



INTERNATIONAL HYDROLOGICAL PROGRAMME

17th IHP Regional Steering Committee meeting for Southeast Asia and Pacific

Wuhan, China, 5-6 November, 2009

FINAL REPORT

IHP-VII Regional Steering Committee meeting | No. 17
Regional Steering Committee for Southeast Asia and the Pacific
UNESCO Jakarta Office, 2009

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**The 17th IHP
Regional Steering Committee Meeting for
Southeast Asia and the Pacific**

**Wuhan, China,
5-6 November 2009**

Chairman: Mr Leonardo Liongson (Philippines)
Secretary: Mr Kaoru Takara (Japan)

UNESCO Representatives: Mr. Giuseppe Arduino (Jakarta Office)
Mr. R. Jayakumar (Beijing Office)

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

Observing Countries and Organizations: None

1 OPENING

The RSC Chair Mr Leonardo Liongson (Philippines) opened the meeting at 09:05 am on 5 November 2009 and welcomed the participants. The China National Committee was thanked for organizing the conference and meeting.

2 ADOPTION OF AGENDA

The draft agenda was presented by the Chairman. A number of Agenda Items were changed and the agenda in Annex 2 was adopted.

3 ELECTION OF RAPPORTEUR

It was agreed that the task of Rapporteur would be carried out by Mr Trevor Daniell (Australia) with support from Mr Richard Ibbitt (New Zealand).

4 SECRETARIAT REPORTS

4.1 UNESCO JAKARTA OFFICE REPORT

Mr Arduino introduced his colleagues Mrs Masami Nakata, Mr Takeshi Mori (Jakarta) And Mr R Jayakumar (Beijing). He then presented his report. Some key points follow, with details of other topics being noted elsewhere in these minutes and the complete report as Annex 3.

The status of 12 action items from the 17th RSC meeting in Mongolia were outlined. Specific requests were made as follows:

- Countries to give names of people who might participate in the Transboundary Groundwater Workshop by Dec 2009

There was a meeting with UNESCO Jakarta IHP and MEXT representatives for the Japanese Fund in Trust (JFIT). Discussions were carried out on the use of these funds for various activities including the Nagoya Training Courses.

A number of activities undertaken by UNESCO Jakarta, such as the Hydrogeological investigations in Viet Nam were described.

The complete report, including status of action items from the 16th RSC meeting, is included as Annex 3.

4.2 UNESCO BEIJING OFFICE REPORT

Mr. Jayakumar reported on the activities from UNESCO (Beijing Office) such as capacity building and research/pilot projects.

Mr Jayakumar also reported on activities on UNESCO Chair on sustainable groundwater and transboundary aquifers in the region. A complete report is included as Annex 4.

5. REPORT ON THE IHP INTERGOVERNMENTAL COUNCIL

An outline of important points from the bureau meeting of the Intergovernmental Council held in June 2009 was given by Mr Takara. The full proceedings of this meeting have been published by UNESCO.

A number of issues were covered at the Intergovernmental Council Bureau Meeting:

- How the IHP 7th phase should proceed and the naming of IHP for IHPVIII;
- Mr András Szöllösi-Nagy moved to IHE, UNESCO Category 1 Centre in September;
- The activities in Africa were discussed at some length as this was considered a priority region;
- Cooperation with International NGOs and other organizations;
- Promotion of water related education. This is part of the UNESCO Decade of Education for Sustainable Development (2005-2014); and
- 19th Session of the Intergovernmental Council will be held in 5th to 9th July and the Kovacs Symposium 2nd to 3rd July 2010.

Mr Ibbit pointed out that concern had been expressed at the last RSC meeting concerning the budgetary cuts and there had been any discussion at the Bureau meeting.

It was pointed out that resources need to match expectations and vice versa

Mr Daniell as Chairman of the Intergovernmental Finance Committee supported the statements by NZ.

Ms Yan Huang replied that the matter was raised at the general Conference of UNESCO and they provided a n explanation but no real details were forthcoming.

Mr Soontak Lee expressed that the budget papers were distributed at the general Conference.

6 COUNTRY REPORTS

All country reports are included as Annex 5.

6.1 AUSTRALIA

Mr Trevor Daniell noted that the Australian Federal government has indicated a large increase in funding for water issues. Mr Daniell noted that IHP activities continued to receive the interest and support within Australia with Bruce Stewart (Bureau of Meteorology/WMO), Prof Ian White, Tony Falkland, Peter Dillon and other members of the Committee being actively involved. Many water activities are being carried out in Australia at all levels of government and research institutions due to the prolonged drought and upgrade of Australian Rainfall and Runoff (ARR) Flood analysis project.

A high priority has been the work in the assistance given to Pacific Island on the adaption policies and Science for climate change on water resources.

6.2 CAMBODIA

There were a number of activities that were described such as:

- attendance at the 4th International Coordination Group (ICG) meeting of the GEOSS Asian Water Cycle Initiative (AWCI) This was held at the Kyoto Research Park, Kyoto, Japan, 6-7 February 2009;
- attendance at the workshop on 10-15 April 2009 on technical model calibration for SWAT and IQQM model held at Mekong River Commission MRC in Lao PDR, supported by MRC; and
- participant and cooperation on a field trip from 10 September 2009 to 25 October 2009 on data collection and soil moisture and rain gauge and automatic weather station AWS installation.

6.3 PR CHINA

Ms Huang Yan presented the report for the China IHP National Committee. The full report contains details of many activities, both carried out and planned, across all IHP areas. Some selected highlights follow.

The Ministry of Water Resources has approved new members for the China IHP National Committee. The China IHP committee met before this meeting in Wuhan.

Ms Huang Yan reported on meetings she had attended in coordinator of the Hindu Kush Himalayan Flow Regimes from International Experimental and Network Data (HKH-FRIEND) programme in November 2008. Activities in this role have included attendance at the 7th FRIEND Intergroup Coordination Committee (FIGCC) meeting in Adelaide, Australia in April 2008, and a meeting at UNESCO Paris, France, in September 2008 to expand opportunities for joint research.

The International Small Hydropower Centre organised a training workshop on small hydropower and community sustainable development in Hangzhou, China in April-May 2008. This course linked directly to the IHP-VII theme related to water and energy and involved 46 participants from 23 developing countries.

6.4 DEMOCRATIC PEOPLES REPUBLIC OF KOREA

The Korea DPR delegation expressed their thanks and outlined a series of activities that had been undertaken within the country including

- A number of major floods
- Research activities.
- Participation in workshops
- Flood forecasting in small and medium basins

- Hydrometeorological information service
- Water quality issues
- Some in country publications

6.5 JAPAN

Mr Kaoru Takara presented the Japan IHP National Committee report. The report covered progress on the Catalogue of Rivers, the Asia-Pacific FRIEND project, the Predictions from Ungauged Basins (PUB) project, and the International Consortium on Landslides (ICL).

The review and evaluation meeting on IHP activities supported by the Japanese Fund In Trust (FIT) was presented. This is covered in more detail in the UNESCO Jakarta report (Annex 3).

6.6 LAO PDR

The Dept of Meteorology and Hydrology has been transferred to the Ministry of Water Resources and Environment. As yet the IHP committee for Lao has not yet been formalized.

6.7 INDONESIA

Ms Gadis Sri Haryani presented the report of the Indonesian IHP National Committee. The report contains descriptions of a wide range of activities and meetings, with an attempt to align the activities to Phase VII.

The Indonesian National Committee for IHP has a total of 18 members.

The Asia Pacific Centre for Ecohydrology (APCE) was agreed to be established at the October General Conference of UNESCO in October in Paris. It also continues a programme of training workshops and participations in external meetings.

6.8 MALAYSIA

Mr Azmi Mhd Jafri noted there has been a major change of guard on the Malaysian IHP (MIHP) National Committee.

MIHP plans its activities through its Executive Committee and implements work through three standing committees and associated working groups on Research, Education Training and Public Information, and on Standardization of Hydrological Practices. The standing committee on research coordinates and formulates proposals for research projects. An overview of the activities and courses undertaken were given.

6.9 MONGOLIA

Mr Basandorj presented an overview of national activities under 4 main headings. These included training and workshops for a variety of activities in water resources, water supply, sanitation, water policy household water treatment.

Regional and International Activities included participation in Central Asian semi arid regions, ecowater efficient water infrastructure and water related disasters.

Mr Basandorj concluded by stressing the need for support from UNESCO for the implementation of IHP VII for improved water education in both urban and rural areas.

6.10 MYANMAR

There are 17 members of the committee. The activities in Myanmar have been aligned to the IHP VI are now actively pursuing aligning to the IHPVII activities.

6.11 NEW ZEALAND

Mr Dennis Jamieson briefly described IHP related activities in New Zealand, highlighting freshwater resources data collection, effects of land use intensification on water quality and quantity, reducing the effects of weather related hazards and the FRIEND Motueka Basin project. The importance of collaboration was emphasized with examples given of the New Zealand work with the WMO and the South Pacific Applied Geosciences Commission (SOPAC), and important ongoing and active linkages between the New Zealand Hydrological Society and the Korean Water Resources Association (KWRA).

Additional information was presented on initiatives to work in a collegial manner with Pacific Island based water specialists, introduce new technology via education and training, and to ensure international linkages were maintained and expanded. The emphasis was stressed on how to support colleagues in the Pacific Island countries as much as possible.

Much more information is now being published on line through NIWA and through the EDENZ system which is GIS based.

6.12 PAPUA NEW GUINEA

Mr Virobo presented the PNG report which noted the challenges facing the water resource work given a switch in emphasis and resources from protection and conservation of the environment to policy development. There are 8 members of the IHP committee.

There are a number of government policies on sustainable development and the activities related to national water events have been carried out in flooding and disaster management. A number of projects in water resources are funded by SOPAC with EU funding support.

Significant developments reported include an upsurge in mining, infrastructure and energy related activity. PNG gas energy projects are related to development of water resources especially in the area of environmental quality.

6.13 PHILIPPINES

Mr Tabios described the operation of the National Committee over the previous year, highlighting the committee's 25 member organisations.

A range of activities were reported on by Mr Tabios. These included meetings and training associated with the Philippine Water Partnership and participation in IHP training courses conducted by the University of Nagoya.

6.14 KOREA (REPUBLIC OF)

Mr Soontak Lee presented information on the wide range of activities related to the IHP undertaken in the Republic of Korea. The work described, included a comprehensive range of projects associated with the implementation of IHP-VII.

The linkages with many different agencies in Korea were explained.

