric network were operating in a minimal maintenance mode with only essential upkeep, site visits and data downloads being done. Following the increase in funding referred to in last years report, activity associated with the upgrading of recording stations and instrumentation, and the general lifting of standards, particularly those associated with the maintenance of stage / flow ratings at the less stable flow recording stations, has continued.

In 2000 New Zealand started to build a national soil moisture monitoring network. These sites take time to stabilize. The network, including some local government sites, has now reached 60 in total and is increasing, as appreciation of the value of the network is gained, particularly as pressure increases to make better use of limited water available for irrigation.

The year has seen the implementation of NIWA's nationwide data logger and radio/cellular-phone/satellite communications telemetry upgrade project which was designed to replace the ageing Aquitel (1980's) telemetry system and involves the upgrading of about 180 hydrometric stations.

In addition significant reinvestment funding has been assigned to:

- upgrade the general standard of the ageing hydrometric network infrastructure;
- standardise station layouts and instrument configurations;
- station "hardening" (floods & droughts), i.e. making stations more robust to provide better data on flood and low flow conditions;
- the installation of duplicate, but independent "back-up" recording systems (to minimise occurrences of missing record);
- accelerate the conversion from conventional mechanical type current meters to Acoustic Doppler Current Profilers (ADCP); and,
- use hydraulic gauging winches in order to deploy slackline cableways on wider rivers and thus remove gauging personnel from the hazards of gauging rivers from manned cableways and busy highway bridges (important health & safety issues).

In addition the automation / telemetry of a number of key climate stations continues to be implemented. These and other initiatives have enabled a significant increase in the numbers of telemetered climate and hydrometric stations, and this has enabled the provision of expanded near real time data services, while the ease of data input has facilitated the publication of regular bulletins such as "The Climate Update" and "Water Resources Update".

Also from an operational and health and safety point of view, the satellite phones which have been introduced as standard equipment with NIWA field teams have proved their worth on a number of occasions on field campaigns into remote areas. Extremely positive feed-back has been received on the assurance and comfort of having these phones available when working alone in remote field locations. Apart from the health and safety considerations, the phones have proved extremely useful for logistical purposes where no other forms of communication are available.

As a result of the latest review of WG2.8 the funding authority has invited the National Institute of Water and Atmospheric Research (NIWA) to renegotiate future funding for this project rather than require NIWA to write a new proposal for competitive rebidding. While this is good news as it recognizes the quality and value of the work already done, it precludes any funding increase above the present value of the contract, i.e. future work will be eroded by inflation.

### **1.1.3 Decisions regarding contribution to/participation in IHP-V**

Some components of the New Zealand hydrological research programme are aligned with IHP-VI themes in eco-hydrology and sustainable water management. It should be noted that the bulk of hydrological research in New Zealand is funded through the Foundation for Research Science and Technology (FRST), whose mandate is to fund research that is in the national interest. All proposals submitted to the Foundation must therefore demonstrate that results will address national needs, and alignment with IHP themes is possible only to the extent that these themes are relevant to resource management requirements in New Zealand. Additional sources of support (e.g. WMO, internal support from NIWA and other institutes) are important to maintain links with colleagues in the Asia-Pacific region.

## **1.2 Activities at national level in the framework of the IHP**

### **1.2.1 National/local scientific and technical meetings**

Scientific and technical meetings are generally held within the context of professional societies (particularly the New Zealand Hydrological Society) and resource management affairs (e.g.

workshops organized by the Ministry for the Environment under the aegis of its National Agenda for Sustainable Water Management and the governments inter-departmental Water Plan of Action).

The Secretary and Chairman of the IHP National Committee have met regularly to discuss IHP matters.

### **1.2.2 Participation in IHP Steering Committees Working Groups**

The Chairman is a member of New Zealand's UNESCO Science Sub-Commission where he is able to promote hydrological matters at a national level.

Dr Ibbitt and Mr Curry attended the 14<sup>th</sup> RSC meeting held in Bangkok, Thailand and attended the 12<sup>th</sup> Technical Sub-Committee meeting associated with the 14<sup>th</sup> RSC meeting.

### **1.2.3 Research/applied projects supported or sponsored**

None

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

- Sustainable Water Programme Of Action (SWPOA)

The NZ government launched a suite of actions, coordinated through the Ministry for the Environment and Ministry of Agriculture and Forestry in 2006 to:

- Improve the quality and efficient use of freshwater by building and enhancing partnerships with local government, industry, Māori, science agencies and providers, and rural and urban communities
- Improve the management of the undesirable effects of land use on water quality through increased national direction and partnerships with communities and resource users
- Provide for growing demands on water resources and encourage efficient water management through increased national direction, working with local government to identify options for supporting and enhancing local decision making, and developing best practice.

The SPWOA takes a "whole of government approach" to deal with the situation where the existing regulatory environment was struggling to cope with issues such as, water allocation where the available water resources were becoming fully allocated.

IHP activities under IHP-V and capabilities resulting from these activities are being used to inform the process, together with wide-ranging consultation. Specific initiatives under the SWPOA include the development of National Environmental standards for Water Measuring Devices, Ecological Flows and Water Levels, and National Policy statements for Flood Risk Management and Freshwater Management. The above tasks are particularly challenging given they aim to bring consistency to a government system that was devolved to regional authorities some 25 years ago.

- The Chairman and Secretary of the National Committee are in frequent contact with the Regional Hydrological Advisor to the President of the WMO Regional Association V, and with the Hydrological Adviser, Charles Pearson, to New Zealand's Permanent Representative to the WMO. This contact enables coordination of activities under the aegis of IHP and the WMO OHP in New Zealand. Frequent contact is also maintained with SOPAC's Suva based Water & Sanitation Unit, through its role of representing the SW Pacific Island states on water related issues.

- SOPAC – Pacific HYCOS project

A WMO Workshop and launch of Pacific-HYCOS meeting was organised in Brisbane, Australia. This was attended by representatives from all the Pacific Island countries and was a key step in the initiation of the HYCOS project and programme in the Pacific. The project, which is designed to establish and consolidate hydrometric network monitoring in the various countries, and provide capacity building over the next three years, was discussed in detail.

Subsequent meetings were held with the two SOPAC co-ordinators with a view to assisting with the provision of standardised instrumentation and hydrometric recording equipment familiar to the countries, and the establishment of the various pilot networks. A history of the hydrometric activities that NIWA staff had been involved with in Vanuatu, Solomon Islands and Papua New Guinea over the years was provided prior to SOPAC's visit to each country to evaluate their needs. Information on the status of each country's current network operations, its hydrometric database, local staff, and instrumentation purchased in recent years, was provided, along with an assessment of each country's capabilities.

A generic proposal was provided to Ben Parakoti – Chief Water Supply Engineer with the Cook Islands Ministry of Works for instrumentation of an existing catchment under the HYCOS programme. The proposal is to telemeter one of the existing weir sites and two rainfall sites within the catchment. The sites are believed to be within cellular phone coverage of Rarotonga and the near-real time data could be transferred to the SOPAC regional archive via the Internet

- WMO  
Important outcomes of the Brisbane WMO Workshop (Working Group on Hydrology) were support for Pacific HYCOS, initial thoughts for a South East Asian HYCOS and a hydrological training centre (Bandung, Indonesia), and strategic plans and directions for greater coordination of national Hydrological and Meteorological services across the region. The sustainability of the Pacific HYCOS after the initial three years of European Union (EU) funding was recognised as a key challenge.
- Cook Islands Hydrology Network  
Whilst visiting the Cook Islands NIWA staff member (Pete Mason) spent four days working with local colleagues from the Cook Islands Ministry of Works to reinstate the Cook Islands hydrometric monitoring programme which had all but stopped, except for one flow site. While the installations were all fine, the main problems came from a faulty serial port on the back of their borrowed laptop which was used to download data, and logger batteries that had been run so flat that they were unable to be brought back up to charge. A new set of batteries and charger were immediately air-freighted to Rarotonga with SOPAC funding support. All logger batteries were then replaced. A further day was spent gauging the three main river intakes on Mangaia Island with the Director of Infrastructure, Ora Henry. This was the first time any flow gaugings had been done on this island. All data files since the last visit have been processed and updated to the Pacific Islands section of the Hydrometric Database. Since the support funding finished two years ago, there has been a lot of missing record, which is clear evidence that even the simplest of networks will not survive without proper support.

On another occasion a NIWA donated, used Panasonic CF27 laptop was sent to the Cook Islands Ministry of Works after receiving word that the hard drive had failed on their field laptop. This replacement laptop will be used to download all the field loggers until funding can be obtained to buy a new replacement laptop. Two rain-loggers were serviced and also sent as back ups to those already in the field

Such technical advice, assistance and maintenance of equipment service is typical of the type of on-going support required by Pacific Island nations. The level of work required is modest and will contribute to critical decisions about water resource availability and its use. However, such arrangements need to be formalised and funding arrangements made if long term monitoring networks are to survive.

- Samoa hydrometric network upgrade  
A total of 16 Hydrologgers were provided to Samoa via NIWA Instrument Systems, signaling the start of an upgrade of their hydrometric network, facilitated via SOPAC.
- Fiji - Navua & Rewa Flood Forecasting Projects  
NIWA staff (John Fenwick, Marty Flanagan, Martin Robertson) were contracted by SOPAC to undertake an EU funded telemetry and flood forecasting project on the Navua catchment on

the main island of Viti Levu in Fiji. The Navua project involves the supply and installation of telemetered rainfall and river flow monitoring equipment and a flood forecasting system, together with the appropriate training required for the Fiji Public Works Department to operate the system.

Three water-level and rainfall stations were installed and commissioned, as was a fourth rainfall-only station and the main telemetry base station at Suva which was set up to run the Flosys 2 data management software. Remaining work includes a visit to re-set the radio frequencies once these are established at the repeater, setting and/or checking the TDServer/Client data transfer operation (with the broadband connection), refining alarms and the development of the forecasting model after some initial data collection at these new sites.

The Flosys hydrology data collection telemetry system is to be operated by the Hydrology section of the former PWD in Suva. Advanced warnings are to be forecast by running a flood forecasting model developed by NIWA which will be operated by the Fiji Meteorological Service (FMS) in Nadi, and warnings disseminated to the general public by the National Disaster Management Office (NDMO).

On a related project, advice was received from SOPAC that the EU funded flood warning and forecasting project in the Rewa catchment in Fiji has been approved. This proposal is similar to the project already underway for the Navua catchment, with many synergies existing with instrumentation, equipment, installation, flood forecast modeling etc.

- Palau hydrometric network upgrade  
NIWA (John Fenwick) was contracted by SOPAC to undertake the appraisal and reporting on the proposed reinstatement of ex-USGS hydrological stations (8 flow and 5 rainfall) in Palau. A visit to Palau was made to install the Tideda hydrometric database software, provide the data converted from USGS format, and assess the needs for an on-going programme. Most of this work was carried out with the Environmental Quality Protection Board (EQPB). Following the evaluation a senate briefing paper was provided and an evaluation report was prepared detailing the “data rescue” from USGS format to Tideda, and detailing the resource, engineering and hardware needs for re-establishment of the stations and an on-going hydrometric programme for the main island of Babeldoab. Providing the Palau Government finds resources (a staff member), then funding will be available from the EU via SOPAC for the second phase - the upgrade of the network (including equipment procurement and installation) and data management system.
- Papua New Guinea – Ramu River flow monitoring  
A proposal from the PNG Department of Environment and Conservation to SOPAC for a flow monitoring system in the Ramu River has been approved in principle by the EU, and the PNG Water Resources Management Bureau (WRMB) has requested a quotation. This was provided in the form of the above mentioned Pacific HYCOS generic proposal and will be further modified to suit the Ramu case. This project is to monitor the environmental effects of a proposed Nickel and Cobalt mining operation in the lower reaches of the Ramu catchment
- Papua New Guinea – Digitiser acquisition  
An investigation into available digitisers suitable for digitising rainfall and water-level charts was undertaken following a request from the Water Resources Management Branch of the PNG Department of Environment & Conservation. It is understood that SOPAC may fund this acquisition for PNG and possibly other Pacific Island countries. A similar request for a suitable digitiser was received from Sri Lanka showing the emphasis countries are placing on the rescue of old chart record data for archiving on electronic databases.
- Papua New Guinea – Data Rescue  
Following a change of data processing software the PNG Bureau of Water Resources was left without access to much of their early hydrological data. Over the past two years the old data files have been retrieved and been the subject of international collaboration to translate the



data into Tideda format consistent with the current PNG operated hydrological data processing software. The conversion began with the Australian Bureau of Meteorology (Ross James), converting the old files into a text format that NIWA (Richard Ibbitt, Jani Diettrich) with financial support from SOPAC (Llyod Smith) were then able to convert into Tideda format and assemble into a hydrological archive for return to PNG.

- Vanuatu – Data Rescue

Following a change of data processing software the Vanuatu authorities were left without access to much of their early hydrological data. The problem was exacerbated when offices of the Department of Mines, where the data were stored, were recently destroyed by fire. Owing to the foresight of a SOPAC hydrology specialist (Llyod Smith) who visited the offices just before the fire, an electronic copy of the more recent Tideda data was made. Earlier electronic data files held in Noumea were not affected. However, it is understood that most, if not all, paper records were lost in the fire. NIWA (Richard Ibbitt, Jani Diettrich), with support from SOPAC and assistance from Noumea (Geoffroy Wotling) have recently completed conversion of the Excel files into Tideda format, combined the data with the “rescued” Tideda data, and assembled the surviving hydrological data for Vanuatu into a hydrological archive. Copies of the data have been supplied to Vanuatu and SOPAC. This incident is not the first time that hydrological data has been lost to fire in the Pacific region and serves to remind everyone of the need to make back up copies that are stored off-site. NIWA and SOPAC are happy to provide off-site storage facilities for copies of electronic data.

- Republic of Korea Water Resources Association – MOU with NZ Hydrological Society

An MOU between the NZ Hydrological Society and the Republic of Korea Water Resources Association (KWRA) was signed in Wellington on 13 February 2007. Present at the signing ceremony were representatives of both organisations (Prof JaeWoo Song – President, KWRA plus three KWRA delegates, and Paul White & Tim Davies – past and present President, HydSoc), the Korean Ambassador to NZ (His Excellency Joon-gyu Lee), FRST (Anne French), MoRST (Amanda Tomlinson), The Royal Society (CEO – Steve Thompson and Eddie Davis – Manager International). The MOU aims to promote collaboration between the two societies through attendance at annual conferences and exchange of publications. Further to the MOU, in May four NZHS members gave papers at the KWRA annual conference in Gangwon Province, South Korea. In November NZHS will host four KWRA delegates at the NZHS annual conference in Rotorua. Further details on this collaboration can be found at: [http://www.hydrologynz.org.nz/KWRA\\_link.php](http://www.hydrologynz.org.nz/KWRA_link.php)

- Lao PDR – hydrometric data collection reviews

NIWA continued to provide review and analysis of hydrometeorological data collected by the Department of Meteorology and Hydrology (DMH) for the Nam Theun Power Company (NTPC).

### 1.2.5 Other initiatives

#### Diatom invasion - *Didymosphenia geminata*

Concern about the spread of the diatom *Didymosphenia geminata* continues. The alga, which forms massive slimes over riverbeds and which appears to have been introduced by tourist fisherman, is slowly extending its range over South Island rivers and has been declared to be an ‘unwanted species’ in New Zealand because of the way it affects the quality and pristine status of our key trout fishing rivers. MAF has implemented a wide-scale containment strategy: actions have included preparing fact sheets, provision of information on the alga’s biology to regional government agencies, and work to assess rates of dispersal, potential risks, habitat requirements, and border control / disinfection measures.

Trials to test biocides that might be used to control didymo have identified a compound that has proved effective in a trial situation, and which could be used in streams with flows up to 10 m<sup>3</sup>/s and where an economic justification can be shown.

Regional government agencies have been trained to recognize the alga and carry out periodic surveys of their regions. In November 2007 a national survey will be carried out to identify the current extent of the alga.

#### EcoConnect

Eco-Connect is a system aimed at making accurate weather forecasts for environmental forecasting. It uses a meso-scale weather model (NZLAM) run on a super-computer to downscale global weather forecasts with assimilation of satellite data. Forty-eight hour forecasts are produced on a 12 km grid covering New Zealand. Output from the weather model is now input to five calibrated river basin models. Furthermore the operation of the rainfall-to-runoff models has been enhanced by introducing assimilation of hydrological data into each model. This process enables more accurate forecasts as the latest data on the state of the catchments is automatically included in each forecast. Over the past year presentations have been made of the system to many local government agencies responsible for flood warning and also to the NZ Minister of Science and Technology.

### **1.3 Educational and training courses**

#### **1.3.1 Contribution to IHP courses**

None.

#### **1.3.2 Organisation of specific courses**

Courses and workshops are generally organized in New Zealand to meet national needs. Because of the country's relative remoteness and distinctive resource management requirements, courses are not always suitable for participation by people from overseas.

#### NIWA Courses / workshops

Over the course of a year NIWA provide many courses for regional government agencies and their own staff. These cover many topics from general hydrological training to courses on specific topics. For examples of the courses and a full program for the coming year please refer to <http://www.niwascience.co.nz/edu/unitech>.

#### NZ Hydrological Society Workshops

The following workshops were conducted by the NZ Hydrological Society in conjunction with the NZ Association of Resource Management and the Meteorological Society of NZ at their annual joint symposia in Christchurch (ref 1.5.1):

- Uncertainty in model predictions
- How should groundwater be allocated?
- National groundwater Monitoring Programme: water quality with age
- Sustainable nutrient management
- Where to with telemetry?

#### ADCP Training for regional councils

NIWA provided training to several regional councils in the use of Acoustic Doppler Current Profiler (ADCP) instrumentation to measure river flows. This training was provided on a one-to-one basis with individual council staff through an "Envirolink" funding initiative offered by the New Zealand Government to foster technological and knowledge transfer from research institutions to smaller regional councils.

#### Hydrology of Ungauged Basins

A two-day training course on the Hydrology of Ungauged Catchments was attended by 10 Regional Council staff and consultants. The course covered new methods and national data resources to assist in estimating streamflow information (mean flow, seasonal patterns, floods, low

flows) in ungauged catchments. A particular emphasis was placed on using the river network from the River Environment Classification as a method for organising data about rivers.

### 1.3.3 Participation in IHP courses

See 1.3.1.

## 1.4 Publications

Contributions to IHP publications have been principally through the Regional Steering Committee and the Asia-Pacific FRIEND. Other publications related to IHP activities include:

- Mean Annual Low Flow Model  
We have completed development of a new method to estimate mean flows in ungauged catchments (Woods, R. A., J. Hendrikx, et al. (2006), "Estimating mean flow of New Zealand rivers." *Journal of Hydrology (NZ)* 45(2): 95-110.), using a new national rainfall map (Tait, A., R. D. Henderson, et al. (2006). "Spatial interpolation of daily rainfall for New Zealand." *International Journal of Climatology* 26(14): 2097-2115.). Work is now focusing on long series of monthly flow data at several hundred locations throughout NZ.
- The "Climate Update" monthly bulletin  
The National Climate Centre (NCC) has published a further 12 issues (88 to 99) of the monthly circular entitled "The Climate Update". (<http://www.niwa.co.nz/ncc/cu/archive>) This publication summarises each month of New Zealand's climate, including soil moisture and river flows. It also predicts the following three month's climate, soil moisture and river flows, and states how good was the previous month's forecast. Prediction of river flows continue to be used by Greater Wellington Water as input to its water supply planning for summer low flow periods.
- The "Island Climate Update" monthly bulletin  
The National Climate Centre (NCC) has published a further 12 issues (73 to 84) of the monthly circular entitled "The Island Climate Update" (ICU). This NZAID, funded bulletin provides an overview of the present climate in tropical South Pacific Islands and a forward outlook, which continues to be published, and circulated widely throughout the South Pacific. (<http://www.niwa.co.nz/ncc/icu/archive>).

The ICU, produced by NIWA's NCC in collaboration with SOPAC, is a multi-national project with important contributions from the meteorological services of countries around the region. The bulletin provides El Nino/Southern Oscillation and seasonal rainfall forecasts, discusses climate developments each month and provides a tropical rainfall outlook for the next three months and tropical cyclone outlooks during the cyclone season. It also includes an editorial on some topical aspect of relevance and interest to end-users.

NZAID via SOPAC continues to support this activity through 2007 and to focus on climate effects on end users and a more collaborative and consultative approach with the recipient countries.

- "Water Resources Update" bulletin  
The National Centre for Water Resources (NCWR) has published a further 5 issues (19 to 23) of the bulletin entitled "Water Resources Update" (<http://www.niwa.co.nz/ncwr/wru/archive>) This publication summarises seasonal groundwater, river flows, water clarity, water temperature and slime (periphyton) and focuses on a number of topical issues confronting New Zealand scientists.

- Access to climate and water resources information

NIWA has developed a real time environmental data site called EDENZ (Environmental Data Explorer New Zealand) which is available to the public on the web (<http://www.edenz.niwa.co.nz>).

EDENZ provides visitors with near real-time access to Foundation for Research, Science & Technology (FRST) Public Good Science and Technology (PGS&T) funded data that are collected from the NIWA nationwide network of monitoring stations, installed as a component of the Nationally Significant Database programme.

Data on this site are automatically transferred using a national telemetry network and are un-audited. The goal of this programme is to provide comprehensive and accessible data as a basis for improved knowledge on New Zealand's climate and freshwater resources.

The programme collects, stores, and disseminates data from national monitoring networks, and comprises two core nationally significant databases - the Climate Database (CliFlo) and the Water Resources Archive. The data include air temperature, barometric pressure, wind direction, rainfall, lake and river water levels, river flows and sediment loads, and river water quality variables.

A key aspect of the archiving programme is application of stringent quality control procedures ensuring national consistency and providing assurance that data can be confidently used for scientific and planning purposes.

A recent review of NIWA's policy with regard to charging for labour in the provision of FRST funded data from its Nationally Significant Databases (includes climate and hydrometric archives) has been undertaken. As from the 1st July 2007 free access has been provided to all 100% FRST funded climate and hydrological data via the automated web based systems "CliFlo" and "EDENZ" (Environmental Data Explorer New Zealand) located on the NIWA website. This includes all hydrometric data from NIWA owned sites which are fully or partially funded by FRST, the terms and conditions for release of data from jointly funded sites being subject to individual site arrangements with the respective co-funders.

Free access to CliFlo in particular has seen an exponential increase in the use of the data. Usage rates are up by 4.5-fold (> 15 million rows downloaded in July) compared with last years monthly average, and there were ~550 registered users (up > 4 fold). A similar pattern has been observed with the greater use of the hydrometric data around the country.

The change in NIWA policy reflects changes in expectations by NIWA's owner and aligns with the long term position of NIWA personnel that easier access to data provides local, regional, national and international benefits.

## **1.5 Participation in international scientific meetings**

### **1.5.1 Meetings hosted by the country**

#### NZ Hydrological Society Annual Symposium

The annual conference of the New Zealand Hydrological Society, was held from the 20-23 November 2006 in Christchurch, New Zealand with the theme "Resource management under stormy skies: Water allocation @ the crossroads?" The Symposium was run in conjunction with the New Zealand Association of Resource Management and the Meteorological Society of New Zealand

### **1.5.2 Participation in meetings abroad**

- New Zealand was represented at the 14th RSC meeting and scientific conference held in Bangkok, Thailand, 19-20 October 2006 by Dr Ibbitt and Mr Curry.
- Dr R A Woods convened a special session at the American Geophysical Union meeting in December 2006 on the topic of classification and similarity in hydrology.

- Dr Woods attended a PUB workshop on “Model Diagnostics” in Tucson, Arizona, USA in April 2007.
- Drs R A Woods and M P Clark attended the IUGG meeting in Perugia, Italy in July 2007. Dr Clark gave a keynote address while Dr Woods attend the Prediction in Ungauged Basins (PUB) workshop and contributed to the PUB report of the workshop.

## **1.6 Other activities at regional level**

### **1.6.1 Institutional relations/co-operation**

There is considerable contact between New Zealand and other UNESCO Member Countries in the Asia-Pacific region, principally through overseas development assistance and consulting. For example, the Tideda hydrological database management system has been or is being installed in various agencies in Australia, Cambodia, Indonesia, Malaysia, Vietnam, Cook Islands, Fiji, Samoa, Solomon Islands, Papua New Guinea, Vietnam and Vanuatu. Many such contacts have been enabled via the IHP, even though subsequent work has been in the context of bi-lateral assistance.

New Zealand Government Assistance In Development (NZ Aid) recognises the importance of effective water management in efforts to achieve sustainable development in the Pacific and look forward to continuing their engagement in the Pacific Type II Partnership Initiative on Sustainable Water Management.

#### Pacific Island Mentoring and Technical Assistance

NIWA staff were involved in liaising with, and mentoring, of staff of the various water resources agencies in the various Pacific Island nations throughout the year. This involved technical assistance with hardware and software systems and general advice on the installation and operation of hydrometric stations. A proposal is currently being considered by SOPAC / NZ Aid for the funding of this essential activity.

#### Cook Islands Ministry of Works

A request has been made from the Ministry of Works, Rarotonga, to price the construction of another weir and flow station in the large Avana catchment on the eastern side of the island. Also requested were two more automatic rainfall recorders for the top and bottom areas of the catchment. The work is being supported by Geoff Mavromatis, Team Leader of Lincoln International who are coordinating research studies in the same area.

### **1.6.2 Completed and ongoing scientific projects**

None

## **2. FUTURE ACTIVITIES**

### **2.1 Activities foreseen until December 2007**

#### NZ Hydrological Society Annual Symposium

The annual conference of the New Zealand Hydrological Society, will be held in Rotorua, New Zealand from the 20-23 November 2007. The theme for this years conference is “Water and Land”. New Zealand’s water resources are set to come under increasing pressure in the future after a significant growth of water allocation in the last twenty years. Pressure on water resources follows pressure on land use as water quantity and water quality are linked to our use of the land. The conference will be an ideal opportunity to discuss the science and management of water and land resources in New Zealand. The conference will bring together hydrologists, meteorologists and resource managers to present scientific research and debate issues around water and land management.

## NZ Hydrological Society Workshops

The following workshops are scheduled to be run in conjunction with the NZ hydrological Society's annual symposia on 20 November 2007 (above):

- Water Programme of Action & emerging fresh water issues (led by NZ Ministry for the Environment)
- Forest hydrology
- GIS and hydrology
- Water quality and water allocation in the horticulture industry
- Hydrological statistics

## 15<sup>th</sup> Regional Steering Committee Meeting

Attendance at the 15<sup>th</sup> RSC meeting in Manila from 19-23 November 2007 and the associated meetings.

## **2.2 Activities planned for 2008**

Scientific activities planned at the national level are, as explained in Section 1.1.3, within the context of the research programme funded by the Foundation for Research Science and Technology (FRST). A significant proportion of this activity will be in areas that are included within the IHP, but is not explicitly implemented as a component of the IHP.

Future activities are expected to depend very much on decisions reached by the Regional Steering Committee, and we are committed to participate in its deliberations, with the intention of being involved in future scientific work at the regional level.

### NIWA Courses

Further training courses for regional council and NIWA staff will be provided as follows:

- Hydrological data collection
- General environmental data logging
- Hydrological statistics
- ADCP flow measurements
- Advanced flow regime analysis

For a full list of courses refer to <http://www.niwascience.co.nz/edu/unitech>

These courses are also open to overseas participants.

### Snow and Ice Monitoring Network

A new project, funded from NIWA's Strategic Capex Fund, has been initiated this year for the establishment of a snow and ice monitoring network to measure snow depth and mass, glacier thickness and meltwater outflow, and high-elevation climate data.

Snow and ice are New Zealand water resources that are likely to be subject to significant change over the next 20-100 years, depending on the pace of global climate change. Such changes will have significant impacts on the hydro-electricity, agriculture and tourism/skiing industries. The changes are likely to be increased rainfall and temperature, leading to possibly less snow and more rain, more river flow and less snow cover in winter, and possibly less river flow in spring. These projected changes in the amount and seasonal pattern of river flows have not been quantified in detail, and remain research questions. Such changes would be desirable for electricity generation (assuming current demand patterns are unchanged), but undesirable for irrigators and tourism/skifield operators.

In the first year of development of the NIWA Snow and Ice Monitoring Network, 3 lower elevation sites were established. These were located on existing infrastructure at Mt Cook (730m), Arthur's Pass (620m) and at the Chateau at Ruapehu (1120m). This year the plans are well underway for

the establishment of several high elevation remote alpine stations (elevation ranges from 1200-2400m) in various parts of the New Zealand mountains. Once established these sites will provide valuable real time observations of alpine climate, snow and ice in New Zealand. Besides the regular monitoring a field data campaign was held in September. During this campaign extensive measurements of snow density and depths were made in the Jollie catchment to improve process understanding and spatial variability.

#### Hydrological support programme proposal for the Pacific

During the 1<sup>st</sup> course of the Pacific Islands Hydrological Training Programme held in Suva in April/May 2004, it was identified that major constraints to effective operation for most countries were skills shortages, failure of equipment, inadequate resources for repair and servicing of instruments, and the lack of funds for software purchase and maintenance. These constraints were further evident during the 2<sup>nd</sup> and 3<sup>rd</sup> courses which were held in Suva during April / May 2005 and June 2006. It is obvious that many of these constraints have a massive negative effect on the availability of information on water in Pacific Island countries – but that they are individually minor issues that could be resolved by some carefully targeted, practical training and “collegial” support.

A project whereby NIWA provides hydrological database software maintenance, instrument and equipment repairs and maintenance, database management support, and an in-country technical colleague mentoring and a year-round technical support service, has been proposed jointly with SOPAC in collaboration with the National Hydrological Services (NHS's) in the Pacific. NZAID have indicated its support for such a programme which will provide continuity of assistance to NHS's and complement parallel bilateral water resources based aid projects. NZAID support is still to be finalised pending assessment of the need that is being carried out by the Pacific HYCOS implementation personnel. In the meantime the HYCOS program is providing some support so that a partial service can be maintained.

### **2.3 Activities envisaged in the long term**

Continuation of the:

- NZAID funded Pacific Hydrological Training Programmes as required;
- NZAID funded monthly “Island Climate Update” publication with stronger links to end users.
- Monthly NZ “Climate Update” publication.
- Periodic “Water Resources Update” publication.

Commencement of the formal Pacific-wide hydrological support programme (if approved), as outlined in Section 2.2 above.

15<sup>th</sup> IHP REGIONAL STEERING COMMITTEE MEETING  
FOR  
SOUTH EAST ASIA AND THE PACIFIC  
MANILA, PHILIPPINES  
(19 – 23 November 2007)

NATIONAL REPORT OF PACIFIC ISLAND COUNTRIES

by

**Taboia Metutera**  
**CEO Public Utilities Board**  
**Kiribati**

**INTRODUCTION**

The Pacific Island Countries (PIC) Cook Islands, Federated States of Micronesia, Fiji, Kiribati, Marshall Islands, Nauru, Niue, Palau, Papua New Guinea, Samoa, Solomon Islands, Tokelau, Tonga, Tuvalu, and Vanuatu are members of UNESCO.