6.15 THAILAND

Ms Runghirunviroj noted that the Thai National Committee (TNC-IHP) Chair is now Mr Hungspreung and that the committee has a total of 17 members. Information was given on IHP-VI activities including the implementation of Integrated Water Resources Management (IWRM) in 29 small sub-basins, extension activities with local communities, flood forecasting on the Chi-Lower Mun river basin, the installation of Flood and Landslide early warning systems and the construction of village water supply systems. Specific highlighted issues for IHP-VII are integrated river basin management, public awareness of water management, institutional development, guidelines for IWRM with public participation, increasing available water sources and flood and drought management.

Ms Runghirunviroj described collaboration with a wide range of national and international organizations including multiple projects with the Mekong River Commission, the Asian Working Group on Water Resources Management and ADB projects. Other initiatives include a Hydro-Agronomic Economic Model for the Mekong River Basin, the Mekong HYCOS project, and an impact study of climate change on irrigation systems. The presentation concluded with an overview of expected future activities.

6.16 VIETNAM

Mr Hoang noted that Mr Tran Truc is now Director General of the Vietnam Institute of Meteorology, Hydrology and Environment (IMHEN) under the Ministry of Natural Resources and Environment.

The focus of IHP activities in Vietnam was at the national level. A number of meetings were held in Vietnam including the APFriend meeting on Floods and IDFs as well as the Flood Forecasting project. A number of major publications have been submitted to parliament on Climate change.

Of particular concern to Vietnam are the effects of climate change and sea level rise due to climate change. A priority has been the development of dry season reservoir rules for Central Vietnam.

The VNNC IHP has a yearly meeting with the Vietnam National UNESCO Commission

7. INTERNET EDUCATION/LECTURE

Ms Masami Nakata, Programme Specialist for Engineering Sciences and Technology outlined a UNESCO e-learning programme which was mobilising Science and Technology Knowledge in Asia and the Pacific. A linkage of a number of partners was described in how to use high speed networks of satellite, internet and intranet for higher education and research. INHERENT (Indonesian Higher Education and Research Network) has a network for sharing education around Indonesia connecting over 300 universities. PREGINET (Philippines Research Education, Government Network) is linking 168 organisations within the Philippines, MYREN (Malaysia Research and Education Network) connects about 28 partners in Malaysia. Regional and sub-regional networks of TEIN (Trans-Eurasia Information Network) and SOI (School on Internet Asia) are connecting above mentioned NRENs (National Research and Education Network) in the region. The general public has access to the Unesco material on an archive server

Mr Achmad Husni Thamrin then presented on the Asian Collaboration of SOI using UDL for transference of information and the connections required for this happen.

On December 3rd and the 10th there will be a course on Climate Change and Water Resources Management from Kyoto University.

Action: Countries will be informed of the links and sites to visit for the material on this initiative.

8. DEVELOPMENT OF CENTRES UNDER THE AUSPICES OF UNESCO (INDONESIA, THAILAND AND CHINA)

The following reports were given

- Indonesia. Mr Hehanussa gave a report on the Ecohydrology Centre based in Indonesia. This Centre will actively participate in projects related to reservoir eutrophication and to possible water scarcity issues affecting major cities. Next May there will be a meeting which will connect Culture with Water Management. In Indonesia there is a new law which breaks the country into 421 catchments
- Thailand: A proposal for a Hydraulic Engineering Centre had been sent to UNESCO via the Asian Institute of Technology (AIT) but no further information has been received from AIT.
- China: Mr Liu Heng gave a description of the progress of the International Research Centre on Karst, Guilin which was established in December 2008. This was further elaborated on by Giuseppe Arduino. An outline of the activities that were being undertaken by the centre were described including a workshop in Nov –Dec 2009

9. REPORT FROM THE ASIA-PACIFIC FRIEND

Mr Jamieson updated the Committee on the Intensity Frequency Duration (IFD) workshop in Ho Chi Minh City in March 2009. The 2 day workshop had one day spent on IFD and one day on flood estimation methods.

- Mr Jamieson then outlined what would be undertaken for the peak flood estimation as decided at the APFRIEND workshop held on Tuesday 3rd November as follows:
 - A lot of work is underway on IDF/Flood design methods in many countries
 - Some countries fast developers of new methods – others more likely to adopt and adapt
 - Updating of flood estimation methods is more like a continuing process than a regular update.
 - Ability to identify who is doing what in each country will be important – demonstrates value of IHP network of people/organisations.
 - Need to recognise limits of what work can be achieved in volunteer project

The Project Outline is

Stage 1 (Year 1)

- Flood peak estimates at point
- Detail country methods: “Catalogue of Methods”
- Incorporate notes on climate change, land use intensification approaches
- Identify agencies actively developing/updating methods
- Output: “Catalogue of Methods” (Working title)
 - List relevant organisations in each country
 - Summarise (list) methods used in each country
 - Descriptive material in report form suitable for DRH
 - Initial project description to DRH
- Outcome
 - Common themes identified across many countries

- Ensure countries known to have major development efforts underway (i.e. not funded by UNESCO) are able to be lead providers (Japan, Korea, Australia...others??)
- All countries in APFRIEND area can use document, even if they haven't yet participated
- DRH used to disseminate information and encourage participation

Stage 2 (Year 2)

- “Hydrograph” focus – techniques to convert the IDF information into useful flood design
- Incorporate IDF supplementary information (Map, list of methods, standardisation/cross-correlation of terms)
- Introduce Depth-Area-Duration methods and other important refinements under development in some countries
- Output: “Flood design hydrographs” (Working title)
 - Report identifying promising new methods, (applied) research programmes and listing key contacts
 - Report will include important developments in incorporating climate change, land use intensification and any other emerging issues in flood estimation techniques.
- Outcome
 - APFRIEND region has a better coordinated effort in development of better flood design methods to help avoid disasters, through better design of structures and improved risk management
 - Updating of flood design methods recognised as a dynamic, ongoing process that adapts to new challenges rather than an occasional refinement of numbers
 - DRH used to disseminate information and encourage participation

Actions required and Timetable

Coordinator: Dennis Jamieson, as well as carrying out project activities the coordinator will liaise with DRH leader, UNESCO Jakarta and IHP Secretary

Country representatives are required from each country. The RSC is to be requested that each country nominate a focal person to assist Mr Jamieson with individual country aspects of the proposal. The default person is to be the National IHP Committee Secretary.

Stage 1:

Action Items

- Coordinator to circulate report outline for “Catalogue of Methods” by 31 December 2009. This will include a description of information required from each country which will be brief and descriptive rather than technically detailed. The report will include a listing of key contacts in each APFRIEND country who participates.
- Country representatives to assemble and submit information required by 31 March 2010
- Coordinator to circulate draft report by 30 September 2010
- Finalisation at RSC/APFRIEND meeting November 2010

Stage 2:

Action Items

- Coordinator to circulate report outline for “Flood Hydrograph Techniques” by 31 December 2010. This will include a description of information required from each country which will be brief and descriptive rather than technically detailed.
- Country representatives to assemble and submit information required by 31 March 2011
- Coordinator to circulate draft report by 30 September 2011
- Finalisation at RSC/APFRIEND meeting November 2010

10 FLOOD FORECASTING AND WARNING SYSTEM ASSESSMENT (SEAP)

Mr Mohd Nor gave the report that he had presented at the Workshop earlier in the week. He summarised the preliminary assessment in one table with aspects of flood warning system, flood forecasting system, whether they are operational or not, the land use, area and rainfall/streamflow stations in the catchment for the four river basins being examined in Malaysia, Indonesia, Vietnam and the Philippines.

Mr Mohd Nor thought that this study could have a 2nd phase include four further catchments for this study in four more countries (possibly Cambodia, China, Rep. of Korea and Thailand).

Mr Tabios added that indeed the social consequences of a flood forecasting system are very important to justify to Funding organizations the need to have flood forecasting systems. Yan Huang and Peter Hehanussa alerted the committee to the problems that need to be addressed

Action Item

It is recommended that the document and study address the social consequences of the flood forecasting systems that are in place on the people downstream and the damages and people at risk downstream.

11 PROGRESS OF THE CATALOGUE OF RIVERS, VOLUME VI

Mr Chikamori gave a presentation that gave details of the rivers that have been submitted for the Volume 6 of the Catalogue of Rivers and the Supplement No 1 volume.

He then gave a demonstration of the website at Kyoto University of the Catalogue of Rivers website.

The Action Item of the previous RSC were undertaken only by a handful of countries with 2 countries submitting new rivers and a total of 10 rivers being in the supplement report.

Action : All countries to progress with rivers for inclusion in Vol. VI and Supplement No 1 in the next 12 months

12 IHP TRAINING COURSES IN THE REGION (19TH IHP NAGOYA TRAINING COURSE, JAPAN 2009 IN KYOTO)

Mr Arduino gave a presentation on the 19th IHP Nagoya Training Course. The key point of the presentation was to draw attention to changes in the method of delivery for this course and future courses. Electronic textbooks will be uploaded to the site before courses and lecture presentations will be uploaded immediately after the lecture. The courses will be in the future part of Masters Program in Environmental Studies at Nagoya.

Non-participants in the training course who have an interest in the topic will be able to participate in an interactive forum for a certain period following the course. This is to increase the availability of course content to a wider audience.

Mr Mohd Nor praised the series of on line lectures but questioned how can everyone participate in these courses.

Mr Takara then announced that there will be internet lectures on the 3rd and 10th of December.

Mr Richard Ibbit suggested improvements in the process of announcement of the courses and this was duly acknowledged by Mr Arduino as being a problem and in the future this would be addressed with early dissemination of the dates.

Mr Jayakumar noted that it was UNESCO policy to address the gender balance by encouraging female participation in UNESCO Activities.

13 REPORT FROM UNESCO CHAIR IN MONGOLIA

Mr Tanaka introduced Mr Tsujimura who then spoke on Groundwater Resources for Ulaan Bataar. Mr Tsujimura noted the UNESCO –Tsukuba agreement signed on 22 June 2007. Progress has included climate stations at 3 locations around Ulaanbaatar associated with water supply, together with groundwater monitoring in Tuul River basin. Capacity building programmes with two week exchanges in Japan have also commenced. A number of activities have been carried out on Groundwater Resources including International Student Programmes. Both undergraduate and graduate students have been involved in research in Mongolia.

14 REPORT OF THE IHP-DRH WORKSHOP (H. KAMEDA AND T.TANAKA)

Mr Takara introduced the IHP-DRH workshop that had been undertaken. Mr Kameda demonstrated an overview of the “Disaster Reduction Hyperbase (DRH)” which uses a wide range of web based technology to share information amongst collaborators.

There are two levels of membership and all participants were asked to sign on to the Membership. He discussed the benefits of having full profile membership able to insert material into the database. The participants were able to view the templates that can be downloaded.

Considerable discussion followed with participants noting the need to manage knowledge about both new and indigenous technology and exploring ideas around how data could be held and served. One approach that emerged for consideration was to carry out a “web-mining” activity to identify technologies, and then to approach web information authors to incorporate their work.