The 11<sup>th</sup> meeting of the Regional Steering Committee for Southeast Asia and the Pacific (RSC) convened in Fiji 2003 enabled the participation of representatives from many PICs and resulted in the admission of the Pacific Island Countries as new members to the RSC.

It also marked the culmination of several years of dialogue and cooperation between SOPAC, UNESCO and WMO on hydrology and water resources activities and provided an excellent opportunity to further advance regional cooperation within the Pacific and establish linkages to partners in the Southeast Asia region. Since the 11<sup>th</sup> RSC Pacific Island Countries have participated in UNESCO's meetings on a rotational basis. The Pacific is represented by Kiribati at the 15<sup>th</sup> RSC held in Manila, Philippines, 19-23 November 2007.

**Mr. Filipo Taulima - a friend and a colleague**

Mr. Filipo Taulima had been Tuvalu's Director of Public Works for more than 10 years. He was a member of Tuvalu's Water and Sanitation Committee and the National Development Coordinating Committee. Mr Taulima was also Focal Point for the International Hydrological Programme for Tuvalu.

There are no words to express our shock and sorrow on hearing the sad news about the sudden death of a friend and colleague, Mr Filipo Taulima, Director, Public Works Department, Tuvalu. Not only was Filipo a dedicated champion for managing water resources for Tuvalu, he was also a strong regional advocate for this cause as well acting as a focal point for several regional initiatives including the Pacific Hydrological Cycle Observing System (HYCOS) and the Sustainable Integrated Water Resources Management Project in Pacific Island Countries (IWRM Project) projects to name a few.

We remember fondly our last moments with Filipo at the launch of the Pacific-HYCOS project in Brisbane and also at the 2nd Steering Committee Meeting of the IWRM Project in Nadi in April 2007 where he once again showed his strength of character and understanding of the needs for Tuvalu and the region. He will be dearly missed by his friends and colleagues in the region. May he rest in peace and may his family and friends find the strength to cope with his sudden passing.



## **1. ACTIVITIES UNDERTAKEN IN THE PERIOD OCTOBER 2006 – SEPTEMBER 2007**

### **1.1 Meetings of the IHP National Committees**

#### **1.1.1 Decisions regarding the composition of the IHP National Committee**

During RSC11 it was generally agreed that there was value in continued collaboration between water resources managers and hydrological scientists from the Pacific and Southeast Asia and this could be facilitated by the creation of an IHP focal point in each Pacific Island Country through the National Hydrological Service.

The proposal to represent the region in future RSC's and associated conferences on a rotational basis was accepted. Requirements for the chosen country delegate are presentation of the region's activities relevant to the RSC and presentation of a scientific paper at the associated conference.

The order of representing countries was discussed and by ballot the countries will be approached for attendance in the following order: Niue; FSM; Cook Islands; **Kiribati**; Fiji; Vanuatu; Solomon Islands; Nauru; Tonga; Marshall Islands; Samoa; Tuvalu; Palau. The countries that were in attendance at the 11<sup>th</sup> RSC meeting got the privilege to start the sequence. When more than one country can be invited, the list will automatically drop down to the next country.

Letters were sent in April 2004 from SOPAC and UNESCO Apia Office to seek nominations of IHP focal points and a deputy and to date confirmations from 10 countries were received.

It was proposed that future involvement and correspondence regarding Pacific contributions to the International Hydrological Programme (IHP) of UNESCO and the Hydrology and Water Resources Programme of SOPAC be dealt through the IHP focal point. In order to keep UNESCO, WMO and SOPAC informed, all correspondence will be copied to each respective national representative – in the case of UNESCO, the UNESCO National Commission.

The harmonization of these three programmes will greatly benefit the efficiency and effectiveness of delivery into the PICs. This has been demonstrated by the collaboration on the WMO/UNESCO/SOPAC Hydrology Training Programme, which was completed this year through support provided by NZAID.

Actions supported under this partnership include studies on floods and droughts in the region, involvement of communities in catchment management and monitoring, Hydrology for the Environment, Life and Policy (HELP), integrated water resources management, and activities under the Hydrological Cycle Observing System (HYCOS) programme.

We are grateful to the IHP RSC and UNESCO for the recognition given to the Pacific region by allowing representation of Pacific Island Countries in future RSC meetings and activities.

#### **1.1.2 Status of IHP-VI activities**

Based on earlier UNESCO and SOPAC meetings held in 1994 and 1997, a number of water resources projects were identified as Pacific priorities under the International Hydrological Programme. These included:

- projects on catchments and communities;
- groundwater recharge;
- groundwater pollution by sanitation.

An ENSO workshop in September 1999 identified drought assessment in the Pacific as an additional priority. Funding from UNESCO in 2002 enabled the start of the Catchment and Communities project in Vanuatu executed by the Directorate of Geology, Mines and Water Resources (DGMWR) in collaboration with NIWA (New Zealand) and SOPAC. One of the catchments in Vanuatu has since been adopted as one of the basins within UNESCO's Hydrology for the Environment Life and Policy project (HELP) network.

A UNESCO HELP workshop organised in New Zealand in November 2005 (see below) resulted in the publication of the *HELP Framework for Action in the context of the Pacific Regional Action Plan on Sustainable Water Management*, linking Pacific activities under the HELP programme with the overarching framework for water resources management in the Pacific.

Major IHP activities during the current year include the provision of assistance to the Government of Niue for the development of water resources legislation, and support to the Government of Fiji for the development of an integrated water resources management framework in the context of the HELP programme for the Nadi River Basin in Fiji.

UNESCO also supported (ground)water management and monitoring projects in Niue and the Solomon Islands through a Participation Programme grant, and contributed to water resources activities relating to the Man and Biosphere programme in FSM, public awareness and education activities in Samoa, and groundwater monitoring in the Cook Islands.

### **1.1.3 Decisions regarding contribution to/participation in IHP-VI**

-none-

## **1.2 Activities at regional level in the framework of the IHP**

### **1.2.1 National/local scientific and technical meetings**

-none-

### **1.2.2 Participation in IHP Steering Committees Working Groups**

-none-

### **1.2.3 Research/applied projects supported or sponsored**

#### Niue receives UNESCO assistance for Water Legislation

Following Niue's attendance at the 12<sup>th</sup> RSC meeting of the International Hydrological Programme, Niue's Department of Water Works received confirmation of support by UNESCO for a groundwater monitoring programme.

The objectives of the programme are, besides the establishment of a **groundwater resources assessment and monitoring programme**, to obtain a clear understanding of the hydrogeology of Niue, to determine possible and potential contamination of the groundwater from land-based activities, to adopt effective measures to address the vulnerability of the freshwater supply during natural disasters such as droughts, to assist in establishing Government approval of a Water Resources Regulation that legalises and enforces the Water Resources Act of 1996, and to develop effective education and awareness programmes for communities in protecting the island's main water source from contamination and include these in school curricula.

The results of the groundwater assessment and monitoring programme will be disseminated to other Pacific Island Countries, specifically to benefit other uplifted limestone islands such as Nauru, Kiribati (Banaba) and Tonga. Potentially, a publication on the project could be developed as contribution to the IHP.

Drilling in Niue commenced in October 2005 accompanied by a geophysical survey, water quality monitoring and the installation of the first borehole loggers.

A project is currently under implementation supported by the UNESCO Offices in Jakarta and Apia and SOPAC for the development of a legal framework for water resources. The main objectives of this project are as follows:

1. Review current Niue Water Resources Act 1996 and Water Resources Regulations 1996
2. Provide the Government of Niue with draft documentation highlighting proposed alterations to current Water Resources Act and Water Resources Regulations, ensure appropriate linkages to other existing Acts and Policies
3. Prepare in consultation with the Government of Niue an amended draft Water Resources Act and draft Water Resources Regulations.
4. Identify impediments to approval of the Water Resources Act and Water Resources Regulations in consultation with The Government of Niue.
5. Facilitate stakeholder meetings to assist in the review of the revised draft Water Resources Act and draft Water Resources Regulations, and provide recommendations from stakeholder

- meetings to draft a document to assist with Cabinet approval of the Water Resources Act and Water Resources Regulations.
6. Submit draft the Water Resources Act and Water Resources Regulations to Government of Niue and the Crown Law office for review, and endorsement of Water Resources Act and Water Resources Regulations by Cabinet

For more information on the groundwater monitoring programme please contact Andre Siohane, Director of Water Works ([waterworks@mail.gov.nu](mailto:waterworks@mail.gov.nu)).

#### New HELP initiative in Fiji: The Nadi River Basin

As a follow-up action to the Pacific HELP Symposium, Landcare Research Ltd. has been working closely with the Fiji Department of Land and Water Resources Management on the development of the Nadi River catchment on the island of Viti Levu as a UNESCO HELP Basin, and on the integration of these efforts with relevant regional activities to secure sustainable funding for the site. The initiative includes the following components:

1. Visits by Landcare Research Ltd. specialists to the Nadi River Catchment and Suva to meet with key stakeholders and government departments for consultations on the development of the project
2. Complete the application for the Nadi River Catchment to become a candidate basin within the global UNESCO-HELP network (Hydrology for the Environment, Life and Policy and is a network of 77 global catchments sharing information about Integrated Water Resource Management, (IWRM))
3. Development and completion of a whole catchment IWRM proposal to be integrated into the GEF-IWRM project
4. Identification of potential funding sources for further development of the Nadi River Catchment
5. Assistance and suggestions to the Government of Fiji and SOPAC for the completion of the GEF IWRM project application

#### Solomon Islands receives UNESCO Participation Programme Grant for Water Monitoring

In 2005, funding was made available to the Department of Mines & Energy of the Solomon Islands from UNESCO's Participation Programme. The Contribution from the 2004-2005 Biennium covered the purchase of hydrological equipment for water resources assessment for water supplies and hydropower. The grant was also used to raise awareness on water related issues.

The equipment purchased from NIWA and DATAFLOW New Zealand comprises water level recorders, rainfall gauges and streamflow equipment for low flow and high flow gauging. The equipment will assist the Water Resources Division to install hydrological monitoring stations at priority sites in the Solomon Islands. The UNESCO funding addresses an important need of the Solomon Islands Water Resources Division which has been severely lacking hydrological equipment over the past years.

#### World Water Day

This year's World Water Day was dedicated to better managing water resources. SOPAC and Live and Learn Environmental Education organised another Pacific World Water Day campaign on 22 March 2007. With the slogan "Our Islands with Water", the Pacific's pledge fitted well with the World Water Day theme "Coping with Water Scarcity". It challenges the Pacific to better manage its current water resources in terms of usage, access, supply, demand and quality and responsibility.

Globally, water use is increasing at more than twice the rate of population growth, and more people than ever are learning first-hand about coping with water scarcity. Scarcity could mean an absolute shortage of water or lack of access to safe water supplies. Both SOPAC and Live & Learn developed awareness materials comprising student activity booklets and stickers.

These materials have been distributed throughout the Pacific region to encourage the observance of World Water Day with financial support from the Trade Mission of Taiwan. The UN System's marking of World Water Day 2007 was coordinated by FAO.

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

##### Australia Water Research Facility

A project on Catchment-based risk assessment research is being carried out by the Australia Water Research Facility (AWRF) in the Solomon Islands. It aims to develop a framework determining priorities for water resource management actions in catchments.

Water resource managers face numerous constraints around ownership of the resource, financing, lack of awareness, poor legislative frameworks and limited technical capability. Managers must choose the most effective actions for greatest benefit with limited information. Recent activities in developing the Water Sector Steering Committee and the efforts of the Solomon Islands Water Governance Program provide a foundation for an integrated analysis of issues affecting catchment management. The Environmental Health Division from the Ministry of Health, the Water Resources Division from the Ministry of Natural Resources, and the Solomon Islands Water Authority are currently engaged in this sector wide approach.

A recent analysis of priorities for the water sector by the SOPAC administered Solomon Islands Water Governance Program identified in January 2006 four key pilot areas for attention: policies; legislative framework; creating and organizational framework; and awareness. At a recent study visit to Samoa for the same program, water shortages in catchments, a lack of data, and awareness were raised as key priorities.

For more information on the Australia Water Research Facility, please see [www.watercentre.org](http://www.watercentre.org)

##### Island Climate Update

The Island Climate Update (ICU) continues in its 7<sup>th</sup> year as a multi-national and multi-organisational monthly climate bulletin with a primary goal of assisting Pacific Island Countries (PICs) in making informed planning and management decisions relating to climate-sensitive sectors through the provision of timely and accurate seasonal climate predictions. It is published monthly both in print and online by the National Institute of Water and Atmospheric Research (NIWA) in New Zealand and is funded by the New Zealand Agency for International Development (NZAID).

Much of the project's success to date has depended on the multi-national collaboration by all participating partners especially concerning access to historical and real time climate data and expert advice from Pacific National Meteorological Services (NMS) and climate research institutions in the region. In early 2006, the first review of the ICU was carried out. Three key recommendations emerged:

1. continue production of a regional climate prediction bulletin;
2. continue strengthening collaborations with end users and strengthen ties to other users;
3. strengthen and expand critical partnerships with regional partners and programmes.

A follow-up review will be conducted by the 3 coordinating agencies (SOPAC, SPREP and NIWA) from July through to September 2007. Some of the information we hope to find out through this survey includes:

- o changes (if any) in audience
- o readers' response to ICU products and services
- o readers' response to improvements made since the first review
- o change in relationship/interaction between primary and secondary users

The ICU project is one of the regional initiatives in support of the Pacific Hydrological Cycle Observing System (HYCOS) project by providing climate forecasting information for its drought and flood forecasting components.

For more information on the Island Climate Update, please see [www.niwa.co.nz/ncc](http://www.niwa.co.nz/ncc)

##### Pacific HYCOS

Pacific HYCOS, a regional initiative to improve the management and protection of Pacific Island Countries' freshwater resources held its first Steering Committee meeting in Brisbane on 17 April 2007. The project was

launched in conjunction with a workshop on flood and drought forecasting hosted by the Australian Bureau of Meteorology (BOM) and organised by the World Meteorological Organization (WMO) and SOPAC. UNESCO and the Fiji Meteorological Office are Associate Partners in the Pacific HYCOS project.

The launch was attended by the focal points from the participating 14 countries, with representatives with WMO Geneva, NIWA, the Regional Association V Working Group on Hydrology members, and SPREP. The launch also hosted the first steering committee meeting with participation by all attendees. Some of the components of the project were discussed, including flood forecasting, groundwater monitoring, drought forecasting, and databases and information sharing. Also discussed was the workplan of the project with feedback from the participating countries on their needs as to how the project could help them.

The Steering Committee suggested appropriate linkages to be made to other global observation systems and regional capacity building programmes such as the Pacific Islands Global Ocean Observing System (PI-GOOS); the Pacific Islands Global Climate Observing System (PI-GCOS); and the AusAID-funded Pacific Island Climate Prediction Programme (PI-CPP), as well as discussed the information to be shared with the Steering Committee on bi-annual basis.

### Reducing vulnerability of water services in the Pacific

The Global Research Alliance (GRA) and the Australian Commonwealth Scientific and Research Organization (CSIRO - Australia's national science agency) are bringing together local stakeholders, funding agencies and experts to address the issue of vulnerability of water services in the Pacific.

This is done in a stepwise process with the main components being a Delphi consultation, which will be followed by a workshop. The Delphi consultation, which is email based, engages about 45 participants from around the world, including a number of major funding agencies, as well as representatives from countries such as Kiribati, Samoa, Tonga, Cook Islands, Papua New Guinea and Tuvalu. Via an iterative process, different panels have identified the following as the most important issues:

1. Experts: Appropriate technology: innovation, selection and uptake
2. Local stakeholders: Adjusting services to local contexts
3. Funding agencies: Ownership issues
4. GRA: Community participation

It has also been acknowledged that solutions depend on the context and that there is no one single solution for all nations, but rather a wide range of inter-related issues that need to be addressed, within a particular context. This reinforces the need for IWRM. As an output of this project, solutions to meet the needs of individual nations or groups of nations are anticipated.

To this end, subsequent to the Delphi consultation, a workshop is planned where participants will aim at taking the issues developed in the Delphi consultation forward as fully funded projects. Originally scheduled for September 2007 but postponed due to unavailability of several key partners, the workshop is now tentatively scheduled for February 2008.

For more information, please see [www.csiro.au](http://www.csiro.au) and [www.research-alliance.net/](http://www.research-alliance.net/).

## **1.2.5 Other initiatives**

### Pacific Dialogue on Water and Climate

The **Pacific Resource Centre on Water and Climate** has been established at the SOPAC Secretariat. The Centre, supported by the Asian Development Bank (ADB), will continue to assist in achieving the goal of the Pacific Dialogue on Water and Climate: "to improve the capacity in water resources management to cope with the impacts of increasing variability of the world's climate, by establishing a platform through which policymakers and water resource managers have better access to and make better use of information generated by climatologists and meteorologists".

The Centre has established a Pacific Water and Climate Focal Group, promoted implementation of the Pacific Hydrological Cycle Observing System (HYCOS) project, promoted South-South transfer of knowledge through the Caribbean-Pacific Joint Programme for Action on Water and Climate, and disseminated relevant Case Studies on Water & Climate.

For more information, please see:

[www.sopac.org/tiki/tiki-index.php?page=Pacific+Resource+Centre+on+Water+and+Climate](http://www.sopac.org/tiki/tiki-index.php?page=Pacific+Resource+Centre+on+Water+and+Climate)

and

[www.waterandclimate.org/home.html](http://www.waterandclimate.org/home.html)

### Climate Predictions for Pacific Island Countries

The Australian Bureau of Meteorology (BOM), in collaboration with a number of partners, is implementing an AusAID-funded project entitled “**Enhanced application of seasonal climate predictions in Pacific Island Countries**”.

The project aims to develop the seasonal prediction capacity in Pacific Island Countries, similar to the Australian Bureau of Meteorology, so that the National Meteorological Services (NMSs) have the ability to perform seasonal predictions, or at least have access to predictions specifically tailored to their region/country.

The project commenced in mid-2003 in the nine participating Pacific Island Countries: Fiji, Cook Islands, Vanuatu, Samoa, Tonga, Niue, Solomon Islands, Kiribati and Tuvalu. It is scheduled to be completed in 2007.

The project consists of four parts:

1. Development and installation of PC-based climate prediction software;
2. Training of NMS personnel in the use of the climate prediction software and the establishment of a climate prediction service;
3. Facilitation of linkages between NMS staff and clients making climate sensitive decisions; and
4. Training of clients in the effective and prudent use of prediction information.

[For more information, please see www.bom.gov.au/climate/pi-cpp/index.shtml](http://www.bom.gov.au/climate/pi-cpp/index.shtml)

### Pacific Programme for Water Governance

SOPAC through the EU funded Pacific Programme for Water Governance (PFWG) provided support to in-country consultations held in three pilot countries (Fiji, Solomon Islands and Kiribati). The PFWG supported the establishment and strengthening of National Water Committees and the development of a strategy in each pilot country to address institutional arrangements for water resources management.

In Fiji, the PFWG supported the National Water Committee in developing a draft national water policy and proposals for: a national water strategy; a National Council with public-private stakeholders; a water resources legislation covering water rights and allocation and a definition of responsibility for water management at Ministerial level and in administration; as well as a mechanism for water resources information coordination.

In the Solomon Islands, the PFWG assisted in: the preparation of a National Water Policy which describes both water resources and services; a proposal for a monitoring and implementation programme; and a draft legislation that covers water rights, licensing of water development and protection of catchments and water bodies.

In Kiribati the PFWG initiated a process for: the re-establishment of a National Water and Sanitation Coordination Committee run under the Strategic National Policy and Risk Assessment Unit in the Office of the President; the drafting of a National Water and Sanitation Policy and a 10 yr Water and Sanitation Plan; as well as developing a proposal for activities to be considered under the European Union's EDF10 programming.

### Pacific Water Safety Plans

The Pacific Water Safety Plans (WSP) Programme is a joint initiative of the World Health Organization (WHO) and SOPAC. It focuses on promoting a risk management approach for the provision of safe water supply in Pacific Island countries through piloting Water Safety Plans in four pilot countries (Tonga, Vanuatu,

Cook Islands and Palau). The program is funded under AusAID's Water Quality Initiative is jointly implemented by SOPAC and WHO. The New Zealand Ministry of Health, through its Pacific Island Countries assistance programme under NZODA funding, is providing in-kind support to the WSP programme to strengthen the technical aspects of the programme by providing Drinking Water Assessors as technical experts. Training was provided on Water Safety Planning and Water Safety Plans were developed for urban and rural water supply schemes as well as associated improvement schedules in the four pilot countries. It promoted an inter-sectoral approach by integrating water sector and health sector/hygiene issues through a focus on health education which is a key element of the program. Public awareness programmes were conducted by in-country NGOs and IEC materials were produced. Replication of Water Safety Planning is underway in Fiji, Solomon Islands and Samoa and a follow-up phase is being considered by AusAID to allow for further replication in other PICs and support the actual implementation of Water Safety Plans in the pilot countries.

#### Pacific Water Demand Management Programme

SOPAC and the Pacific Water Association (PWA) are implementing the NZAID funded Pacific Water Demand Management Programme in five pilot countries (Niue, Cook Islands, Solomon Islands, Marshall Islands and FSM). The purpose of the project is to improve the capacity for water demand management in Pacific urban water utilities. In partnership with Wide Bay Water Corporation (WBWC) sub-regional workshops were held in Rarotonga, Cook Islands and Pohnpei, FSM and in-country support was provided to establish System Loss Management Plans in each of the pilot countries. The programme will assist the pilot countries to acquire both "hardware" such as water meters, leak detection equipment or bulk water-saving devices for incentive or rebate schemes, as well as "software" which would include training, community education materials and technical expertise.

#### Water Quality Monitoring Capacity Building

SOPAC, the World Health Organization (WHO) and the Institute of Applied Sciences of the University of the South Pacific (IAS-USP) are implementing the NZAID-funded Water Quality Monitoring Capacity Building (WQM) Programme in four pilot countries (Cook Islands, Niue, Marshall Islands and Vanuatu). The objective of the WQM programme is to build sustainable national capacity for monitoring the quality of water (drinking, surface, ground and coastal). The key principles of the programme are to: build local capacity to monitor the quality of water through addressing the priority problems related to water quality assessment and management; supply (where needed) some basic water quality monitoring equipment; provide laboratory training on analysis techniques and proper management of data; and develop proper water quality monitoring programmes and standards. Regional training has been organised for all Pacific Island Country laboratory technicians and these were held in Fiji (hosted by USP-IAS) and Guam (hosted by Guam EPA and in collaboration with US EPA and WERI). The next step in the programme is to strengthen the water quality analysis techniques and data management through in-country laboratory trainings in the four pilot countries. The WQM programme has also developed strong partnership with the New Zealand Ministry of Health and the development of an electronic water quality database is currently in progress. This database will be trialled in the four pilot countries initially before regional dissemination.

#### Kiribati Sustainable Sanitation Training

SOPAC supported the Kiribati Environment and Conservation Division within the Ministry of Environment, Lands and Agricultural Development (MELAD) to coordinate a training with wastewater experts on sustainable sanitation. This included a review of common sewage treatment technologies and practices, and the design, construction and maintenance of composting toilets. The focus area for the training was the water reserve in Bonriki, a sensitive area as it supplies water to households in densely populated South Tarawa. Implementation of compost toilets in Kiribati could control and prevent pollution discharge to the fragile water lens but it requires long term commitment and participatory approaches to achieve behaviour change in sanitation practices.

#### Pacific Water Focal Groups

Through a service provided by the Pacific Partnership for Sustainable Water Management Coordination Unit at SOPAC, it is now possible to join one or more of the **Pacific Water E-mail Focal Groups**. Everyone

working in the Pacific is facing challenges of remoteness, isolation and lack of access to information and human or technical resources.

With the Water E-mail Focal Groups, the Coordination Unit aims to address these challenges by building an active network of people working in the water sector in the region. By exchanging experiences and offering a forum for asking questions and promoting discussion, the Unit hope to assist in tackling some of the issues that water specialists face.

Four separate groups have been set up in the areas of Hydrology and Water Resources; Water Engineering; Water Quality; and Wastewater and Sanitation. You can subscribe to any of the groups as follows:

The Hydrology and Water Resources group is co-ordinated by Alena Lawedrau and comprises mainly of hydrological technicians and focal points for UNESCO's International Hydrological Programme. To join send an e-mail to [PICHydrologicalNetwork-subscribe@yahoogroups.com](mailto:PICHydrologicalNetwork-subscribe@yahoogroups.com) or [linda@sopac.org](mailto:linda@sopac.org).

The Water Engineering group is primarily targeted at those working at water utilities and is co-ordinated by Mathias Kleppen. To join send an e-mail to [PICWater-subscribe@yahoogroups.com.au](mailto:PICWater-subscribe@yahoogroups.com.au) or [mathias@sopac.org](mailto:mathias@sopac.org)

The Water Quality group has members from both the water supply and health sectors and is co-ordinated by Tasleem Hasan. To join send an e-mail to [water\\_quality-subscribe@yahoogroups.com](mailto:water_quality-subscribe@yahoogroups.com) or [tasleem@sopac.org](mailto:tasleem@sopac.org)

The Wastewater focal group looks at raising awareness on water, sanitation and hygiene issues and implementation of the Pacific Wastewater Policy and Framework for Action with membership from wastewater operators, specialists as well as NGO's and is co-ordinated by Kamal Khatri. To join send an e-mail to [wastewater\\_group-subscribe@yahoogroups.com](mailto:wastewater_group-subscribe@yahoogroups.com) or [kamal@sopac.org](mailto:kamal@sopac.org)

### **1.3 Educational and training courses**

#### **1.3.1 Contribution to IHP courses**

None.

#### **1.3.2 Organisation of specific courses**

##### Pacific Hydrological Training Programme

The New Zealand Agency for International Development (NZAID)-funded Hydrological Training Programme for Pacific Island Countries (PIC) which ran for 3 years from 2004 to 2006, has successfully concluded. The programme was established and coordinated by SOPAC in collaboration with the WMO, UNESCO and the NIWA.

A combined funding of NZD720,000 under this programme saw 4 training workshops carried out over 3 years benefitting 39 hydrological technicians from 13 Pacific Island Countries and 1 from the Maldives.

The programme had an overall goal of contributing to the sustainable management of water resources in Pacific Island Countries. The immediate objective was to increase capacity in water resources assessment and monitoring.

There were 3 outcomes under this objective. The overall success of the training programme was assessed by the coordinators, trainers and the heads of participating National Hydrological Services (NHS) through the evaluation of these outcomes.

Outcome 1: Basic competencies – Trainees have acquired the basic competencies needed to provide water resources information in support of national development and resource management.

Outcome 2: Common standards – By consistently engaging the same trainers and data management software throughout the programme, participating countries have been able to achieve common standards of practise and data management.



Outcome 3: PIC NHS interaction – The programme gathered regional hydrological technicians to share ideas and experiences and to learn from one another. An online peer e-network has been set to encourage continued interaction after the conclusion of the programme.

The Hydrological Training Programme has enabled Pacific hydrological technicians to be better skilled in assisting the NHS directors in the implementation of the Pacific Hydrological Cycle Observing System (HYCOS) project.

#### USP establishes Pacific Water Virtual Learning Centre (WVLC)

The University of the South Pacific has signed a Memorandum of Understanding with the United Nations University - International Network on Water, Environment and Health (UNU-INWEH) to formalise the establishment of a Regional Centre of the **UN Water Virtual Learning Centre (WVLC)** in the Pacific. The programme of the WVLC Regional Centre will focus on improving water resource management and water services of developing countries, and on improving training and education in the water sector. The MOU was signed on 19 May 2005 by the Vice-Chancellor of USP, Professor Anthony Tarr, and the Assistant Director of UNU-INWEH, Dr Colin Mayfield.

This Regional Centre is part of a pilot programme of the UNU's project on Capacity Building to Improve Water Management and to Accelerate Sustainable Investments in the Water Sector which is to see the implementation of a WVLC in Africa, Asia and the Pacific focused on training in IWRM. The main objective of WVLC Pacific Regional Centre, which will be located at the School of Pure and Applied Sciences (SPAS) at USP's main campus in Suva, Fiji, is to provide adult training in IWRM through a core curriculum in distance learning using the Internet, CD-ROMs, and other media. The programme aims to assist current managers, scientists and policy makers to improve water resource management practices in Pacific Island Countries. It will target professionals in the water sector wishing to upgrade their knowledge of integrated water management, with the long-term goal of enhancing national capacities for the development and implementation of sustainable water strategies at local, regional, sub-regional and basin scales.

The courses designed by UNU-IWEH will assist in meeting USP's long term objective and vision of introducing courses in water resources and management that are closely aligned with the objectives of the WVLC programmes. The IWRM curriculum will comprise 10 courses and will run as a pilot project for approximately 10-15 months. The courses include the following: An introduction to IWRM; Water Transfer; The Terrestrial Ecosystem and the Impacts of Land Use Changes; The Aquatic Ecosystem; Aquatic Ecosystem Health and Impact Assessment; Water Use; Wastewater; Governance and Community based approaches; Organisational infrastructure and Management and Applying Integrated Water Resources Management. Students who complete the courses successfully will receive a UNU Diploma in Integrated Water Resources Management.

The course will run through the Continuing Education stream of USP's Distance and Flexible Learning Support Centre (DFLSC) which provides a range of educational opportunities no matter where a student is located using USP's advanced satellite communications Network, USPNet, audio conferencing tutorials via USPNet and access to online learning through email and the Internet. Apart from co-ordinating the programme, USP will also provide academic expertise in the areas of Environmental Science, Aquatic Ecology, Earth Science, Land Management, Hydrology, Geography, Chemistry, Sociology, Law, Public Administration and Management.

#### GPA and UNESCO-IHE develop Pacific Wastewater Training Course

A **training course for wastewater management** has been jointly developed by UNEP's Global Programme for Action for the Protection of the Marine Environment from Land-based Sources of Pollution (GPA/UNEP) and the UNESCO-IHE Institute for Water Education.

The wastewater training course addresses one of the Guiding Principles of the Pacific Wastewater Policy and Framework for Action and will be implemented in the Pacific region from 2005-2006 by a consortium of SOPAC, USP-IAS, IOI, in collaboration with SPREP, UNESCO-IHE, GPA/UNEP and UN/DOALOS.

Using UN/DOALOS Train-Sea-Coast standards as well as the GPA Strategic Action Plan on Municipal Wastewater and the UNEP/WHO/UN-HABITAT/WSSCC Guidelines on Municipal Wastewater Management, the training will provide participants with analytical tools, substantive information, and skills on how to select, plan and finance appropriate and environmentally sound municipal wastewater management systems.

The training is divided into 3 modules:

Module 1: Objective oriented planning

Module 2: Conventional and innovative approaches to municipal wastewater management

Module 3: Presentation skills

A training needs assessment for the Wastewater Training Program has been completed showing that there are not many opportunities for training in wastewater management in the Pacific region. However, respondents in the field of water/wastewater management indicated that the training would be beneficial to them. The programme is designed to build capacity within the water/wastewater sector and will be focused at manager or senior supervisor level. Participants should ideally be from a wastewater utility or equivalent responsible government department.

The first training was organised in Suva, Fiji Islands in 2005, with consecutive courses organised in Guam and in Port Moresby, PNG June 2006. The outcome was the increased capacity among participants to identify and formulate feasible projects to improve wastewater management that are cost-effective and can, in practice, be financed, operated and maintained. Additional courses in 2007 are being designed for Tuvalu, Kiribati and Tonga besides further replication in PNG and Fiji.