15 ORGANIZATION OF THE 18TH RSC MEETING IN VIETNAM IN 2010

The delegate from Vietnam gave a short presentation on the 5th APHW 2010 and 18th RSC Meeting Programme 8 to 12th of November 2010. Two proposals were forwarded with the meeting in Hanoi and the then RSC in Halong Bay. The alternative is in Ho Chi Minh City and in Vung Tau. It needs to be confirmed that the 5th APHW is two days duration to ensure coordination with the RSC.

After discussion it was concluded that the preferred meeting arrangement would be Hanoi and perhaps a field trip to Ninh Binh. The hosts indicated that the schedule would allow time for the field trip but this will be confirmed from the Vietnam Delegation.

16 REPORTS FROM UNESCO CATEGORY II CENTRES (HTC, ICHARM, ETC.)

The Humid Tropics Centre (HTC) report presented by Mr Mohd Roseli Zainal Abidin and he described a range of activities to date. He noted that he had been appointed as Director of HTC 5 months ago. A key future activity for the HTC will be R&D of a WSUD project. There will be a training Workshop on the Application of GIS and RS on Water Resources in 2010.

Mr Daniell advised the Malaysian delegation of the activities in WSUD and ARQ in Australia.

Action: Evaluation of the HTC will be required consisting of an external review prior to consideration of a new Memorandum of Understanding (MoU) between UNESCO and the Government of Malaysia to replace the current MoU which expires in 2009

Mr Liu Cheng presented a report on the activities of IRTCES. The structure of the organization and links to outside organizations was given. Involvement in the International Sediment Initiative (ISI)

was outlined. Key components have included Global Evaluation of Sediment Transport, Case Studies of River Basins as Demonstration Projects as well as having the Secretariat at IRCTES. There is a comprehensive website of the ISI on the website <http://www.irtces.org/isi/>. A series of capacity building workshops and conferences have been organized and these are shown on the website <http://www.irtces.org/english.asp>. *International Journal of Sediment Research* is the official *journal* of the WASER, and publishes scientific and technical papers on all aspects of erosion and sedimentation IRTCES

Mr. Jayawardena gave a comprehensive presentation on the International Center for Water Hazard and Risk Management (ICHARM) which was originally established in March 2006. Information presented showed the relationship of the 3 research teams to the various activities in ICHARM. It appears that flood related disasters remained the first priority of the Centre. The research output was outlined. The wide range of international activities reported on reflected the importance of training and capacity building including the Flood Hazard Mapping Course, The Comprehensive Tsunami Disaster Management Course and Post graduate degree courses. Important future initiatives include participation in WWAP, training courses, international and regional collaboration and publication of research letters.

Mr Arduino asked whether the ICHARM Newsletters were sent to IHP committees in the region. Mr Ibbitt asked about the relationship between ICHARM and DRH. The answers from Mr Jawardena and Mr Kameda were that the two sets of activities were separate.

Mr Liu Heng asked whether cooperation from meetings of the Category 2 Centres has achieved anything. Mr Mohd Nor stated that to date nothing has really eventuated from these meetings.

Mr Liu Cheng stated that an MOU had been signed between IRTCES and ICHARM.

17 ORGANIZATION OF THE 19TH RSC MEETING IN 2011

Nominations were called for the RSC for 2011. Japan indicated an intention to host the RSC in 2011.

Japan confirmed its intention to hold the 2011 RSC meeting as and details will be produced for the next meeting

18 ELECTION OF THE RSC CHAIRPERSON

There were calls for Nomination of the next RSC Chairperson and China was duly nominated by Malaysia and supported by PDR of Korea and unanimously by the representatives from all the Countries present.

Mr Liu Heng was nominated from China and duly elected with acclamation from the meeting

19 ANY OTHER ISSUES

General discussion for planning for IHPVII was raised by the Malaysian Delegation and responded to by Mr Arduino and Mr Soontak Lee

Action : The Secretariat to draw out the discussion items on IHP VII items from the country reports

Mr Daniell raised the question of what response had progressed from the resolutions from the previous meetings.

RSC XVI-1: Honouring Achievements in the Region

Action: The IHP National Committees and UNESCO field offices in the region to nominate relevant candidates for the newly established awards.

RSC XVI-2: Invitation of new members

Action: UNESCO field offices in the region to approach the relevant government agencies in Singapore, Brunei Darussalam and Timor Leste to enable participation in the RSC activities.

20 ADOPTION OF RESOLUTIONS

The resolution concerning RESOLUTION RSC XVII-I Archiving water-related disaster management/reduction technologies.

Malaysia suggested that the resolution be forwarded to the Intergovernmental Council for their information only.

Mr Jayawardena made the point that the Catalogue of Rivers is losing momentum but there is a need for addressing the consequences of monsoons in the region.

Mr Daniell mentioned that the sequences of low flows and drought need to be addressed as well.

Mr Jamieson said that a new phase of data information cataloguing through linking to on-line data is progressing internationally. This provides a vehicle for revitalizing the “catalogue of rivers” concept by overcoming much of the need for specific data supply to the catalogue.

23 CLOSING OF THE MEETING

The Chairman thanked people for participating in the meeting and the Chinese National Committee for hosting the meeting and the excellent organization for their assistance and, all the Delegates for their contributions during the meeting.

"The incoming Chair and all delegates congratulated and thanked, Dr. Leonardo Liongson, the outgoing Chair of RSC for his excellent work in the past two years"

The meeting was closed at 11:00 on 6 November 2009.

ACTION ITEMS	BY WHOM	DATE
1. UNESCO field offices in the region to approach the relevant government agencies in Singapore, Brunei Darussalam and Timor Leste to enable participation in the RSC activities.	UNESCO field office in Jakarta, Beijing	When 18 th RSC details and timing confirmed
2. Countries will be informed of the links and sites to visit for the December 3 rd and 10 th presentation material on this initiative.	IHP Training Course broadcast operators Takara and Masami Nakata (Program Specialist in Engineering Sciences and Technology).	ASAP
3. Nomination of a focal person to assist the Coordinator (Mr. Jamieson) with individual country aspects of the Flood estimation project. The default nomination is the Secretary of each national committee	Coordinator	31 December 2009
<p>4. Stage 1 Action Items on the Flood Estimation Project</p> <ul style="list-style-type: none"> • Coordinator to circulate report outline for “Catalogue of Methods” by 31 December 2009. This will include a description of information required from each country which will be brief and descriptive rather than technically detailed. The report will include a listing of key contacts in each APFRIEND country who participates. • Country representatives to assemble and submit information required by 31 March 2010 • Coordinator to circulate draft report by 30 September 2010 • Finalisation at RSC/APFRIEND meeting November 2010 	<p>Coordinator</p> <p>Country representatives</p> <p>Coordinator</p> <p>APFRIEND Workshop</p>	<p>31 December 2009.</p> <p>by 31 March 2010</p> <p>30 September 2010</p> <p>November 2010</p>
<p>Stage 2: Action Items</p> <ul style="list-style-type: none"> • Coordinator to circulate report outline for “Flood Hydrograph Techniques” by 31 December 2010. This will include a description of information required from each country which will be brief and descriptive rather than technically detailed. • Country representatives to assemble and submit information required by 31 March 2011 • Coordinator to circulate draft report by 30 September 2011 • Finalisation at RSC/APFRIEND meeting November 2010 	<p>Coordinator</p> <p>Country representatives</p> <p>Coordinator</p> <p>APFRIEND Workshop</p>	<p>by 31 December 2010.</p> <p>by 31 March 2011</p> <p>November 2010</p>
5. Data for Catalogue of Rivers Volume 6 and supplement Number 1 to be assembled in Kyoto with links to open data access sites where these are made available by the country providing the data	Mr Chikamori and countries with linked data.	End Feb 2010

ACTION ITEMS	BY WHOM	DATE
6. All countries to progress with rivers for inclusion in Vol VI and Supplement No 1	All countries	Up to Oct 2010
7. Flood forecasting and Warning system Assessment-- It is recommended that the document and study address the social consequences of the flood forecasting systems that are in place on the people downstream and the damages and people at risk downstream.	Committee	Publication date in March 2010
8. First Announcement for 18 th RSC Meeting and associated conference	Vietnam to inform Jakarta	Mid-Dec 2009
9. Evaluation of the HTC is required consisting of an external review prior to consideration of a new Memorandum of Understanding (MoU) between UNESCO and the Government of Malaysia to replace the current MoU which expires in 2009	UNESCO Jakarta Office	Early 2010
10 The Secretariat to draw out the discussion items on IHP VII items from the country reports	The Secretariat	Before Intergovernmental Council Meeting
11 The IHP National Committees and UNESCO field offices in the region to nominate relevant candidates for the newly established awards.	The IHP National Committees	March 2010

ANNEX 1

**PARTICIPANTS, 17TH MEETING OF THE IHP
REGIONAL STEERING COMMITTEE FOR
SOUTHEAST ASIA AND THE PACIFIC**

17th RSC Meeting, Wuhan, 5-6 November 2009

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ANNEX 2

**AGENDA, 17TH MEETING OF THE IHP
REGIONAL STEERING COMMITTEE FOR
SOUTHEAST ASIA AND THE PACIFIC**

AGENDA

17TH MEETING OF THE IHP REGIONAL STEERING COMMITTEE FOR SOUTHEAST ASIA AND THE PACIFIC

Central International Hotel, Wuhan, China

Thursday 5 and Friday 6 November 2009

- 1) Opening (9.00 am)
- 2) Adoption of the Agenda
- 3) Election of Rapporteur
- 4) Secretariat reports (Jakarta - Beijing)
- 5) Report from The IHP Intergovernmental Council
- 6) Country Reports (5-10 minutes each), discussion
- 7) Internet Education/Lecture (M. Nakata, A. Husni, G. Arduino)
- 8) Development of Centres under the auspices of UNESCO (Indonesia, Thailand, China)
- 9) Report from the Asia-Pacific FRIEND (Dennis Jamieson)
- 10) Flood Forecasting and Warning System assessment (SEAP) (Mohd Nor)
- 11) Progress of the Catalogue of Rivers, Volume VI (Chikamori)
- 12) IHP Training Courses in the Region (19th IHP-Nagoya Training Course, Japan 2009)

Possible draft resolutions should be submitted to the RSC Secretariat early afternoon 5 November 2009

- 13) Report from UNESCO Chair in Mongolia (T. Tanaka)
- 14) Report on IHP-DRH Workshop (H. Kameda/K. Takara)
- 15) Organization of the 18th RSC Meeting in Viet Nam in 2010 (Hoang Minh Tuyen)
- 16) Reports from UNESCO Category II Centres (HTC, ICHARM, IRTCES, IRCK)
- 17) Organization of the 19th RSC Meeting in 2011
- 18) Election of RSC Chairperson for 2009-2011
- 19) Other issues
- 20) Adoption of Resolutions
- 21) Closing of the Meeting

ANNEX 3

**SECRETARIAT REPORT
BY
UNESCO JAKARTA OFFICE**

**17TH IHP REGIONAL STEERING COMMITTEE MEETING
FOR SOUTHEAST ASIA AND THE PACIFIC**

Wuhan, China, 5-6 November 2009

UNESCO OFFICE, JAKARTA

Secretariat Report

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

1.1 Follow-up to the 16th IHP-RSC meeting

A number of actions to be followed-up were identified during the 16th RSC meeting (UNESCO Office, Jakarta, 2008). Here below is a brief report on the current status:

1. *Write to relevant authorities who can be identified in Myanmar Singapore, Brunei Darussalam and Timor Leste inviting participation in 17th RSC meeting in China.*
So far only Myanmar has responded to our request and a delegate is attending the current RSC meeting. Concerning Brunei and Singapore' relevant authorities have to be yet found. Timor Leste's current government organisation does not allow a clear picture for water resources issues.
2. *IFD Project. All countries to review next draft available for inspection at the end of October 2008 and forward comments to Mr Daniell & Mr.*
This was done
3. *IFD Final Report ready for print by UNESCO Jakarta*
The final draft of the report was made available to Jakarta in November 2008.
4. *IFD Final Report Printed*
The APFRIEND IFD final report was printed in November 2008 and sent out to all countries together with other publications.
5. *IFD/Flood Workshop (2-day) March 2009 in HCM City*
Mr Tran Thuc confirmed the dates for the WS
6. *IFD /Flood Workshop (2-day) 9-10 March 2009 in HCM City*
The workshop was organized in Ho Chi Minh city on 9-10 March 2009
7. *Data for Catalogue of Rivers Volume 6 and supplement Number 1 to be assembled in Kyoto with links to open data access sites where these are made available by the country providing the data*
Mr. Chikamori to report.
8. *Word template for basin description to be sent to all countries*
Mr. Chikamori to report.
9. *Countries to provide basin description/ data for new basins for inclusion in Volume 6*
Mr. Chikamori to report.

10. Organisation of 18th RSC meeting in 2010

Viet Nam offered and later conformed to host the 18th RSC meeting in Ha Noi, 2010.

11. First Announcement for 17th RSC Meeting and associated conference

The 1st announcement was ready at the end of January 2009

12. Identify available Hydrogeological mapping information on Trans-boundary Aquifers

Only Thailand has sent to the RSC Secretariat (UNESCO Jakarta) groundwater data on aquifers shared with Lao DPR, Cambodia and Myanmar.

1.2 Workshops, training courses, symposia

1.2.1 18th IHP Nagoya Training Course “Satellite Remote Sensing and Atmospheric Constituents”, Nagoya, Japan, from 3 to 15 November 2008

The 18th IHP Nagoya Training Course “Satellite Remote Sensing of Atmospheric Constituents”, organized by the Institute of Hydrospheric-Atmospheric Sciences of Nagoya University, was held in Nagoya, Japan, from 3 to 15 November 2008 and attended by 8 participants (7 of which supported by UNESCO Office, Jakarta, through the Japanese FIT). The course comprised a series of lectures in English, practice sessions and technical tours to Japan Aerospace Exploration Agency in Tsukuba.

The general aim of the 18th IHP training course was to provide an opportunity for participants to learn the fundamentals of satellite remote sensing and its application to atmospheric sciences. The training course offered introductory lectures on the basics of meteorological satellite observations and the physical principles of retrieval algorithms. Two practical sessions, i.e. the Geostationary Meteorological Satellite (GMS) Data Analysis and Real-time Global Precipitation Data Analysis, were also provided to establish basic skill to analyze satellite data. The training course also provided technical tours to the Japan Aerospace Exploration Agency in Tsukuba and seminar for satellite data/images access through JAXA EORC WWW site.

Eight participants (5 ladies and 3 gentlemen) from 8 countries have attended the Training Course, namely from Bangladesh (1), China (1), Indonesia (1), Lao P.D.R (1), Myanmar (1), Philippines (1), Rep. of Korea (1), and Vietnam (1). Seven participants were supported by UNESCO Jakarta through Japanese FIT, while one participant was from the Graduate School of Environmental Studies, Nagoya University. Participants who attended the course were researchers (3), scientist (1), associate professor (1) and government officials (2). Regarding their affiliation, most of the participants were working at governmental institution (4) while the rest are working at university (2) and research institute related to Hydrology, Meteorology and Water Resources.

1.2.2 Special Side Event on “Ecohydrology – an interdisciplinary challenge” at the International Conference on International Perspective on Environmental and Water Resources, Bangkok, Thailand, from 5 to 7 February 2009.

UNESCO's Ecohydrology Programme has evolved into a transdisciplinary scientific programme to analyse dynamic relationships between hydrological, social and ecological systems; to consider how these act upon each other, and to seek new ways to balance human and environmental needs for water resources. The programme aims to advance the integration of social, ecological and hydrological research; and generate outcomes that enable the development of effective policies and practices.

The special side event aims to bring together EHP implementation pathways to identify, quantify and improve the critical interrelationships between water, biota and social systems. There are three key objectives of this special session:

- Firstly it will synthesize knowledge gaps for addressing issues related to critical water systems, such as those in arid and semiarid zones, coastal areas and estuaries, and urbanized areas.
- Secondly it will show how better knowledge of the interrelationships between the hydrological cycle, livelihoods and ecosystems can contribute to more cost-effective and environmental-friendly management.
- Thirdly, this session will highlight system solutions and technology transfer opportunities through North-South and South-South linkages using demonstration site and education networks.

The event was attended by approximately 30 participants from 14 countries such as Argentina, Australia, Burkina Faso, China, France, Germany, Indonesia, Japan, Philippines, Mali, Kenya, Portugal, Poland, Thailand and the UK, including Mr. Shahbaz Khan from HQs, Mr. Koen Meyers and Mr. Giuseppe Arduino from UNESCO Office, Jakarta. UNESCO Jakarta supported the Director of Asia Pacific Centre for Ecohydrology (APCE) to the said event.

1.2.3 Regional Water Education Workshop, Jakarta, Indonesia, from 11 to 12 February 2009

The regional workshop on water education intends to identify gaps in order to prepare appropriate response to the local needs and to achieve the objectives foreseen in the strategic plan for IHP-VII, the DESD Action Plan and the Water Education Workplan. The workshops will contribute to the execution of theme 5 (“Water Education for sustainable Development”) of the strategic Plan for the 7th Phase of IHP.

The general objectives of the workshop are as follows:

- To identify examples of best practices on water education in the region at all educational levels;
- To analyse examples of best practices to identify barriers and opportunities;
- To propose recommendations to enable effective water education in the region at all educational levels for: (1) the international community, in particular for UNESCO; (2)

National Governments, in particular the ministries in charge of education and freshwater; (3) local authorities; (4) educational practitioners, including academics, researchers, trainers, teachers and mass media professionals.

The workshop was attended by 16 representatives from the Asia and Pacific region i.e. Australia, India, Indonesia, Korea (Rep.of), Malaysia, Mongolia, Pakistan, Philippines, and Sri Lanka.

1.2.4 UNESCO-ITALY-VIET NAM WORKSHOP “Adapting to climate Change: Evaluating impacts of sea level rise by climate change on coastal zones and islands. Solution for monitoring saltwater intrusion and sea level rise” from 29 to 30 June

This workshop was organised as an inception event in order to launch the project “*Impacts of sea level rise by climate change on coastal zone and Islands in Central Part of Viet Nam*” proposed by the Institute of Geological Sciences, Vietnamese Academy of Science and UNESCO Jakarta that was accepted by the Vietnamese Ministry of Science and Technology in December 2008 and allocated of 2 billion VND (approximately USD 120,000) for 3 years from 2009 to 2011. This project was also granted of extrabudgetary FIT from Italy of USD 30,000 as a component of the “Water Programme for Environmental Sustainability, WAP II”.

The workshop was attended by approximately 100 people and opened by

- Dr. TRAN Tuan Vice Director of the Institute of Geological Sciences of the Vietnamese Academy of Science
- Ms. Vibeke Jensen, Director and Representative, UNESCO HA Noi Office
- Mr. Koos Neefjes, Policy Advisor Climate Change, UNDP
- Mr. Andrea Perugini, Ambassador of Italy, Viet Nam.

The event included 2 sessions on 1) Policies, Solutions for adapting to climate change and 2) Solutions for monitoring saltwater intrusion, sea level rise and management of aquifer recharge.

A total of 19 presentations were given in both sessions. On behalf of UNESCO, Mr. Giuseppe Arduino have delivered a paper together with Prof. Paolo Bono from the University La Sapienza, Rome, with the title “Preliminary hydrogeological investigation in the coastal area of Ninh Thuan province and isotopic signature and hydrochemical screening of surface and groundwater resources in coastal areas of Ninh Thuan, Binh Thuan and Ninh Binh Provinces.

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:

- 5 participants from 5 countries were supported by UNESCO Office, Jakarta through Japanese FIT to attend the International Conference on “Uncertainties in Water Resource Management: causes, technologies and consequences” (WRM-Mon2008), in conjunction

with the 16th Regional Steering Committee Meeting for UNESCO – IHP Southeast Asia and the Pacific, Ulaanbaatar, Mongolia, from 29 September to 3 October 2008;

- 7 participants were supported by UNESCO Office, Jakarta through Japanese FIT from 7 countries to attend the 18th IHP Nagoya Training Course “Satellite Remote Sensing of Atmospheric Constituents”, organized by the Institute of Hydrospheric-Atmospheric Sciences of Nagoya University, was held in Nagoya, Japan, from 3 to 15 November 2008;
- Director of Asia Pacific Ecohydrology Centre was supported to the Special Side Event on “Ecohydrology – an interdisciplinary challenge” at the International Conference on International Perspective on Environmental and Water Resources, Bangkok, Thailand, from 5 to 7 February 2009;
- 1 Vietnamese scientist was supported to participate at the International Symposium on Efficient Groundwater Resources Management in Bangkok, Thailand from 16 to 20 February 2009;
- Director of Humid Tropics Centre, Kuala Lumpur was supported to attend the 5th World Water Forum which was held in Istanbul, Turkey from 16 to 22 March 2009; and
- 1 expert for Managing Aquifer Recharge was supported to participate as a resource person at the workshop “Adapting to Climate Change: Solutions for Monitoring Saltwater Intrusion, Sea Level Rise and Evaluating Impacts of SLR on Coastal Zones and Islands”, 29-30 June 2009 in Hanoi, Viet Nam. The seminar was followed by a field survey (investigations) in the project area (Ninh Thuan and Binh Thuan provinces) from 1 to 9 July 2009.