### Postgraduate Diploma in Integrated Water Resources Management (IWRM)

IWRM became a new theme at the University of the South Pacific with the signing of a Memorandum of Understanding between USP and the United Nations University in May 2005, and the simultaneous establishment of the Water Virtual Learning Centre on the Main Campus. USP was chosen by the UNU to be the regional coordination centre for the IWRM diploma program in the Pacific islands. This was due to the fact that not only could USP provide distance and flexible learning support services but also academic expertise in the interdisciplinary areas important for IWRM training.

Two years after the MoU, the course has officially started. The course coordinators Dr Kifle Kahsai (Division of Earth Science) and Dr James Terry (School of Geography) with the help of an advisory committee selected eighteen students from Fiji and around the region for the initial pilot program. Participants were mostly professionals directly involved in the management, conservation and decision making in the water, environment or health sectors. Having the relevant educational qualifications as well as the work experience made them the ideal candidates for this pilot program. Selection of students was followed by the hiring of project assistant personnel to administer the programme. The first of the core programme of 10 courses was distributed to the students in May 2007.

Phase two of the IWRM training involved bringing academic staff from across many disciplines at USP to 'customise' the core content of the course. Essentially, customisation is the inclusion of relevant examples, research and case studies to 'regionalise' the course. The core material designed by UNU for the course is appropriate for a general audience but for a specific target group such as the Pacific Islands, the course content needs to be customised to suit the region. As part of the assessments for each course (there are 10 courses comprising the diploma), students will be required to complete exercises, assignments and short exams designed by the academic staff during their continuous assessment.

Continuous liaison with the students has become the key in offering the programme by distance learning. Programme coordinators met with students at the WVLC at USP in April 2007, where the IWRM programme was officially launched. This initiative was followed by another face-to-face session in June to monitor the students commitment and progress with course one.

IWRM is a concept that is being rapidly appreciated in the Pacific region. In the forefront is the aim to provide capacity building in the region for sustainable development in the water sector. Individuals that finish the IWRM training will be awarded a UNU Diploma, but more importantly will be capable of applying their knowledge in various fields across government departments and in NGOs.

#### **1.3.3 Participation in IHP courses**

none

## 1.4 Publications

### **HELP in the Context of the Pacific Regional Action Plan on Sustainable Water Management – A Framework for Action** (UNESCO Office in Apia, 2007)

A proceedings document containing all presentations and discussions on “HELP in the Context of the Pacific Regional Action Plan on Sustainable Water Management – A Framework for Action”. was published by UNESCO Apia Office and Landcare Research, Ltd. in early 2007.

### **Hydrology and Water Resources of Small Islands: A practical guide** - UNESCO IHP Studies and Reports in Hydrology 49, Editor: A. Falkland

In most small islands, water development projects have not achieved their stated goals. This is often because the technologies, design and materials were not suitable for either the environment or the cultural habits of the population, or because the operation and maintenance costs were excessive. Combined with geological and other physical complexities and the exposure to natural disasters, the hydrological and water resources problems must be carefully considered. The situation is aggravated by lack of qualified personnel.

This guide has been prepared to assist technicians, hydrologists, engineers and managers in the identification, assessment, development, management and protection of water resources of islands. It is intended to be a guide to the selection of methods and practices appropriate to the special conditions of small islands.

Copies of this publication can be obtained from the SOPAC Secretariat ([arieta@sopac.org](mailto:arieta@sopac.org)) or UNESCO Apia Office ([hans@unesco.org.ws](mailto:hans@unesco.org.ws))

## 1.5 Participation in international scientific meetings

### 1.5.1 Meetings hosted by the Pacific Island Countries

#### Science, Technology and Resources Network (STAR) Meeting, Honiara, Solomon Islands, 2006

The Science, Technology and Resources Network (STAR) associated with SOPAC's Annual Session provides a platform for scientists, experts and practitioners to exchange information and present findings from scientific researches of relevance to the themes chosen for the STAR Meetings.

At last year's STAR Session held on **22 September 2006**, scientists, experts and scholars all convened for 2 days of presentations and dialogue. They also exchanged information and provided recommendations to SOPAC's Council relevant to the different working programmes for SOPAC including its Water Sector programme as summarized below:

The STAR Water Working Group (WWG) met as an integral part of the 2nd Steering Committee Meeting of the Pacific Partnership Initiative on Sustainable Water Management on 22 September 2006.

Members present came from the Cook Islands, Fiji Islands, FSM, Kiribati, Marshall Islands, Niue, PNG, Samoa, Solomon Islands, Tonga, Vanuatu, as well as Australia and New Zealand.

#### **Preamble**

The STAR WWG concluded that:

1. Sustainable water management in Pacific Small Island Countries (PSIC) embodies some of the most complex and challenging problems in water management in the world.
2. Rates of deaths and illnesses due to water-borne diseases in Pacific SIC are unacceptably high and have major social and economic costs.
3. Economic development is underpinned by the water sector and unreliable and unsafe water supplies reduce the potential for development opportunities.
4. Solutions to these problems lie not just in the economic and technical realms, but involve fundamental behavioural change.

5. Behavioural change requires long time frames (of order 10 years) and sustained engagement.
6. Donor and SOPAC water and sanitation programs tend to be short term with rapid staff turnover. SOPAC does not have a core-funded position in the water and sanitation sector.
7. The Pacific Plan and many national development strategies and plans do not emphasise the fundamental importance of water and sanitation.
8. The Pacific Regional Action Plan on Sustainable Water Management in contrast provides a key framework for addressing water and sanitation problems in PSIC.
9. The Pacific Partnership Initiative for Sustainable Water Management (PPISWM) plays a valuable role in building capacity to manage water and sanitation in PSIC. The Coordination Unit currently housed in SOPAC is critical to the success of the PPISWM.
10. Funding for the PPISWM Coordination Unit expired in June 2006.

## **Recommendations**

The STAR WWG recommends unanimously that Council:

1. Advocate specific inclusion of water and sanitation in the Pacific Plan as a key strategic sector and specify that the Pacific Plan be consistent with the Pacific Regional Action Plan on Sustainable Water Management.
2. Encourage all member states to promote the importance of integrated water and sanitation management in their national development strategies and plans and to increase investments at the local and national level in addressing the Millennium Development Goals for water and sanitation.
3. Recommend that SOPAC seek a mechanism to sustain the Coordination Unit for the Pacific Partnership Initiative on Sustainable Water Management.
4. Recommend that SOPAC develop an initiative for monitoring regional progress on meeting the Millennium Development Goals for water and sanitation.
5. Recommends that SOPAC continue to provide assistance to PSIC to improve Water Governance.
6. Recommend that SOPAC ensures that continued assistance be provided to PSIC on water resource assessment, monitoring, analysis, prediction and water demand management.

### **1.5.2 Participation in meetings abroad**

#### Mainstreaming Gender in Water Management for Southeast Asia, East Asia and the Pacific

A workshop covering the sub-regions of Southeast Asia, East Asia and the Pacific was held at the Asian Institute of Technology (AIT) in Rangsit, Thailand, 18-21 July 2007. The workshop aimed to bring together key individuals and organisations in the region who are willing to facilitate, plan and lead gender mainstreaming in water policy, practice and institutions through knowledge sharing, capacity building and networking.

The workshop included presentations from country representatives from the focused regions as well as making countries aware on the role and strategic plan of the Gender and Water Alliance for the coming years. The core component of the workshop was countries rather regions planning on actions that they would like to initiate in the area of capacity building, knowledge development and dissemination and policy advocacy.

The key outcomes of the workshop included identification of individuals as well as institutions that are willing to coordinate and monitor regional activities to take gender initiatives forward. GWA will also provide inputs based on this workshop to the 3rd South-East Asia Water Forum to be held in Malaysia from 22-26 October 2007 and the 1st Asia-Pacific Water Forum in Japan in early December 2007.

## **1.6 Other activities at regional level**

### **1.6.1 Institutional relations/co-operation**

#### Pacific Regional Action Plan on Sustainable Water Management

Leading to the World Summit for Sustainable Development (August 2002) and the World Water Forum (March 2003) an ADB/SOPAC-led regional consultation on Water in Small Island Countries was held in Sigatoka, Fiji. The consultation led to a Pacific Regional Action Plan on Sustainable Water Management (Pacific RAP) and Ministerial Declaration that was signed by 16 Pacific Island Countries. The meeting

identified key messages for six themes viz. Water Resources Management, Island Vulnerability, Awareness, Technology, Institutional Arrangements and Finance.

UNESCO's International Hydrological Programme is an important partner for the development and implementation of the Pacific RAP.

[For more information, please see list.sopac.org.fj/Secretariat/Programmes/H2O/3rd\\_world\\_water\\_forum/index.html](http://list.sopac.org.fj/Secretariat/Programmes/H2O/3rd_world_water_forum/index.html)

### Pacific Partnership Initiative on Sustainable Water Management

The overall aim of the Type II Initiatives is to ensure coordination and increased partnerships in meeting the WSSD goals through its Plan of Implementation.

The Pacific Partnership Initiative on Sustainable Water Management is coordinated and facilitated by the intergovernmental organisation SOPAC, which has the regional mandate to support the Pacific Island Countries in water & sanitation. SOPAC is assisted in this task by a deputy facilitator, the University of the South Pacific (USP).

The Partnership has a Facilitator (based at SOPAC) who is responsible for implementing the core functions of the partnership: liaising between the regional stakeholder groups and their sub-networks; researching and receiving stakeholder information on on-going and planned water activities; tracking donor and development agency programmes; identifying areas requiring implementation; and coordinating proposal submissions and project implementation. The Facilitator is also responsible for high-level advocacy of the strategic approach.

Monitoring and evaluation are carried out using a matrix inventory of previous, existing, planned and proposed activities, including details of the stakeholders involved, the intervention objectives, implementation duration and status, and anticipated impact.

The Facilitator enables countries and development agencies to: identify successful previous activities and therefore improve the sustainability of subsequent interventions; reduce and prevent duplication of activities; link country requirements to development programmes (and vice versa); and augment existing and proposed activities nationally and regionally.

A working group of CROP agencies (Council of Regional Organizations of the Pacific) and NGO representatives has been set up to act as the overall coordinating body of the Pacific Type II Initiatives. Facilitators are asked to report to this Sustainable Development Working Group on a regular basis.

If you have comments on this Initiative or would like to make contributions and be further involved please do not hesitate to contact Marc Overmars, SOPAC's Water Adviser, at [marc@sopac.org](mailto:marc@sopac.org).

## **1.6.2 Completed and ongoing scientific projects**

### New Flood Warning System Piloted for Navua

Recent flooding in Fiji has confirmed that inland flooding is the most frequent and damaging hazard facing Fiji's communities. SOPAC estimates that on average, inland flooding costs Fiji around 10 lives and F\$20 million in total damage every year. A new flood warning system is being developed for the Navua Delta and could provide residents with up to 2.5 hours warning following intensive rainfall higher in the catchment. SOPAC is piloting a new warning system in partnership with the National Disaster Management Office (NDMO), the Public Works Hydrology Division, the Fiji Meteorological Services and the Provincial Administrations of Serua and Namosi.

Representatives from national government agencies and SOPAC are now working with local authorities to find the best means of disseminating information and warnings to local response agencies and the general public. An economic analysis of the new system is now being undertaken to determine the monetary value of these benefits compared to the cost of designing, installing and operating the system.

## **2. FUTURE ACTIVITIES**

### **2.1 Activities foreseen until December 2007**

#### **Pacific IWRM**

The Global Environmental Facility (GEF) through UNDP signed a PDF-A agreement with SOPAC in November 2004 to develop an innovative programme on Sustainable Integrated Water Resources Management (IWRM) in Pacific Island Countries (PICs) in response to the request by the region's diplomatic missions at CSD12.

Based on the endorsement of 10 PICs, the GEF CEO approved entry into the GEF pipeline of this proposal and approved the request for financial resources to further develop the full project in the coming two years. An Inception Meeting for the Pacific IWRM project was organised in conjunction with SOPAC's Annual Session from 21-27 September 2006 in Honiara.

The project is being developed by the countries through IWRM Focal Points supported by SOPAC and in collaboration with UNDP, UNEP and partners in the Pacific Partnership Initiative on Sustainable Water Management. The project will support the implementation of the Pacific Regional Action Plan on Sustainable Water Management that aims to improve the assessment and monitoring of water resources, reduce water pollution, improve access to technologies, strengthen institutional agreements, and leverage additional financial resources in supporting IWRM. A 2nd Steering Committee meeting for the project was held in Nadi Fiji 23-27 April 2007 to review national IWRM diagnostic reports and demonstration concepts. A 3rd Steering Committee meeting for the project was held in Suva Fiji 5-8 November 2007 to agree on the final demonstration designs and mechanisms for implementation. The IWRM Demonstrations will constitute part of the GEF Pacific Alliance for Sustainability as one of the regional programmes to be considered by the GEF Council in April 2008.

The EU Water Facility approved funding for the 3-year Pacific SIDS IWRM Planning programme which will provide substantial co-financing for the GEF IWRM Demonstrations in a unique partnership of mutual aid and assistance. The programme will focus on the development of applicable and effective National Integrated Water Resources Management (IWRM) and Water Use Efficiency (WUE) plans as an important contribution to the Millennium Development Goals.

#### **UNESCO-supported projects**

The UNESCO-supported Nadi HELP Basin and Niue groundwater legislation projects will both be completed by end-2007, and will be reported on in detail at the 16<sup>th</sup> RSC meeting.

### **2.2 Activities planned for 2007**

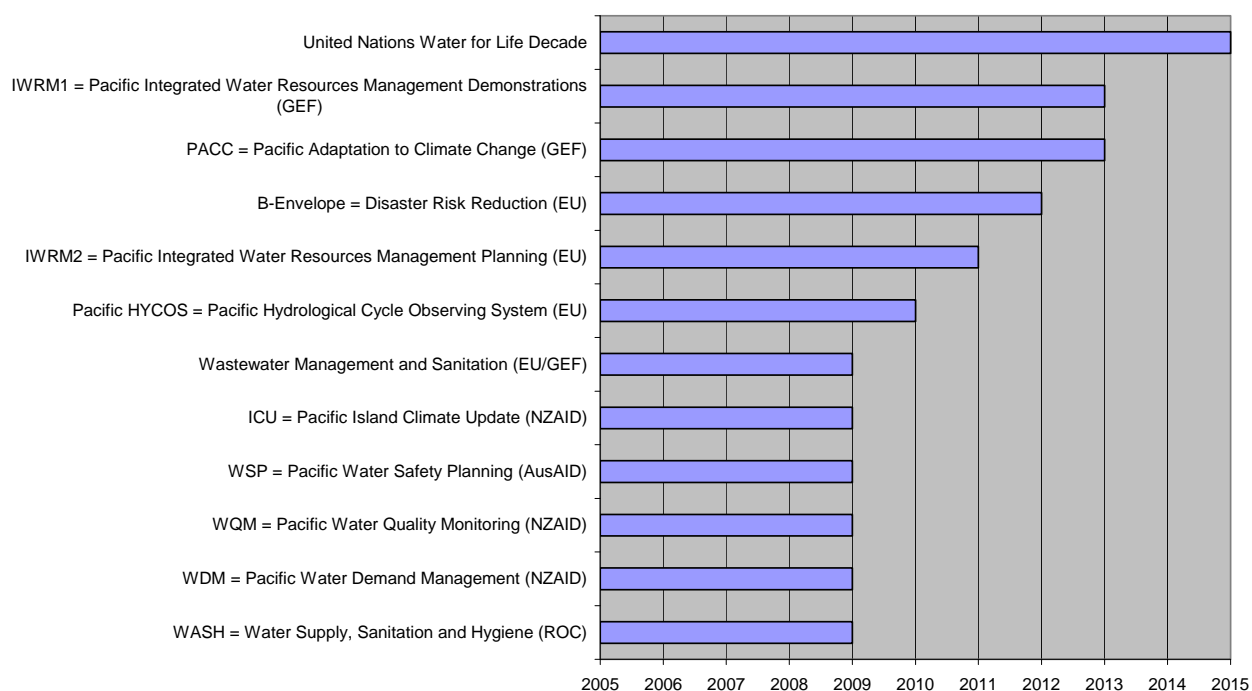
- Implementation of Pacific HYCOS Project
- Implementation of Pacific IWRM Project
- Continuation of the Pacific Island Climate Update
- Continuation of the Pacific Island Climate Prediction Programme

### **2.3 Activities envisaged in the long term**

Within the Water for Life Decade (2005-2015) Priority Actions specifically identified in the Pacific Regional Action Plan on Sustainable Water Management are being implemented including but not limited to the following programmes:

- Pacific Integrated Water Resources Management
- Pacific Hydrological Cycle Observing System
- Pacific Adaptation to Climate Change
- Pacific Disaster Risk Reduction
- Wastewater/Sanitation
- Water Safety Planning
- Water Quality Monitoring
- Water Demand Management
- Water, Sanitation and Hygiene (Pacific WASH Coalition)

**Pacific Water Sector Support Programmes**



**15<sup>th</sup> UNESCO-IHP REGIONAL STEERING COMMITTEE MEETING  
FOR  
SOUTH EAST ASIA AND THE PACIFIC**

**in conjunction with the  
International Conference on Hydrology and Water Resources Management  
For Hazard Reduction and Sustainable Development  
MAKATI CITY, METRO MANILA, PHILIPPINES  
(19 – 23 November 2007)**

**NATIONAL REPORT OF THE PHILIPPINES**

by

**Leonardo Q. Liongson  
Director, National Hydraulic Research Center  
University of the Philippines  
and  
Chairman, Philippine National Committee for UNESCO-IHP**

**1.0 Introduction**

The institutional members of the Philippine National Committee for the IHP are the following organizations, which are mandated with and engaged in research, development and management activities in the water sector:

Bureau of Soils and Water Management (BSWM), Department of Agriculture (DA)  
Bureau of Research and Standards (BRS), Department of Public Works and Highways (DPWH)  
Environmental Management Bureau (EMB), Department of the Environment and Natural Resources (DENR)  
Flood Control & Sabo Engineering Center (FCSEC), Department of Public Works and Highways (DPWH)  
Laguna Lake Development Authority (LLDA)  
Local Water Utilities Administration (LWUA)  
LPA & Associates (private sector)  
Metropolitan Waterworks and Sewerage System (MWSS)  
Mines and Geoscience Bureau (MGB), Department of the Environment and Natural Resources (DENR)  
National Economic and Development Authority (NEDA)  
National Hydraulic Research Center, University of the Philippines (UP-NHRC)  
National Irrigation Administration (NIA)  
National Mapping and Resource Information Authority (NAMRIA)



National Power Corporation (NAPOCOR)  
National Water Resources Board (NWRB)  
Philippine Atmospheric, Geophysical and Astronomical Services  
Administration (PAGASA), Department of Science and Technology  
(DOST)  
Philippine Council for Agriculture, Forestry and Natural Resources Research  
and Development (PCARRD), Department of Science and Technology  
(DOST)  
Philippine Council for Aquatic and Marine Research and Development  
(PCAMRD), Department of Science and Technology (DOST)

Mapua Institute of Technology, School of Civil Engineering, Manila  
University of Santo Tomas, Department of Civil Engineering (UST), Manila  
University of the Philippines at Los Baños, College of Engineering and Agro-  
Industrial Technology (UPLB-CEAT), Los Baños, Laguna

Other Invited Universities:

Ateneo De Manila University, Manila Observatory (ADMU), Quezon City  
Central Luzon State University (CLSU), Muñoz, Nueva Ecija  
De La Salle University, Department of Civil Engineering (DLSU), Manila  
University of San Carlos, Department of Civil Engineering & Water  
Resources Research Center (USC), Cebu City

## **2.0 Activities of the Water Resources Sector in the Philippines**

This brief section provides an enumeration of the recent activities of the water resources sector in the Philippines during the period 2006-2007 as well as activities in previous years not included in the Philippine National Report submitted in 2006. These were incidental yet official activities undertaken or attended by the principals and nominees of Philippine institutions and stakeholders in the water sector who are the members of the PNC-IHP.

### **2.1 International and Regional Activities (2006-2007)**

*14<sup>th</sup> Regional Steering Committee Meeting for Southeast Asia and the Pacific UNESCO International Hydrology Programme (14<sup>th</sup> RSC Meeting for SEAP, UNESCO-IHP), in conjunction with the International Symposium on Managing Water Supply for Growing Demand, 16 – 20 October 2006, Bangkok, Thailand.*

*15<sup>th</sup> Regional Steering Committee Meeting for Southeast Asia and the Pacific UNESCO International Hydrology Programme (15<sup>th</sup> RSC Meeting for SEAP, UNESCO-IHP), in conjunction with the UNESCO-IHP International Conference on Hydrology and Water Resources Management for Hazard Reduction and Sustainable Development (HRSD 2007), 19-23 November 2007, Makati City, Metro Manila, Philippines*

*Innovative Capacity Development Program for Extreme Flood Risk Assessment in Major Asian Cities, August 2007, Environment and Sustainable Development Programme, United Nations University.*

## **2.2 National Activities (2006-2007)**

*First National Meeting for 2007 of the Philippine National Committee for UNESCO-IHP*, 9 May 2007, National Hydraulic Research Center (NHRC), University of the Philippines – Diliman, Quezon City, Philippines.

*Meeting of the Local Organizing Committee and Finance Sub-Committee of the UNESCO-IHP International Conference on Hydrology and Water Resources Management for Hazard Reduction and Sustainable Development (HRSD 2007)*, 30 May 2007, National Hydraulic Research Center (NHRC), University of the Philippines – Diliman, Quezon City, Philippines.

*Meeting of the Finance Sub-Committee of the UNESCO-IHP International Conference on Hydrology and Water Resources Management for Hazard Reduction and Sustainable Development (HRSD 2007)*, 1 June 2007, National Hydraulic Research Center (NHRC), University of the Philippines – Diliman, Quezon City, Philippines.

*Joint Meeting of the Advisory Committee and Local Organizing Committee of the UNESCO-IHP International Conference on Hydrology and Water Resources Management for Hazard Reduction and Sustainable Development (HRSD 2007)*, 18 July, 2007, Metropolitan Waterworks and Sewerage System, Balara, Quezon City, Philippines.

*Second National Meeting for 2007 of the Philippine National Committee for UNESCO-IHP*, 16 August 2007, National Hydraulic Research Center (NHRC), University of the Philippines – Diliman, Quezon City, Philippines.

*Meeting of the Program Sub-Committee of the UNESCO-IHP International Conference on Hydrology and Water Resources Management for Hazard Reduction and Sustainable Development (HRSD 2007)*, 25 October 2007, National Hydraulic Research Center (NHRC), University of the Philippines – Diliman, Quezon City, Philippines.

*Philippine National Committee on Large Dams (PNCOLD) 2007 Technical Conference/Workshop*, 27-28 November 2007, National Power Corporation, Quezon City, Philippines.

*Philippine Water Partnership, Dialogue on Water Service Providers: Part I - The Water Districts and the MDG on Water and Sanitation*, 8 May 2007, Quezon City, Philippines.

*Philippine Water Partnership, First Visayas Round Table Discussion for Small Scale Water Providers*, 18 May 2007, Cebu City, Philippines.

*Philippine Water Partnership, Dialogue on Water Service Providers: Part II - The Water Cooperatives as Water Service Providers*, 25 May 2007, Quezon City, Philippines.

*Philippine Water Partnership, Mindanao Roundtable Discussion on Small Scale Water Providers*, 1 June 2007, Davao City, Philippines.

*Philippine Water Partnership, Round Table Discussion on “Towards Improving the Plight of Small Water Providers”*, 7 June 2007, University of the Philippines, Diliman, Quezon City, Philippines.

*Philippine Water Partnership, Forum on Small Water Service Providers: “Shaping Our Agenda And Unified Action to Bridge the Gap in Water Service Provision”*, 21-22 June 2007, University of the Philippines, Diliman, Quezon City, Philippines.

*Philippine Water Partnership, National Pre-conference Forum: “Creating the Niche for Small Water Providers”*, 5 July 2007, University of the Philippines, Diliman, Quezon City, Philippines.

*Philippine Water Partnership, Round Table Discussion on “Financing for Small Scale Water Providers”*, 3 August 2007, Pasig City, Philippines.

*Philippine Water Partnership, First National Conference on Small Water Service Providers, with the theme “Building Partnership to End Water Poverty”*, 9-10 August 2007, SEAMEAO INNOTECH, Quezon City, Philippines.

*National Water and Sanitation Association of the Philippines (NAWASA) Strategic Planning Workshop*, 11-14 October 2007, Davao City Water District Training Center, Davao City, Philippines.

*Philippine Water Partnership, Water Policy and Strategy Planning Workshop*, 7-8 November 2007, Cloud Resort, Antipolo City, Philippines.

*Philippine Water Partnership, Regional Training of Trainers (ToT) on Integrated Water Resources Management*, 15-19 October 2007, Davao City, Philippines.

### **2.3 Ongoing and Completed Programs and Projects (2006-2007)**

Member institutions of the Philippine National Committee have undertaken programs and projects in the field of hydrology and water resources management during the period 2006-2007, including some with foreign technical assistance and aided by consultants. Some notable activities are as follows:

Bureau of Soils and Water Management (BSWM), *Drought Mitigation Measures*.

Bureau of Soils and Water Management (BSWM), *Integrated Watershed Management for Sustainable Soil and Water Resources Management of the Inabanga Watershed, Bohol Island, Philippines*.

Bureau of Soils and Water Management (BSWM), *Rainwater Harvesting*.

Bureau of Soils and Water Management (BSWM), *Rehabilitation/Upgrading of Regional and Provincial Soil and Water Analyses*.

Bureau of Soils and Water Management (BSWM), *Small Water Impounding Projects (SWIP)*.

Flood Control & Sabo Engineering Center (FCSEC), Department of Public Works and Highways (DPWH), *Project for Enhancement of Capabilities in Flood Control and Sabo Engineering of the DPWH*, JICA.

Laguna Lake Development Authority (LLDA), *Environmental User Fee Program* (as centerpiece of Environmental Management Program).

Laguna Lake Development Authority (LLDA), *River Rehabilitation Program* .

Laguna Lake Development Authority (LLDA), *Lake Fishery Management Program*.

Laguna Lake Development Authority (LLDA), *Laguna de Bay Shoreland Management*.

Metro-Manila Development Authority (MMDA), *Effective Flood Control Operations System (EFCOS)*.

National Academy of Science and Technology (NAST). Dialogues on National Water Reform, and on Climate Change.

National Hydraulic Research Center (NHRC), *Feasibility Study of the Proposed Infiltration Gallery Project in the Municipality of San Mateo*. Manila Water Company Inc. (MWCI).

National Hydraulic Research Center (NHRC), *Value Engineering Study for the Detailed Engineering Design of Pasig-Marikina River Channel Improvement Project, Phase I*, Department of Public Works and Highways (DPWH) and CTI Engineering International Co., Ltd .

National Hydraulic Research Center (NHRC), *San Roque Reservoir Sedimentation Study*, National Power Corporation.

National Hydraulic Research Center (NHRC) and Department of Civil Engineering - University of the Philippines, *Various faculty-led and student researches in Stochastic Rainfall Modeling, Rainfall Frequency Analysis, Distributed Rainfall-Runoff Modeling, Regional Flood Frequency Analysis, Groundwater Flow and Contaminant Transport Modeling, Infiltration Gallery Modeling, Flood Hydraulics by 1-D River Network Models and 2-D Finite-Volume Models, and Sediment Transport by Finite-Volume Models*.

National Water Resources Board (NWRB), *Case Study on the Application of Strategic Planning and Management (SPM) for IWRM*, UN-ESCAP.

National Water Resources Board (NWRB), *Study on Regionalization of Water Tariffs for Private Utilities*, ADB and IDP.

National Water Resources Board (NWRB), *Performance Improvement and Benchmarking of Small Towns Water Utilities Project*, WSP and Aus-AID.

National Water Resources Board (NWRB), *Enhancement of Processing Water Permit Applications, Billing and other related Information Systems and Creation of Water Resources Regional Council in Region 7*, World Bank and Woodfields.

National Water Resources Board (NWRB), *Expansion of Benchmarking of Small Towns' Water Utilities in the Philippines*, World Bank and WSP.

PAGASA, *Flood Forecasting and Warning System for Dam Operations (FFWSDO)*.

PAGASA, *Global Network for Isotope Monitoring (GNIP)*, IAEA and WMO.

PAGASA, *Special Tropical Cyclone Reconnaissance, Information Dissemination and Damage Evaluation (STRIDE) Team*.

PAGASA, *Strengthening of Flood Forecasting and Warning Administration*, JICA.

PAGASA, *Weather Modification Experiment (WEMEX) Rainfall Stations*.

## **2.4 Major Water Resources Development Projects in the Philippines**

Department of Interior and Local Government (DILG) - 1 Project  
*Rural Water Supply and Sanitation Project (Phase 5)*

Department of Public Works and Highways (DPWH) - 10 Projects  
*Agno and Allied Rivers Urgent Rehabilitation Project*  
*Agno River Flood Control Project (Phase 2-A)*  
*Agno River Flood Control Project (Phase 2-B)*  
*Iloilo Flood Control Project (Phase 2)*  
*KAMANAVA Area Flood Control and Drainage System Improvement Project*  
*Laoag River Basin Flood Control and Sabo Project*  
*Lower Agusan Development Project (Flood Control Component Phase 2)*  
*Metro Manila Flood Control Project - West of Mangahan Floodway*  
*Pasig-Marikina River Channel Improvement Project (Phase 1)*  
*Pinatubo Hazards Urgent Mitigation Project (Phase 2)*

Development Bank of the Philippines (DBP) – 1 Project  
*LGU Urban Water Sanitation Program (APL2)*

Land Bank of the Philippines (LBP) – 1 Project  
*Water District Development Project*

Local Water Utilities Administration - 4 Projects  
*Expansion and Rehabilitation of the Baguio Water System*  
*Provincial Cities Water Supply Project (Phase 4)*

*Provincial Cities Water Supply Project (Phase 5)*  
*Provincial Towns Water Supply I/II*

Metropolitan Waterworks and Sewerage System - 1 Project  
*Second Manila Sewerage Project*

National Irrigation Administration - 14 Projects  
*Agno River Integrated Irrigation Project*  
*Adallam River Irrigation Project*  
*Bago River Irrigation System Rehabilitation and Improvement Project*  
*Balog-Balog Multipurpose Project*  
*Banaoang Pump Irrigation Project*  
*Bohol Irrigation Project (Phase 2)*  
*Casecnan Multipurpose Irrigation & Power – IC (Irrigation Component)*  
*Comprehensive Agrarian Reform Project-Irrigation Component*  
*Help for Catubig Agricultural Advancement Project (HCAAP)*  
*Lower Agusan Development Project (Irrigation Component)*  
*Malitubog - Maridagao Irrigation Project*  
*Small River Irrigation Project*  
*Southern Philippines Irrigation Sector Project (SPISP)*  
*Tarlac Groundwater Irrigation System Reactivation Project*

### **3.0 Participation in IHP Activities**

#### **3.1 Catalogue of Rivers for Southeast Asia and the Pacific**

The Philippines has contributed to Volume V (2004) of the Catalogue of Rivers one chapter on the largest lake-river basin of the country, the *Pasig-Marikina River and Laguna de Bay (Ilog Pasig-Marikina at Lawa ng Laguna de Bay)*. The Philippines previously contributed the *Ilog Magat* and *Ilog Pampanga* in Volume I (October 1995) and the *Ilog Itaas ng Agno* in Volume II (December 1997).