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

1.4.1 Asia Pacific FRIEND Workshop, Ho Chi Minh City, Vietnam, from 9 to 10 March 2009

As follow up to the 16th Regional Steering Committee Meeting in Mongolia, UNESCO Jakarta organized a UNESCO APFRIEND Meeting “Intensity Frequency Duration and Flood Frequencies Determination” at the Sub-Institute of Hydrometeorology and Environment (SIHYMETE), Ho Chi Minh City 9 – 10 March 2009. The meeting was attended by 16 participants from 9 countries in the region, focused on both the IDFs and in setting the programme for the future analyses of the design floods.

The report which was already printed by UNESCO Jakarta in November 2008 was presented at the meeting and highlighting the results with:

- Background

- Storm rainfall data collection
- RIDF analysis: approach
- Results from each countries

It was decided that a small group composed by 2 scientists will finalise the IFDs, by providing a map of all the sites considered in the study and by producing an overall table of comparison between methodologies used for the analysis by each country.

This finalisation will be presented during the Wuhan IHP-RSC meeting in China, November 2009.

1.5 Activities within UNESCO Office Jakarta

1.5.1 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 km², 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 km² 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 m³/day of fresh water to the Hong Phong communities, through a system inaugurated in November 2006.

In 2009, UNESCO Office, Jakarta continues its support to carry out the following activities:

- monitoring of the groundwater system in Bac Binh, including data downloading from 4 observation wells in Bau Noi (2), Bau Trang (1), and Hong Thang (1) and management of pumping station in Bau Noi, observation of pumping station in Hong Phong;
- meteorological observation with daily acquisition of data related to precipitation, temperature, and humidity of the two stations in Hong Phong and Bau Noi, period May – December 2009

During hydrogeological investigation in July 2009, a total of 19 samples of groundwater in Binh Thuan Province were collected for isotopic analyses; the interpretation of results together with the overall data acquired during the field work will allow to report to local authorities on future and correct use of water resources in the Binh Thuan Province, with particular emphasis on the studied area. In order to maintain the current water supply delivery system to Hong Phong Village from Bau Noi well field in a good and efficient way, it is proposed to drill at least 2 new wells and equipped them with stainless steel casings and screen for long term exploitation of the Bau Noi aquifer. Having the Binh Thuan Province envisaged the acquisition of the project, the construction of the new wells will be proposed to the same.

1.5.2 Hydrogeological investigation in the coastal area of Ninh Thuan Province, Viet Nam, July 2009

Following a request from the Ministry of Science and Technology (through the Vietnamese Academy of Science and Technology -VAST), a hydrogeological investigation was also carried out in the coastal areas of Ninh Thuan Province (350 km North east of Ho Chi Minh), for a preliminary survey and general advices on water resources occurrence and evaluation.

1.5.2.1 Introduction

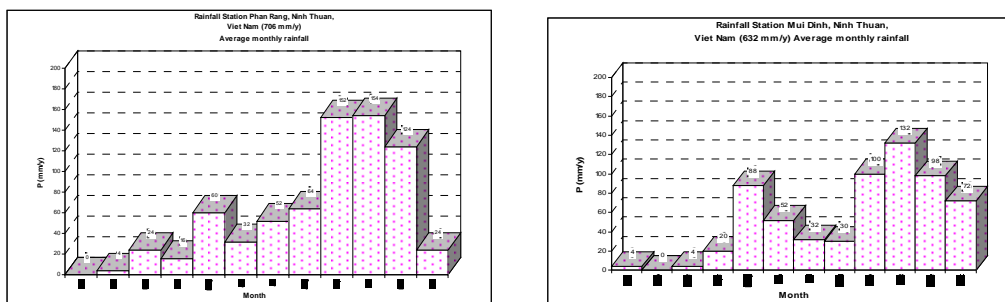
The Ninh Thuan Province, located in the southern part of Vietnam Central Coastal region, borders Khanh Hoa in the north, Binh Thuan in the south, Lam Dong in the west and the South China Sea in the east.

The province has a total surface of 3,360 km² with over half a million inhabitants (571,200 in 2006), 6 administrative units, 1 city and 5 districts. The city of Phan Rang Thap Cham, as provincial city, represents the political, economic and cultural centre of the province.

The morphology of Ninh Thuan can be characterized as gradually sloping from north-west to south-east, with three typical topologies such as mountains (63% of the area), plain areas (14%) and coastal plain areas (23%).

Ninh Thuan has a typical tropical monsoon climate with two different seasons, the rainy season (Sept–Nov) and the dry season (Dec–Aug), with annual average temperature around 26 -27⁰C; annual average rainfall of 700–800 mm in the coastal area (706 mm in

Phan Rang, 632 mm in Mui Dinh and 762 in Ca Na) gradually increasing to more than 1,800 mm in the mountainous areas.



1.5.2.2 Geology and Hydrogeology of the investigated area

The geological setting of the investigated area, located mainly along the coastal zones of Ninh Thuan is characterised by a magmatic bedrock of cretaceous age (granite, granodiorite and granosyenite) overlain by a Pleistocene-Holocene marine deposits of both terrigenous and calcareous origin. Recent and ancient sand dunes also occur in the southern part of the Province (Lu Thien, Son Hai and Mui Dinh) as well as in the northern coast (from My Hoa to Vinh Hai).

The hydrogeology of the investigated area is characterised by the occurrence, in the sediments, of several unconfined aquifers at different elevations (maximum elevation reached by the investigation was around 40 m a.s.l. – Tram Bang) exploited through both drilled wells (up to 28 m deep) and hand dug wells (the majority) with diameter ranging from 0.7 to 6 m and depths ranging from 3 to 9 m from ground level.

The natural morphological lowland settings along the coastal areas with the development of salt evaporation ponds as well as uncontrolled pumping for agricultural purposes causes seawater intrusion in the coastal aquifers. In the investigated areas located at higher elevation (15-20 m a.s.l) and at a distance of several kilometres from the sea salinity of groundwater can also reach up to 0.5 g/l.

1.5.2.3 July 2009 Investigation Campaign in Ninh Thuan Province

The hydrogeological investigation in Ninh Thuan coastal area was carried out from 1 to 5 July 2009 and aimed at the further characterisation of the area in terms of water quality and water occurrences, the design and setting up of a groundwater monitoring system and the definition of different investigations to be done in order to start the implementation of the project.

The major activities included:

- sampling of groundwater for both chemical and isotopic analyses. A total of 67 samples were collected for isotopic analyses, 41 of which represent new points and 26 as a repetition of the old ones. 42 samples were also taken for chemical analyses
- location of a transect where the geophysical investigation will be carried out and 3 monitoring wells will be drilled along the same. The transect is located in the Khahn

Phuoc (khahn nhon on map) upper dam lake - My Hiep - My Tan area, east of Phan rang where intensive agriculture (red onions and chiles) on sandy soils requests a large amount of groundwater which is pumped through large diameter hand dug wells (up to 5 m in diameter), and cause brackish water upconing and related high salinity of the same groundwater (up to 7 g/l salinity and 15,000 $\mu\text{S}/\text{cm}$ for Electrical Conductivity).

The geophysical campaign along the defined transect which extends from approximately 30 m a.s.l. (upper dam) to sea level with a length of 3.5 km. will define depth to the base rock, potential discontinuity in the overlain deposits (where the aquifer is located) and extension of the saline/brackish water intrusion in the same.

During the campaign 3 exploration wells were located along the transect; these will be drilled, after the geophysical investigation, to possibly reach the basement and will be equipped with screened sections corresponding to the main water strikes in the aquifer and installed with automatic data acquisition instruments (data loggers) for EC, T and water level data acquisition.

The hydrogeological investigation in Ninh Thuan coastal zones allowed a secondary assessment of water resources of the area: 67 samples for both chemical and isotopic analyses were collected from water wells and surface water, a transect of 3.5 km from a mountain area (30 m a.s.l) to sea level was located; along this geophysical investigation and a drilling campaign will be carried out and the monitoring wells equipped with automatic data logger for parameters such as temperature, electrical conductivity and water level. Once the potentiality of the aquifer(s) is assessed a further study will be conducted on water needs and usage and quality implication when such aquifer undergoes overpumping. This implies a comprehensive and integrated approach to local communities and understanding of their usual practises in water use and consumption, with the attempt to define adaptation measures to overcome natural resources overexploitation (groundwater). Measures that will be evaluated with ad hoc studies such as pumping allowable water quantity per land use and or with MAR practises such as infiltration trenches parallel to the shoreline fed with water derived from the upper dam reservoir in order to reduce sea water intrusion in the aquifers.

1.5.3 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 $^{\circ}\text{C}$
- EC in $\mu\text{S}/\text{cm}$
- 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 September 2008.

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 2007 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 BATAN (Indonesian National Nuclear Energy Agency) also interested in different rainwater sampling sites in Jakarta. Results will be available soon.

In 2009, UNESCO Office, Jakarta continued the activity and collected both single and monthly events from January until now.

1.5.4 World-wide Hydrogeological Mapping and Assessment Programme (WHYMAP)

In the framework of the global programme WHYMAP, started in 1999, an important result has been achieved with the publication of an educational wall map (160x130 cm) at the scale of 1:25.000.000 published in the spring 2008 and presented to the 33rd International Geological Congress in Oslo in August 2008. UNESCO Office, Jakarta, since 2003 contributed to the compilation of such a map with coordination in southeast Asia with reference to Indonesia, Malaysia, Thailand, Viet Nam, Laos and Cambodia, as well as the Philippines and Republic of Korea.

1.6 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 2007-2008, was presented by UNESCO Office, Jakarta, at the meeting held in UNESCO Office, Jakarta, from 2 to 3 June 2008. 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;
- the IHP Training Courses, annually organised by the Nagoya University in Japan; and
- the Flood Forecasting and Warning System (including the DRH Project)

The resolutions adopted during the meeting are as follows:

- Provide documents of the IHP Training Course (TC) to the intergovernmental council of the IHP in an attempt to show outcomes of IHP TC;
- Provide clear role for possible donors and partners including details of budget allocation of the Water Interoperability Networks for Global Change Adaptation (WINGA) project;
- Explore the possibility to link the IHP TC with Master Degree programmes in the ASEAN University Network and United Nations University;

- Share its biennial priorities on IHP with the Nagoya University and other project partners;
- Provide the topics of the IHP Training Course in a more structured way, such as in three years scheme;
- Include in the questionnaire participants suggestions on the Training Course Programme according to training needs and priority in the participant’s countries;
- UNESCO Jakarta will insert the JFIT logo adequately in such published documents as the RSC SEAP Final Report.