The CD of the electronic files of all geographical and hydrological information present in Volume V (2004) of the Catalogue of Rivers for the Philippine contribution, *Pasig-Marikina River and Laguna de Bay (Ilog Pasig-Marikina at Lawa ng Laguna de Bay)*, was submitted during the 14<sup>th</sup> RSC Meeting held in Bangkok in 2006 for storage in the regional database maintained by the Regional Humid Tropics Center, Malaysia.

#### **3.2 AP-FRIEND**

Prof. Guillermo Q. Tabios III had volunteered in the UNESCO APFRIEND Phase II Meeting held at Cititel Mid Valley, Kuala Lumpur Malaysia last June 6-7, 2005 to assemble and collate storm rainfall (from 2 to 3 stations) and flood flow data (if available) to be provided by each country (Australia, China, Indonesia, Japan, Korea, Malaysia, New Zealand,

Philippines, Vietnam) by June 30, 2005 and to assist Prof. Trevor Daniell to write the document on design flood methodologies and case studies for Asia-Pacific countries.

### **3.3 The Sixth Phase of IHP (IHP VI)**

The Philippines, through the many water-related agencies belonging the Philippine National Committee, undertakes water resources research, development and management programs and projects supportive of the global efforts within the themes covered by the IHP-VI (2002-2007) - Water Interactions: Systems at Risk and Social Challenges:

Theme 1 - Global Changes and Water Resources

Theme 2 - Integrated Watershed and Aquifer Dynamics

Theme 3 - Land Habitat Hydrology

Theme 4 - Water and Society

Theme 5 - Water Education and Training

### **3.4 IHP Workshops, training courses and symposia**

The Philippines nominated participants in the IHP training workshops held in the period at the University of Nagoya.

## **4.0 Concluding Remarks**

The Philippine National Committee for IHP expresses its thanks and gratitude to the IHP-RSC and the UNESCO Jakarta Office for their organizational and financial support to the Philippines for the preparation and holding of the 15<sup>th</sup> RSC Meeting and HRSD 2007 International Conference in Metro Manila, Philippines.

Fifteenth Meeting of IHP Regional Steering  
Committee for the Southeast Asia and the Pacific  
22<sup>nd</sup> November, 2007  
Manila, Philippines

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**Country Report on Papua New Guinea  
International Hydrological Program Activities:  
2006-2007**

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Prepared & presented by:  
**Maino Virobo**  
Principal Hydrologist  
*for Papua New Guinea IHP National Committee*



## **1. Introduction**

The Department of Environment and Conservation (DEC) participated in the activities of the International Hydrological Program Decade (IHPD) through then Bureau of Water Resources (BWR) from 1965-1974, the forerunner of the International Hydrological Program (IHP). With the launching of the latter in 1992, the Papua New Guinea (PNG) IHP National Committee was formed in January 1992 with a view to participating actively in IHP.

The total membership of the PNG IHP National Committee has been maintained at eight (8), and drawn from various government agencies and institutions of higher learning. Over the period 2006-2007, PNG achieved very little progress in terms of implementing and participation in UNESCO sponsored IHP activities. Perhaps, it can be attributed to the lack of recognition of water related events unfolding over the same period, such as high frequency of rainfall events, flooding, sea-level rise, and preparing for national disaster hazard mitigation.

The position of PNG IHP National Committee Chairperson has not been resolved nevertheless the secretariat is performing all IHP responsibilities, while the same issue is being addressed progressively. Secretarial support is being provided by the principal hydrologist with occasional assistance received from staff of Water Resources Management branch of DEC and the office of PNG National Commission for UNESCO.

The secretariat generally disseminates to all members, information on meetings/seminars, training courses and workshops organized by the UNESCO. It also distributes publications and newsletters that it receives from UNESCO.

The PNG IHP National Committee performs its roles, which are formulated by an Executive Committee consisting principally of the following agencies;

- (a) Department of Environment and Conservation (DEC),
- (b) University of Papua New Guinea (UPNG),
- (c) Geological Survey of Department of Mining, and
- (d) National Weather Service (NWS) of Civil Aviation Authority.

## **2. Activities Organized by the National Committee**

The number of membership has been increased from 5 to 8, to ensure wide range of interest is captured from varying water sector agencies. The latest inclusions are Department of Health (DoH) for community water supply and sanitation, National Forest Authority (NFA) for sustainable logging and protection of the environment, and Department of Agriculture and Livestock (DAL) for irrigation and soil moisture supply.

### **3. Other Hydrological and Water Related Activities Conducted by Individual Water Agencies**

#### **3.1 Commemoration of the World Environment Day**

World Environment Day was commemorated on the 5<sup>th</sup> of June 2007 with the theme “*Save our Sinking Island*”. Newspaper articles and educational programs were prepared for the theme, with specific attention to the issue on the saving the sinking islands allegedly from global warming, which also influences the global hydrological cycle.

#### **3.2 National Disaster and Emergency Services – Flood Hazards**

Disaster Information Exposition was organized for 9-10 August 2007, targeting school age children from primary to higher secondary levels, where flood hazard was one of the major themes. An 8-page information booklet on how to prepare for any flood event was produced to commemorate the event and circulated to the general public including the school children.

#### **3.3 Rehabilitating Ramu Hydrological Monitoring Network**

Implementation of the *Rehabilitation of the Ramu Hydrological Monitoring* network commenced in June 2007, when issues relating to stations failing to perform were identified by SOPAC and the need to have these stations restored in light of major development activities happening in the catchments were presented to SOPAC by DEC. Procurement of the instruments is in progress, while the installation of the data base management system has been completed.

Training for one technician to manage the data base system for 14 days was completed in September 2007.

#### **3.4 Meeting with PNG National Commission for UNESCO**

PNG national commission for UNESCO organized a small meeting on 07 September 2007, where the progress on UNESCO sponsored IHP activities were presented. The Director for the PNG national commission for UNESCO is not aware of most of the IHP activities in PNG, thus the meeting organized was to get him acquainted to the water sector programs.

### **4. Participation in Regional and Sub-Regional Programs**

#### **4.1 Meetings and short term training**

**Mr. Maino Virobo** attended the 14<sup>th</sup> IHP RSC Meeting and participated in the International Symposium on *Wise Water Resources Management towards Sustainable Growth and Poverty Reduction* from 16-20 October 2006, Bangkok, Thailand.

**Mr. Joe Kaupa** from Marine division of Transport Department attended the 16<sup>th</sup> IHP Training Course on Basic Oceanography, December 2006, Nagoya, Japan.

## **5. Sub-Regional Programs**

### **5.1 Pacific HyCOS Project**

The Pacific HyCOS project was launched in April 2007, Brisbane, Australia. The major task is to improve the water sector activities through improved hydrological data collection network and a robust data base management system with wider communication potential.

### **5.2 Annual Meteorological Services Director's Meeting**

The annual Pacific Islands meteorological services directors meeting was held in Rarotonga, Cook Islands from 2-6 July 2007. Issues faced by many meteorological services in the sub region are wide ranging given their geographical distribution and isolation, levels of development and specific country needs. Communication is a major issue, where many international agencies showed their interests to assist and to continue their respective bilateral and multilateral agreements in their respective technical engagements.

## **6. Future Tasks**

A number of tasks have been identified and to be taken on board for 2007 and 2008. They include;

- (a) Implementation of the Rehabilitation of the Ramu River Hydrological monitoring network,
- (b) Commence implementation of the Pacific HyCOS project,
- (c) Attend the 2<sup>nd</sup> Pacific HyCOS Steering Committee meeting,
- (d) Participate in the 17<sup>th</sup> and 18<sup>th</sup> IHP courses organized by Nagoya University, Japan, 2007 and 2008
- (e) Commemorate the World Water Day in March 2008
- (f) Commemorate the World Environment Day in June 2008,
- (g) Complete development of the Laloki River Integrated Water Resources Management project proposal, and
- (h) Attend the 16<sup>th</sup> IHP RSC Meeting in Ulan Bahtor, Mongolia.

# NATIONAL REPORT ON IHP RELATED ACTIVITIES

## THAILAND

### 1. ACTIVITIES UNDERTAKEN IN THE PERIOD November 2006 – October 2007

- 1.1 Meeting of the IHP National Committee
  - 1.1.1 Decision regarding the composition of the IHP National Committee
  - 1.1.2 Status of IHP-VI activities
  - 1.1.3 Decisions regarding contribution to/participation in IHP-VII
- 1.2 Activities at national level in the framework of the IHP
  - 1.2.1 National/local scientific and technical meetings
  - 1.2.2 Participation in IHP Steering Committees/Working Groups
  - 1.2.3 Research/applied projects supported or sponsored
  - 1.2.4 Collaboration with other national and international organizations and/or programmes
  - 1.2.5 Other initiatives
- 1.3 Educational and training courses
  - 1.3.1 Contribution to IHP courses
  - 1.3.2 Organization of specific courses
  - 1.3.3 Participation in IHP courses
- 1.4 Publications
- 1.5 Participation in international scientific meeting
  - 1.5.1 Meetings hosted by the country
  - 1.5.2 Participation in meetings abroad
- 1.6 Other activities at regional level
  - 1.6.1 Institutional relations/co-operation
  - 1.6.2 Completed and ongoing scientific projects

### 2. FUTURE ACTIVITIES

- 2.1 Activities planned until December 2007
- 2.2 Activities foreseen for 2008-2009
- 2.3 Activities envisaged in the long term

National Report on IHP Related Activities  
Thailand

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1. Activities undertaken in the period of November 2006- October 2007

1.1 Meeting of the IHP National Committee

1.1.1 Decision regarding the composition of the IHP National Committee

According to the reshuffle of Director-General of Department of Water Resources in late 2007, Thailand National Committee for IHP (THC-IHP) is now having Dr.Adisak Thongkhaimuk, Director-General of Department of Water Resources served as a Chairman of this committee. The present composition of THC-IHP consists of 22 members as follow:

- Chairman : Dr.Adisak Thongkhaimuk, Director-General of Department of Water Resources
- Vice Chairmans : Professor Kasem Chunkao, Environmental College, Kasetsart Universities  
Duputy Director-General of Department of Water Resources
- Secretary : Mr.Boontham Sirichai, Director of Bureau of Research - Development and Hydrology
- Members : Representatives from concerning agencies and individuals are as follows :
1. Bureau of Royal Rainmaking and Agricultural Aviation
  2. Royal Irrigation Department
  3. National Park, Wildlife and Plant Conservation Department
  4. Hydrographic Department
  5. Meteorological Department
  6. Marine Department
  7. National Research Council of Thailand
  8. The Thailand Research Fund
  9. Secretarial of the Thai National Commission for UNESCO
  10. Department of Ground Water Resources
  11. Electricity Generating Authority of Thailand
  12. Mrs.Wajee Ramnarong
  13. Mr.Thawatchai Tingsanyacharee
  14. Associate Professor Suravuth Pratishtananda
  15. Mr.Satcha Sethabuth
  16. Mr.Veeraphol Taesombat
  17. Ms.Sukontha Aekaraj
  18. Mrs.Poonsook Vimukatayon

The mailing address are as follow :

Thailand National Committee for the IHP  
Department of Water Resources  
180/3 Rama 6 Road, Samsaennai District,  
Phayathai Bangkok, 10400, Thailand  
Tel : +66-22986604 Fax: +66-22986604  
Email : sukonth\_a@monre.go.th

During this period, Thailand National Committee for IHP (THC-IHP) held a meeting to revise and review all activities to conduct the new appropriate Nation Policy and Master Plan on Hydrology.

#### 1.1.2 Status of IHP-VI activities

- a) Implementation of the Integrated Water Resources Management in 29 small sub-basins out of 25 major river basins.
- b) Organization of the Training on Information, Education and Communication to the stakeholder and local communities in the river basins.
- c) Flood Forecasting and Management in Upper Mun-Chi River Basin
- d) Continuing installation of Flood and Landslide Early warning System : People Participatory Approach and Community Based in Upland Risk Area
- e) Continuing construction of the water supply systems to provide clean water and consumption targeting for all villages of the whole country.

#### 1.1.3 Decisions regarding contribution to/participation in IHP-VII

Thailand National Committee for the IHP presents its support to the proposal framework for IHP-VII. Some specific issues that should be highlighted are

- Methodologies for integrated river basin management
- Promotion of public awareness raising on water management
- Institutional development and networking for WET
- Guidelines on the sustainable and Integrated water Management with due consideration to public's living quality and participation
- Increasing the available sources water by improving both existing natural and man-made sources
- Flood and Drought Management

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

#### 1.2.1 National/local scientific and technical meetings

- National Workshop on Impact of Climate Change on Water Resources Engineering, 30-31 Aug 2007, Bangkok Thailand

#### 1.2.2 Participation in IHP Steering Committees/Working Groups

- a) The representatives from TNC-INP attended the 14<sup>th</sup> Regional Steering Committee Meeting for the IHP in Southeast Asia and Pacific on International Symposium on Managing Water Supply for Growing Demand 16-20 October 2006, Bangkok, Thailand

#### 1.2.3 Research/applied projects supported or sponsored

- 1 Delineation of River basin Boundaries (25 Major River Basins including 254 Sub-river Basins).
- 2 Integrated Water Resources Management : Case study in Lower Loei Basin.
- 3 Integrated Water Resources Management in Nam Yom Basin
- 4 Study on Social Model for Water Conflict in Bangpakong Basin

- 5 NDVI (Normalize Differential Vegetable Index) for Drought Forecasting.
- 6 API Application in Flash Flood and Landslide.
- 7 Application of Local Wisdom in Water Resources Management.
- 8 The Development of Participatory Process to empower Local Community in Water Resources Management : Case Study in Mun Basin.
- 9 Study on the Risk Factors and community livelihood in Flood and Landslide Hazard Area : Case Study in Upper Ping River Basin.

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

- a) Collaboration with Mekong River Commission in Appropriate Hydrological Network Improvement Project, Basin Development Plan, Water Utilization Program, Environment Program, Flood Mitigation Management Program and Drought management program, Mekong HYCOS and start up Integrated Knowledge Management Program.
- b) Collaboration with Typhoon Steering Committee
- c) Collaboration with APN Inter-Government on Global Change
- d) Collaboration in Convention on Climate Change
- e) Collaboration with ASEM Waternet
- f) Collaboration with NARBO (Network of Asian River Basin Organization)
- g) Collaboration with ASIAN Working Group on Water Resources Management

#### 1.2.5 Other initiatives

- Study on Integrated Water Resources Management in Nam Yom Basin Project in collaboration with ADB
- Study on Social Model for Water Conflict in Bangpakong Basin Project in collaboration with ADB
- Thai-New Zealand Partnership in Exchange of Research on Water Allocation

### 1.3 Educational and training courses

#### 1.3.1 Contribution to IHP courses

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#### 1.3.2 Organization of specific courses

- Training on Telemetry and MIKE II Model, 22-26 Jan 2007, Bangkok.

- Training on Hydrology and Applied Hydrology, 14-18 May 2007, Kanchanaburi.
- Training on Decision Support Framework in Mae Kok Basin and Nam Songkhram Basin , 25-29 Jun 2007, Bangkok.
- Training on Applied GIS for Water Resources Management, 25-26 Jun 2007, Bangkok
- Training on Research Training for New Researcher, 30-31 Aug 2007 Bangkok.