1.7 IHP Nagoya Training Courses Databases

18 IHP Nagoya Training Courses have been conducted since 1991 and were attended by 188 participants from 26 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 was obtained by means of an online feedback form to be filled in by training course participants

Evaluation of the feedback form showed that 44 % of the participants are affiliated to a university, 48% to governmental organizations or government related research institutes and around 8 % 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.

From 2007, the training courses online feedback form was replaced by a comprehensive report that participants have to prepare after having attended the training course. Guidelines for this report were defined and provided to participants of the 17th IHP Training Course on “Numerical Prediction of High-Impact Weather Systems” (Nagoya, Japan, 2 – 15 December 2007). The report will be then uploaded to the ihp Nagoya forum upon agreement with the participants.

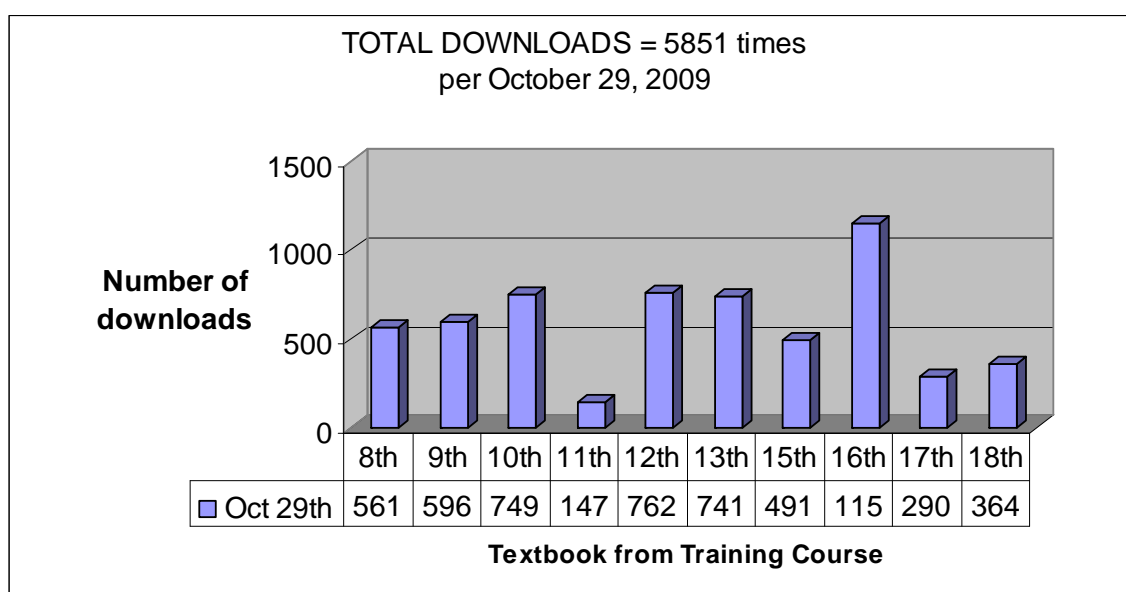
IHP Nagoya Forum

In June 2007 in collaboration with the Nagoya University UNESCO Office, Jakarta has started the design of the IHP Nagoya Training courses website (www.ihpnagoyaforum.org), which was launched in July 2008. The website provides:

- information on training courses and up-coming events,
- training course materials for download (textbooks of past training courses),
- a discussion forum in which participants can exchange ideas, expertise, etc. and
- guidelines for preparing the participants' report after having attended the training course,
- photo gallery of past training courses.

Announcement of the training course has been placed on the website of the UNESCO IHP Nagoya Training Courses. UNESCO Office, Jakarta, sent the website address to IHP National Committees approximately 3 months before the course.

Electronic textbooks will be uploaded to the website before the course, and the presentation files of the lecture will be uploaded immediately after the lecture. Those who are interested in the training course can raise questions with contents of the textbook during a certain period (e.g., for a half year) through an interactive forum on the website (IHP Nagoya Forum) after the course without attending the training course. This improves the training course to get wider attention in the world, to be more efficient and interactive for people who cannot attend, and to enhance the capacity building method of the course which in this way enables anybody to learn the course through internet. Participant list, participant report, and question and answer will be uploaded to the website for exchanging mutual understanding (provided participants agreement).



The use of such implementation methods (website, distance e-learning) represent therefore a wider expansion and dissemination of the training courses, enabling wider attendance form many parts of the world.

2. PUBLICATIONS SINCE OCTOBER 2008

Proceedings of International Conference on “Uncertainties in Water Resource Management: causes, technologies and consequences”, Edited by Prof.D.Basandorj and Dr.D.Oyunbaatar, IHP-VII Technical Documents in Hydrology, No. 2. UNESCO Office, Jakarta, 2008.

Asian Pacific FRIEND: Rainfall Intensity Duration Frequency (IDF) Analysis for the Asia Pacific Region, Edited by Trevor M. Daniell and Guillermo Q. Tabios III, IHP-VII Technical Documents in Hydrology, No. 2. UNESCO Office, Jakarta, 2008.

Final Report of the “16th IHP Regional Steering Committee meeting for Southeast Asia and the Pacific” Ulaanbaatar, Mongolia, 2-3 October 2009. IHP-VII No. 16. UNESCO Jakarta Office, 2008.

3. CONTACT REFERENCES

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ANNEX 4

**SECRETARIAT REPORT
BY
UNESCO BEIJING OFFICE**

17th IHP Regional Steering Committee Meeting for Southeast Asia and Pacific

Wuhan, China, 5-6 November 2009

UNESCO Office Beijing Secretariat Report from East Asia

Introduction: UNESCO Office Beijing is a cluster office representing for East Asian countries, China P.R, Democratic People's Republic of Korea, Japan, Mongolia and Republic of Korea. All five countries are very well represented in the RSC and individual country reports will be presented by members and this report is from the UNESCO Secretariat.

1. Capacity Building activities:

1.1. International Training Workshop on Land Cover, Land Use, Fire and Water Resources for Arid and Semi-arid region 19 to 21st September 2009, Almaty Kazakstan

The growth of human population, increasing demand for agricultural production and concerns about food security in the world are among the reasons for growing interest in land monitoring based on satellite remote sensing. The semi-arid regions are very sensitive to global climate change and all vegetation there depends strongly on weather conditions and water availability. Land cover, land use change, state of agriculture and various natural/ artificial phenomena such as fire, drought, flooding, soil erosion by water and wind are the subject of research using the remote sensing. Remotely sensed observations and analysis play an important role in quantifying changes in these phenomena and informing land management decisions.

Held under the general framework of G-WADI (Water And Development Information for Arid Lands, a global network) , the training workshop is held with focuses on 4 themes: land cover, land use, fire and water resources, with the goal of reviewing the availability of satellite data, products, and processing methods for land monitoring in temperate arid and semi-arid regions. The workshop is aimed to transfer technology of monitoring the land surface, wild fire and water resources by various remote sensing products, to meet the requirements for land cover and land use characterization that address the needs of users in these regions and the community of scientists working on regional environmental issues. Through the workshop, participants are able to evaluate the Land Cover Classification System (LCCS) as a tool for harmonization of available land cover products and as a basis for developing map legends for the region. The workshop is co-organized by UNESCO-IHP, GOFC-GOLD (Global Observation of Forest and Land Cover Dynamics), NEESPI (Northern Eurasia Earth Science Partnership Initiative), along with MAIRS (Monsoon Asia Integrated Regional Study).

1.2. Training Workshop programme on “Integrated water resource management”, Ulaanbaatar, Mongolia, 15th October 2009 at Mongolian University of Science and Technology

Natural ecosystem of the river basin plays a key role in the formation and regulation of resources and regime of surface water. Nevertheless, due to human influences and occurrence of dry phase or period of climate cycle, river basin ecosystem has been changed significantly, specifically in developing countries of critical ecosystem such as Mongolia. Factors, including intensive use of mining resources, over grazing pasture, cutting forest, soil degradation have all contributed to changes of water regime and resources of river basins. Such situation urgently calls for the knowledge and implementation of an integrated management approach in the river basin and water resources.

The seminar is held in this general background in Mongolia, which is aimed to bring together specialists from all relevant Mongolian organizations, in order to discuss and provide information and knowledge on

ways of conducting Integrated River Basin Management (IRBM) and Integrated Water Resources Management (IWRM) approaches and its adoption into Mongolian to the decision-making processes and stakeholders. Moreover, the workshop is also endeavour to find ways of linkages between different organizations, projects, specialists and to raise awareness and strengthen capacities on IWRM/IRBM issue. The workshop is jointly held by the Mongolian National Committee for IHP, UNESCO Office Beijing, Mongolian Ministry of Nature Environment and Tourism, and the Mongolian Institute of Metrology and Hydrology.

1.3. International Advance Training Workshop on Integrated River Basin Management and the Silver Jubilee of the International Research and Training Centres for Erosion and Sedimentation (IRTCES), , 27 July to 3 August 2009

Within the general framework of ISI (International Sedimentation Initiative), the training workshop is held to enhance fundamental knowledge, modern technology, method and new concept in the field of Integrated River Basin Management, and to promote exchanges of practical experiences among participants. The workshop covers the following topics including, principles and methods of IRBM, key technologies of IRBM and relationships between Watershed Management and River Management, guidelines on strategic planning of basin water resources, water resources development and allocation measures with typical river basin, ecology and restoration in typical river basin, mechanism of soil erosion, water and soil conservation measures and effect with typical river basin, introduction of South-to-North Water Diversion Project in China. The workshop received around 50 participants all over the world.

Moreover, the Silver Jubilee celebration of IRTCES was also held in conjunction with the training workshop. As the first UNESCO category II centre, and through close cooperation with UNESCO Office Beijing, IRTCES has grown from a technical agency on erosion and sedimentation into the technical hub and secretariat of ISI, as well as a think tank for international research and capacity building on erosion and sedimentation. With such accreditations, it has been the catalyst to facilitate technical and research exchanges between the developed and developing countries, and would continue to enhance its effects under the framework of south-south cooperation.

1.4. 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

Built on its success achieved in 2008, including the holding of an international workshop on water education, generation the water education materials series enclosing training materials for the Chinese senior high school students and a teachers’ manual, the project continued with ensuing activities, particularly the teachers’ training workshops held in May and June, 2009. The two training workshops are held respectively in Kunming and Lanzhou, which received active participation of about 100 senior high school teachers from the Chinese provinces with critical water environment such as Gansu, Ningxia, Shaan’Xi, Guizhou, Yunnan and Guangxi. The trainings received well-rated feedback from participating teachers, and has been recognized as an important means to enhance knowledge of teachers about incorporation of water knowledge and water saving techniques in the regular curriculum. In response to request of teachers for more copies of the students’ books and the teachers’ manual, the same is being prepared by the project implementation partner the China Association for Science and Technology.

2. Research / Pilot Projects:

2.1. Transboundary aquifer mapping in the Greater Mekong Region

The 4 900 km long Mekong River is an international water body having its source in China’s Qinghai province from where it flows southwards through the Tibet Autonomous region and Yunnan province of China, the eastern portion of Myanmar and the four countries of the Southeast Asian peninsula. It discharges to the South China Sea through the Mekong Delta to the south of Ho Chi Minh City in Vietnam. The Mekong River and its network of tributaries form the Mekong River Basin (MRB), draining parts of

six countries: Cambodia, China, Lao PDR, Myanmar, Thailand, and Vietnam. The boundary of this region includes the entire Mekong River Basin and the coastal area surrounding the Mekong Delta.

The flow regime of the Mekong River and its tributaries has been modified by changes in precipitation patterns and by human activities, particularly the construction of dams for hydropower development, the modification of rivers to improve navigation, and the diversion of river water for irrigation, industrial development and human settlements. Deforestation in the catchments is the principal cause of increased rates of surface water run-off that is increasing the frequency and intensity of flooding. Locally, the built environment is also causing increased rates of run-off. The raising of embankments or levees along the Mekong River and its tributaries is resulting in a significant reduction in the volume of floodplain storage, causing increased rates of river discharge and high flood levels. The increased rates of surface water run-off resulting from deforestation and land clearance in upland areas of the MRB are causing increased soil erosion and the consequent entrainment of suspended and bed-load sediments into water courses. Except where they are trapped in reservoirs or deposited on floodplains and riverbeds, the sediments are transported through the basin to the Mekong Delta, where they are deposited in mangrove forests or discharged to the sea. Suspended sediments are also being introduced to water courses from land disturbance through mining or urbanisation, for example. With all these problems in the Mekong river basin, now the time has come map the groundwater bearing formations and its total potential in the basin to maintain the ecological balance. The preliminary mapping for transboundary aquifers would provide a clear picture on the groundwater storage medium and its parameters accordingly the Mekong basin countries plan for detailed estimation of groundwater resources in the basin and issue policy guidelines which encourage sustainable development of aquifers.

2.2. China Climate Change Partnership Framework under Spanish MDG Achievement Funds

2.2.1 Launching workshop

This workshop served as the launching for UNESCO's component within CCCPF, jointly held by UNESCO Office Beijing, and the Yellow River Conservancy Commission (YRCC). Taken in the adaptation part OF CCCPF, UNESCO's component is aimed to enhance and facilitate adopt of Climate Change Adaptation measures within the water management, and water supply policies of the Yellow River Basin. Starting from 2008, the project would last for three years. This workshop is the first international event held under the project framework. Held in Zhengzhou, China from 14th to 15th January, 2009, it gathered over 150 national and international experts on climate change and water resources. Topics presented in the workshop include global action on climate change and its impacts on water resources, climate change and water resources in the yellow river basin, and research pathways for IWRM (integrated water resources management) in the yellow river basin in the context of climate variability. An internal meeting between UNESCO and YRCC was also held during the workshop to discuss subsequent development of the project. The UNESCO headquarters put great recognition to this project. DADG (Deputy Assistant Director-General) for natural sciences, Dr. Andras Szollosi-Nagy attended the workshop and had met with the YRCC Commissioner Mr. LI Guoying, along with other YRCC colleagues. This has helped substantially for the improvement of project high-level recognition.

2.2.2 Publication of the Assessment Report on Water Resources and Climate Change in the Yellow River Basin

The "Assessment Report on Water Resources and Climate Change in the Yellow River Basin" was published in 2009, as one of the tangible deliveries for the project. Taking a holistic approach, the report is among the first of its kind, investigating impacts of climate change upon water resources in the Yellow River Basin. It gathered contributions from renowned domestic and international hydrologists. The report, along with its research recommendations, has been distributed among stakeholders of UN agencies, government partners, and research organizations.

2.2.3 UNESCO special session on the 4th International Yellow River Forum (IYRF)

As an integral part of cooperation between UNESCO and the Yellow River Conservancy Commission (YRCC), Ministry of Water Resources, featuring a holistic assessment on impacts of climate change in the Yellow River Basin, a UNESCO special session dedicated to the topic of climate change and water resources in the Yellow River Basin was held in the morning of 22nd October 2009 during the 4th International Yellow River Forum.

The special session receives great attention from UNESCO. Dr. Andras Szollosi-Nagy, rector for UNESCO-IHE would present and chair the session, followed by experts from UNESCO Headquarters and the Chinese National Commission for UNESCO-IHP, including Prof. LIU Heng, Director-General of the International Centre on Small Hydro Power, Prof. XU Zongxue, Deputy Director, College of Water Sciences, Beijing Normal University. Moreover, Mr. LIU Changming, Academician, Vice-Chairman for the Chinese National Commission for UNESCO-IHP, Dr. LIU Cheng, Division Chief of the International Research and Training Centre for Erosion and Sedimentation (IRTCES) also participated in the session. It is being planned research contributions received in the special session, along with the opening ceremony, would constitute a research volume on impacts of climate change on water resources in the Yellow River basin, generated as one of the tangible deliveries of the project.

ANNEX 5

COUNTRY REPORTS

NATIONAL REPORT ON IHP RELATED ACTIVITIES AUSTRALIA

1. ACTIVITIES UNDERTAKEN IN THE PERIOD May 2008 to October 2009

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

1.1 Meetings of the IHP National Committee

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

1.1.1 Decisions regarding the composition of the IHP National Committee

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

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

1.1.2 Status of IHP-VI activities

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

- *Theme 1 - Global Changes and Water Resources*

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

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

- *Theme 2 – Integrated Watershed and Aquifer Dynamics*

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

- *Theme 3 - Land Habitat Hydrology*

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

- *Theme 4 – Water and Society*

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

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

On 30 June 2008 the Cooperative Research Centre for Water Quality and Treatment completed its term of operation under the Commonwealth Agreement. During its 13 years of operation the CRC undertook a broad portfolio of research and educational activities addressing issues relating to water quality management and health risk reduction, from catchment and reservoir management and water treatment to the distribution of drinking water to consumers' taps.

The CRC has been succeeded by [Water Quality Research Australia Limited](http://www.wqra.com.au) (WQRA), a national not-for-profit scientific research institution. WQRA will develop and undertake a program of research and education to build on the achievements of the CRC.

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

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

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

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

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

Fenner School of Environment and Society, Australian National University (<http://cres.anu.edu.au>)

conducts research and postgraduate training in spatial-temporal variability and characterisation of climate, integrated catchment management, groundwater modelling and hydrology, floods and droughts, coastal hydrology and land use, salinity, cultural and indigenous water issues, water and land policy and related socio-economic interactions, ecological economics.

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

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

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

- *Crosscutting Program Components – FRIEND and HELP*

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

1.1.3 Decisions regarding contribution to/participation in IHP-VII

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

Theme I- Global Change, Watersheds and Aquifers

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

Primary Focal Area:

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

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

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

- Research activities involving the Pacific Island Countries

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

- The Murray Darling River Basin and GEWEX related research activities

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

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

Theme II: Governance and Socio-Economics

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

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

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

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

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

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

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

Focal Area II-4: Shared Water resources and conflict

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

Theme III: Ecohydrology and Environmental Sustainability

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

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

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

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

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

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

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

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

- Biodiversity and climate change

Theme IV: Water Quality, Human Health and Food Security

Objective: Improved understanding of the distribution of abiotic and biotic pollutants in the water cycle and their impact on human 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

- The biennial convention of the Australian Water Association (AWA) (www.awa.asn.au) is the Australian water industry's largest and most prestigious event. It is an internationally recognised and well attended occasion, attracting delegates from across Australia and around the globe. The Ozwater 09 Convention & Exhibition, was held March 2009 in Melbourne.
- 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.

- 3rd NATIONAL WATER EDUCATION CONFERENCE, WATER EFFICIENCY 2008 and WICD 2008. All three conferences were held 30 March - 2 April 2008 on Queensland's Gold Coast. Education website ([Website 1](#)), Efficiency website ([Website 2](#)), WICD website ([website 3](#)).
- **2nd International Salinity Forum**, Adelaide, South Australia, 30 March to 4 April 2008
- **Water Down Under 2008**, incorporating the **31st Hydrology and Water Resources Symposium** and the **4th International Conference on Water Resources and Environment Research (ICWRER)**, Adelaide Convention Centre, 14-17 April 2008
- International conference "Uncertainties in Water Resource Management: causes, technologies and consequences" /WRM-Mon2008
- 9th National Conference on Hydraulics in Water Engineering, 23 - 26 September 2008 at Darwin Convention Centre. Within this overall theme the conference sub-themes are: Climate Change, Methods in Hydraulics, Applied Hydraulics, Geophysical Hydraulics and Coastal Hydraulics.
- The 6th International Water Sensitive Urban Design Conference and Hydropolis #3 5-8 May 2009 - Parmelia Hilton, 14 Mill Street, Perth, Western Australia
- ENVIRO08 A conference and exhibition for showcasing the Australian environment industry. was held 5-7 May 2008, Melbourne (www.enviroconvention.com.au/).
- A number of meetings of the National Committee on Water Engineering, Institution of Engineer's have been held during this period. Some of the key purposes of these meetings are to coordinate and organise hydrology and water resources symposia and conferences, to coordinate the ongoing revision to the national hydrological design guidelines Australian Rainfall and Runoff, prepare Position Papers on key hydrological issues and to manage the publication of Australian Journal of Water Resources. Position Papers are now all available on the Institution of Engineers, Australia web site: (<http://www.eng.newcastle.edu.au/~ncwe/ncwePosPaper/ppHome.htm>).

1.2.2 Participation in IHP Steering Committees/Working Groups

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

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

Prof Ian White was elected to the Governing Board of UNESCO IHE, Institute for Water Education, Delft, the Netherlands in 2006 and is a Member Editorial Board UNESCO- Cambridge University. Press International Hydrology Series. Attendance at UNESCO IHE Board Meeting, Ian White attended the UNESCO IHE Board Meeting in Delft the Netherlands on 28 November 2008 as representative of the South East Asia-Pacific Region of UNESCO IHP.

Prof Trevor Daniell was elected Chairman of the Friend Inter-Group Coordinating Committee at its meeting in Havana, Cuba in December 2006. The 7th FIGCC Meeting was held in Adelaide on April 9th, 2008. Trevor was also selected as the Munro Orator for 2008 giving an oration at the 31st Hydrology and Water Resources Symposium. He visited Unesco headquarters Paris as Chairman of the Finance Committee of Intergovernmental Council in November 2008.