### 1.3.3 Participation in IHP courses

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## 1.4 Publications

- Hydrological and meteorological Year Book 2005
- Development of Master Plan for Management of Natural Disasters : Floods and Droughts
- Development of Master Plan for Management of Natural Disasters : Landslides
- Flood Early Warning Model

## 1.5 Participation in international scientific meeting

### 1.5.1 Meetings hosted by the country

- The 14<sup>th</sup> RSC Meeting for UNESCO-IHP Southeast Asia and the Pacific in conjunction with International Symposium on Management Water Supply for Growing Demand, 16-20 October 2006, Bangkok, Thailand
- Thematic Workshop on Water Allocation and Water Rights 1 December 2006 for NARBO (Network of Asian River Basin Organization)
- 1<sup>st</sup> Technical Seminar of ASEM Waternet, 23-25 April 2007 for ASEM Waternet

### 1.5.2 Participation in meetings abroad

A representative from Thailand participated in

- The 40<sup>th</sup> Typhoon Steering Committee, Makao, China
- Study Tour on Flood Management, 14-17 March 2007, Japan
- Study Tour on Water Allocation, 11-15 June 2007, New Zealand
- Study Tour on Dam Management and Water Resources Conservation, 8-16 June 2007, China
- Study Tour on Watershed Management, 17-21 September 2007, Australia

## 1.6 Other activities at regional level

### 1.6.1 Institutional relations /co-operation

- TNC-IHP has remained close coordination and contacts with UNESCO Jakarta Office in many activities.
- Close coordination and contacts with the United Nations Economic and Social Commission for Asia and the Pacific



(UNESCAP) and World Meteorological Organization (WMO) as member of the Typhoon Committee

#### 1.6.2 Completed and ongoing scientific projects

- Developed and improvement in the hydrological and meteorological monitoring network in Bangpakong River Basin and Prachup Khirikhan Coast Basin for Water Resources Management including Flood forecasting and management
- Established Telemetry hydro-meteorological stations in Mun and Chi river basin for Flood forecasting and management.
- Continued to develop and set up a flood and landslide warning system in mountain and upland area
- Promote the Year of National Water Agenda in Various Campaign Weeks.
- Preparation and Promotion the Master Plan for Short Term and Long Term Plan National Flood Mitigation.

## 2 FUTURE ACTIVITIES

### 2.1 Activities planned until December 2008

- Strengthening cooperation with other countries in Lower Mekong River Basin
- Raise public awareness and education in Integrated Water Resources Management
- Raise public participation in Integrated Water Resources Management
- Implementation of Integrated Water Resources Management in a pilot river basin
- Promote the Year of National Water Agenda in Various Campaign Weeks.
- Preparation and Promotion the Master Plan for Short Term and Long Term Plan National Flood Mitigation.

### 2.2 Activities foreseen for 2009-2010

- Continuation of Collaboration with RSC for Asia and Pacific
- Continuation of involvement in *Asian-Pacific FRIEND*
- Enhancing activities contributed to IHP-VII
- Enhancing activities in Flood and Drought Management
- Continuation of promotion on Integrated Water Resources Management
- Expansion of an Integrated Water Resources Management implementation to the rest of the country

### 2.3 Activities envisaged in the long term

- Enhancing activities contributed to IHP-VII
- Enhancing activities in Flood and Drought Management
- Expansion of an Integrated Water Resources Management implementation to the rest of the country

- Continuation of raising public awareness and education in water resources management
- Continuation of raising public awareness in efficient water resources management
- Continuation of raising public participation for better water resources management

## **NATIONAL REPORT ON IHP RELATED ACTIVITIES**

### **I. ACTIVITIES UNDERTAKEN IN THE PERIOD OCTOBER 2006 - OCTOBER 2007**

#### **1.1 Meetings in the IHP National Committee**

##### *1.1.1 Decisions regarding the composition of the IHP National Committee*

The Committee has remained unchanged during the period under review, with the Chairman being Dr. Tran Thuc, Director of Vietnam Institute of Meteorology, Hydrology and Environment - Ministry of Natural Resources and Environment.

##### *1.1.2 Status of IHP-VII activities*

Prepare for the participation/contribution to IHP-VII activities.

##### *1.1.3 Decisions regarding contribution to/participation in IHP-VII*

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

##### *1.2.1 National/local scientific and technical meetings*

Scientific and technical meetings are generally held within the context of the Ministry of Natural Resources and Environment and professional societies (particularly the Viet Nam Natural Resources and Environment, Viet Nam Fluid Mechanics, and Viet Nam Geography Societies). There have been no meetings specifically under the aegis of the IHP. The Chairman and the Secretary of the IHP National Committee meet regularly to discuss IHP matters.

##### *1.2.2 Participation in IHP Steering Committees/Working groups*

Viet Nam participated in the establishment of the Regional Steering Committee for Asia-Pacific. The members of the Viet Nam National Committee for the IHP have attended and participated actively in all of the annual meetings of the Regional Steering Committee.

Participate in Asian Pacific FRIEND.

##### *1.2.3 Research/applied projects supported or sponsored*

- *Climate Change Impacts on Water Resources and Adaptation Measures for Huong River Basin*, Research project funded by the Netherlands Climate Assistance Program;
- *Poverty and Environment (PEP)*, Research project funded by UNDP;
- *Benefits on Climate Change Adaptation from Small and Medium Scale Hydropower Plants: Synergies and Trade-offs with Rural Development*, Research project funded by DANIDA;

- *Development of Climate Change Scenario for Vietnam and the Region*, Research project in collaboration with SEA START;
- *Climate Change Check for all DANIDA Supported Projects in Vietnam*, Research project funded by DANIDA;
- *Impact of Climate Change on Water Resources and Adaptation Measures*, Research project funded by DANIDA;
- *Impact of Sea Level Rise and Adaptation Measures*, Research project funded by DANIDA;
- *Flash Flood Zoning and Warning for Mountainous Areas of Viet Nam*, Research project funded by the Vietnamese Government;
- *Drought Zoning and Mapping for Southern Central Region and Highlands of Viet Nam*, Research project funded by the Vietnamese Government;
- *Tsunami Risk Mapping for Coastal Areas of Viet Nam*, Research project funded by the Vietnamese Government;
- *Integrated Water Resources Planning for the Economic Zone of the Red River Delta*, Research project funded by the Vietnamese Government;
- *Natural Resources Utilization, Environmental Protection, and Disaster Prevention for Lo-Chay River Basin*, Research project funded by the Vietnamese Government;
- *Computations of Oil Spill in the East Sea*, Research project funded by the Vietnamese Government;
- *Water Quality Modeling for three River Basins: Cau, Nhue - Day, and Sai Gon - Dong Nai River*, Research project funded by the Vietnamese Government;
- *Development of a Decision Support Framework for Water Management for Ca River Basin*, Research study funded by the Ministry of Natural Resources and Environment;
- *Environment Flow Study for Cau River*, Research study funded by the Ministry of Natural Resources and Environment;
- *Study on the Water Quality Target for the Red River*, Research study funded by the Ministry of Natural Resources and Environment;
- *Development of a Decision Support System for Conflict Resolution in Water Resources Management*, Research study funded by the Ministry of Natural Resources and Environment;

#### 1.2.4 Collaboration with other national and international organizations

- In collaboration with SEA START, organized a Workshop entitled “*Climate Change in the 21<sup>st</sup> Century: Some Initial results*”, Hanoi, November 2007.
- In collaboration with DANIDA, organized a Workshop entitled “*Climate Impact and Adaptation*”, Hanoi, October 2007.
- In collaboration with SEA START, organized a Workshop entitled “*Climate Change in the 21<sup>st</sup> Century: Some Initial results*”, Hanoi, March 2007.
- The VNNC IHP has yearly meeting with the Vietnam National UNESCO Commission,
- The Chairman and Secretary General of the National Committee are in frequent contact with the Vietnam’s Permanent Representative to the WMO. This contact enables coordination of activities under the aegis of IHP and the WMO in Viet Nam,

- Cooperate with Ministry of Natural Resources and Environment of Viet Nam and other Agencies to organize a meeting on the occasion of the World Water Day,
- Members/representatives of Vietnam NCIHP participated and contributed to many national councils.

#### *1.2.5 Other initiatives*

### **1.3 Education and training courses**

#### *1.3.1 Contribution to IHP courses*

None.

#### *1.3.2 Organization of specific courses*

None.

#### *1.3.3 Participation in IHP courses*

Several Vietnamese have participated in IHP courses and workshops during the reporting period, including IHP Training course on Numerical Prediction of High-Impact Weather systems, Urban Storm Water Management.

### **1.4 Publications**

- Thuc T. and Tuong. L. N, Climate Change and Sustainable Development.
- Thuc T. and Tuyen. H. M., Development of a Decision Support Framework for Water Resources Management for Ca River Basin, Research Report.
- Ha L. T., Natural Resources Utilization, Environmental Protection, and Disaster Prevention for Lo-Chay River Basin, Research Report.
- Thuc T. Ca V. T. and Thai T. H., Computations of Oil Spill in the East Sea, Research Report.
- Thai T. H., Water Quality Modeling for three River Basins: Cau, Nhue - Day, and Sai Gon - Dong Nai River, Research Report.

### **1.5 Participation in international scientific meetings**

- Attending the 26<sup>th</sup> Meeting of Subsidiary Bodies, 7-18 May 2007, Bonn, Germany.
- Attending and present paper at the “High-Level Meeting on Forests and Climate”, Sydney, Australia, 23 -25 July 2007.
- Attending European Capacity Building Initiative Fellowship and Seminar on Climate Change 3 to 8 September, 2007
- Attending review workshop on “Vulnerability Assessment of Freshwater Resources in South and Southeast Asia, 12 -14 September 2007, Bangkok, Thailand.
- Attending Workshop on “Reducing the Threats and Harnessing the opportunity of Climate Change” 29-30 October, Kuala Lumpur, Malaysia.
- Attending the 13<sup>th</sup> Regional Steering Committee Meeting for Southeast Asia and the Pacific.

## **1.6 Other activities at a regional level**

### 1.6.1 Institutional relations/co-operation

None

### 1.6.2 Completed and ongoing scientific projects

None under the aegis of IHP-VI

## **II. FUTURE ACTIVITIES**

### 2.1 Activities planned for 2007-2008

- Attending meeting of 15<sup>th</sup> IHP Regional Steering Committee for Southeast Asia and the Pacific.
- Participating in regional and national activities of IHP.

### 2.2 Activities envisaged in the long term

Unknown at this time.

**ANNEX 7**

**SCHEDULE FOR PUBLICATION OF CATALOGUE OF RIVERS VOL VI**

## ANNEX 7

### SCHEDULE FOR PUBLICATION OF CATALOGUE OF RIVERS VOL VI

#### Catalogue of Rivers, Vol. VI

- Volume VI should include new rivers and will keep the same format as Vols. I-V.
- Now only one new basin from Malaysia and two new basins from Indonesia.
- Member countries are requested to submit 1 - 3 new rivers (by when??).
- Data attached to the river is recommended to follow the new format if possible/available.

#### Website Platform of Catalogue of Rivers

- A new platform will be prepared to include all the basic information described in the Catalogue.
- The information of each river can be updated anytime in the future.
- Everybody can access to the Catalogue of Rivers through this platform; the number of the printed book and CDs is limited.

#### Catalogue of Rivers Supplement

- Data for any rivers in the Catalogue will be published in CD form as “Catalogue of Rivers Supplement No.X”.
- This supplement will be published from time to time for upgrading data.
- Supplement No.1 will be published before May 2008 with 7 rivers already submitted by Malaysia (5), Thailand (1) and Japan (1).
- The data format is already proposed by Dr. Chikamori.
- Collected data for this publication will be sent to HTC.

Country	River	Serial Number	Vol. incl. gen. info. (issued date)
Indonesia	Kali Ciujung		New Basin!
	Kali Ciliman		New Basin!
Japan	Shimanto-gawa	Japan-7	III (2000)
Malaysia	Rajang River	Malaysia-1	I (1995)
	Johor River	Malaysia-2	II (1997)
	Kelantan River	Malaysia-3	IV (2002)
	Chalok River	Malaysia-4	IV (2002)
	Pahang River	Malaysia-5	V (2004)
	Damansara River	Malaysia-6	New Basin!
Thailand	Nam Ping	Thailand-1	I (1995)



**ANNEX 8**  
**RESOLUTIONS**

## RESOLUTION RSCXV-1

### Promoting Flood Research

The IHP RSC for South East Asia and the Pacific

- Recalling that flooding is one of the major natural disasters in South East Asia and the Pacific and causes extensive damage and losses in the region;
- Recognizing that the mutual collaboration of UNESCO category II centres and IHP national committees of the region is important to promote science and technology and reduce the impact of flood disasters in the region;
- Also recognizing the official negotiation between ICHARM, HTC and UNESCO Jakarta office at UNESCO's Asia Pacific Category II Centres' meeting held in Bangkok on 26-27 September 2007 to cooperate in research activities;
- Considering the proposed UNESCO category II centres' assessment of their performance and contribution to UNESCO-IHPVII program as well as IFI (International Flood Initiative) secretariat activities;
- Noting that ICHARM and HTC have participated in the 15<sup>th</sup> IHP-RSC meeting in Manila, the Philippines on 22-23 November 2007 and that they have the intention to cooperate with participating countries to conduct joint research activities;
- Requests UNESCO Jakarta Office to seek support to realize the objectives of the study on early warning systems for flood risk reduction.

## RESOLUTION RSCXV-2

### Promotion of hydrological data exchange and research

#### Asian Pacific FRIEND and Catalogue of Rivers

The IHP RSC for Southeast Asia and the Pacific

- Recalling that RESOLUTION RSCXIV-2 “Asian Pacific FRIEND Water Archive” requested RSC and associated Working Groups to facilitate the activities relating to the APF Asian Water Archive and the Catalogue of Rivers;
- Noting that APF and the Catalogue of Rivers for Southeast Asia and the Pacific (Vols. 1-5) have contributed to scientific research and strengthened collaboration in the region, in a mutually complementary manner;
- Recognizing that data collected and stored so far in the Water Archive and the five volumes of Catalogue of Rivers are still insufficient and not frequently updated; and upgrading is an urgent matter for the success of APF Phase II (2002-2007);
- Also recognizing that the data included in the forthcoming volumes of the Catalogue of Rivers should contain more tractable data for scientific research such as longer time series with shorter-term (e.g., hourly) observations and be effectively related to the Asian Water Archive;
- Requests Member countries to provide data and promote hydrological research relevant to the AP FRIEND activities and the Catalogue of Rivers and its supplement volumes for updated information, and to promote hydrological research;
- Also requests the Humid Tropics Center in KL to frequently and efficiently upgrade the Archive in good cooperation with other nodes in Melbourne (Australia) and others.

**ANNEX 9**

**MINUTES OF THE MEETING OF THE 11<sup>th</sup> COORDINATION COMMITTEE OF THE  
REGIONAL HUMID TROPICS HYDROLOGY AND WATER RESOURCES CENTRE  
FOR SOUTHEAST ASIA AND THE PACIFIC (HTC)**

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

**Intercontinental Manila  
Manila, Philippines, 22<sup>nd</sup> November 2007**

## Minutes

### Participants

<b>NAME</b>	<b>COUNTRY</b>
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	UNESCO - APIA
R JAYAKUMAR	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 10<sup>th</sup> Coordination Committee meeting

The Chairman referred the meeting to the Minutes of the 9<sup>th</sup> 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.

10 <sup>th</sup> 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 9 <sup>th</sup> 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 5<sup>th</sup> 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 8<sup>th</sup> Malaysian National Plan undertaken over the period 2005-2007. These projects were funded by the Malaysian government. Projects included in the 9<sup>th</sup> 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**

<b>Action</b>	<b>By whom</b>
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