Australian Government hosted workshop on "Groundwater Resources and Transboundary Aquifers" as part of the programme of the GEF 5th Biennial *International Waters Conference*, in Cairns, North Queensland October 24 through 29, 2009.

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 was 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. The first phase of the project in Kiribati focussing on equitable groundwater use in North and South Tarawa was carried out in conjunction with the French agency CIRAD, the South Pacific Applied Geoscience Commission and government agencies in Kiribati and Tonga. This work used Multi Agent Systems and a companion modelling approach to develop Negotiation Support Systems to minimise conflicts over water resource development and use.

1. Kiribati Adaptation Programme Phase II

Development of National Water Resources Policy and National Implementation Plans

The Pacific small island nation of the Republic of Kiribati has water resource problems amongst the most challenging in the world: rapidly growing population; urbanisation; high infant death rates due to water borne-diseases; limited freshwater supplies; restricted resources and capacity; vulnerability to climate change and variability; seawater intrusion; unclear management and regulatory roles; and limited information on the quantity and quality of water resources. This project focussed on the development of the country's first National Water Resources Policy and 10-year Implementation Plan. Simple translocations of developed-world policy frameworks and "toolkits" to small island nations are unlikely to succeed because they ignore the local biophysical, socio-cultural, governance and resource context. Instead, analysis of past ministerial declarations, government decisions and community consultations as well as publicly-developed water resource priorities were used as a basis for developing policy. Many of the pressing national problems can be addressed through seven key policy objectives: improved understanding and monitoring of water resources and their use; increased access to safe and reliable water supplies and appropriate sanitation; achieving financially, socially and environmentally sustainable water resource management; increased community participation in water management and conservation; improved governance in water and sanitation sectors; providing training opportunities for and mentoring of staff in the sector; and decreasing unaccounted for water losses and improved cost recovery. These objectives were used as the framework for developing a 10-year National Water Resources Implementation Plan, The Cabinet of the Government of Kiribati endorsed both the National Policy and its Implementation Plan in January 2009.

Project support: The Kiribati Groundwater Hydrology Programme was initiated under UNESCO IHP V Theme 6, Humid Tropics Programme. It has been supported by UNESCO IHP, the Australian Centre for International Agricultural Research grant LW1/2001/050, by the European Union-SOPAC Pacific Water Governance Project, by AusAID, NZAid and the World Bank through the Kiribati Adaptation Programme Phase II and by Agence Francaise de Developpement (AFD), France.

Publication:

White I, Falkland A, Rebgetz M, Overmars M, Katatia M, and Metutera T (2009). Development of National Water Resources Policy and Implementation Plans for the Kiribati Adaptation Program. In Proc. H2009. 32 Hydrology and Water Resources Symposium. Newcastle, NSW Australia, 1-3 December 2009, Engineers Australia (in press).

2. Kiribati Adaptation Programme Phase II

Development of a 10-20 Year Water Master Plan for Tarawa.

The Water Master Plan for Tarawa is a direct response to the Government of Kiribati's National Water Resources Policy and its accompanying Implementation Plan. It focuses on the ability of

groundwater sources, the traditional source of the majority of water used in Tarawa, the most populated atoll in the Republic and the location of the capital, to meet expected future demands. This focus is necessary because there are a number of knowledge gaps and difficult issues which need to be addressed by the government, its Ministries and agencies as well as the community. Demand for water in Tarawa is estimated over the next 10 to 20 years. Tarawa is an island in transition from largely subsistence, rural lifestyles, still largely followed in North Tarawa, to high-density, urban living in South Tarawa. Over the last 50 years, demographic and socio-economic factors have changed dramatically. This means that the traditional adaptation strategies developed over 4,000 years of subsistence in small islands are largely ineffective in coping with the demands of a modern urban society. The issues faced in groundwater management in Tarawa are already critical and future population growth will severely challenge the Government's ability to provide adequate supplies of safe, good quality water. Work in the Tarawa Water Master Plan has identified significant shortfalls in the ability of treated reticulated groundwater to meet the water needs of future populations in Tarawa. The potential for meeting some of the future water needs of Tarawa for the next 20 years through rainwater harvesting was examined. The large variability of rainfall in Tarawa, mostly driven by ENSO events plays a critical role. Major droughts occur on average about every 7 years and can last for two years. The predictions from climate change studies Global Circulation Models (GCMs) of changes in future rainfall and drought frequency due to climate change are problematic since the GCMs do not simulate ENSO events. It is assumed here that the future variability of rainfall in Tarawa over the next 20 years will be similar to that in Betio over the period 1947 to the end of 2008.

It was found that there is currently insufficient capacity in South Tarawa to meet the current water needs using piped, treated fresh groundwater from Bonriki and Buota water reserves and from domestic rainwater tanks. Future demand will be even greater than current demand and there is an urgent need, and one mandated by GoK in its National Water Resources Policy, to supply adequate quantities of safe freshwater to meet that demand.

The suggestions of previous studies in Tarawa have been reviewed. Desalination, bulk importation by ship, large constructed rainwater harvesting systems, recycling and a reclaimed island in the lagoon built to act as a source of fresh groundwater for the water supply system have all been critically examined. It is emphasised here that development of any other water source should only be considered once the existing leaks in the reticulation systems are dramatically reduced. There is no point in investing in extra water sources when losses from the reticulation system are 50%.
Project support: The Kiribati Groundwater Hydrology Programme was initiated under UNESCO IHP V Theme 6, Humid Tropics Programme. It has been supported by UNESCO IHP, the Australian Centre for International Agricultural Research grant LW1/2001/050, by the European Union-SOPAC Pacific Water Governance Project, by AusAID, NZAid and the World Bank through the Kiribati Adaptation Programme Phase II and by Agence Francaise de Developpement (AFD), France.

Publication:

White I, and Falkland A (2009). Management of freshwater lenses on small Pacific islands. *Hydrogeology Journal*, DOI 10.1007/s10040-009-0525-0.

Reports:

White I, and Falkland A (2009). Interim Water Master Plan for Tarawa: Future Demand. August 2009, Fenner School for Environment and Society, ANU, Canberra, 54 pp.

White I, and Falkland A (2009). Interim Water Master Plan for Tarawa: Te Karau, Rainwater Harvesting Storage and Use. August 2009, Fenner School for Environment and Society, ANU, Canberra, August 2009, 63 pp.

White I, and Falkland A (2009). Interim Water Master Plan for Tarawa: Te Ran, Groundwater. August 2009, Fenner School for Environment and Society, ANU, Canberra, 82 pp.

White I, and Falkland A (2009). Interim Water Master Plan for Tarawa: Other Water Sources. August 2009, Fenner School for Environment and Society, ANU, Canberra. 32 pp.

3. Reducing the Vulnerability of Pacific APC States.

Vulnerability of Groundwater in Tongatapu, Kingdom of Tonga, Groundwater Evaluation and Monitoring Assessment

Tongatapu, the main island in the Kingdom of Tonga, is blessed with reliable rainfall, fertile soils and has an adequate supply of groundwater. There are, however, increasing demands on, growing threats to, and public concerns about its groundwater, which require wise management and use to ensure adequate supplies of safe freshwater for current and future generations, in accord with UN Millennium Goals and the Pacific Regional Action Plan on Sustainable Water Management.

Over the past 40 years, investigations in Tongatapu have identified a number of natural and human-related factors that increase or have the potential to increase the vulnerability of fresh groundwater sources. Some of these studies have suggested strategies to lessen impacts and improve resilience. This project builds on the considerable weight of those results as well as the depth of local expertise and the valuable, long-term record of monitoring. Our aim here is to summarise early work, to examine the current situation and to propose strategies to decrease the vulnerability of the groundwater resource and the water supply system. The overall goal of this project is to: assist assessment of impacts on the aquatic environment and the planning and sustainable management of the finite water resources of Tongatapu

In order to meet the project goal, the following project objectives were set.

1. Assess the institutional capacity and needs of organisations with responsibility for monitoring groundwater.
2. Assess the vulnerability of the groundwater resources of Tongatapu.
3. Review and analyse baseline groundwater monitoring data.
- 4.
5. Conduct a survey of water quality in water supply wells and bores throughout Tongatapu.

This report presents the results and recommendations arising from consultations with personnel from relevant agencies of the Government of Tonga (GoT) and non-government organisations (NGOs) from groundwater investigations conducted on Tongatapu during between 21st July and 21 August 2007 and from 19th November to 13th December 2007 and from an extensive analysis of the extensive groundwater data bases.

Groundwater contained in Tongatapu's karst limestone aquifer is a valuable resource, particularly during dry seasons and periodic droughts. Unfortunately, the groundwater is of variable quality for drinking due to its mixing with underlying seawater and the impacts of overlying human settlements. There are, therefore, a range of natural, anthropogenic as well as institutional factors that contribute to the vulnerability of groundwater in Tongatapu. This study has assessed the main factors and their impacts on groundwater using: "snap shot" measurements of groundwater conducted during the study; the valuable data bases of monitoring results dating back to 1959 and a range of models and techniques to predict possible future situations.

Project support: This project was supported by the European Union and SOPAC under the EDF 8.

Report:

White I, Falkland A, and Fatai T. (2009). Vulnerability of Groundwater in Tongatapu, Kingdom of Tonga, Groundwater Evaluation and Monitoring Assessment, September 2009, Fenner School for Environment and Society, ANU, Canberra, 375 pp.

4. Vulnerability of Water Supply Catchments.

Natural and Management-Induced Post Fire Impacts on Water Quality in a Major Water Supply Catchment

An extensive monitoring program was undertaken between 2004 and 2009 of the impacts of post-fire disturbance on water quality in the Cotter River, a major source of drinking water for the National Capital, Canberra and the Australian Capital Territory and its region. The lower Cotter

River has had major water quality problems for over 100 years, due to catchment clearing for agriculture, rabbit infestation and pine forestry operations. However, it is shown here that salvage harvesting, suppression of natural regeneration and land clearance to re-establish radiata pine plantation, following the catchment-scale bush fire in January 2003, had a major impact on water quality in Cotter Dam on the lower Cotter River. In sharp contrast, water quality in dams on the upper Cotter rapidly returned to excellent pre-fire conditions following natural, native forest regeneration. We also report on a recently completed \$10 million works program funded by the local water utility to minimise human induced disturbance effects on water quality. The threat of impacts of continued landscape disturbance has now lessened with the completion of these works and the abandonment of forestry operations in favour of management of the lower catchment for water supply. Any prescribed burning of the catchment to reduce bushfire risk needs to be considered in terms of the chance of catchment wide intense fire. It can be seasonally timed to minimise exposure to intense storms and maximise ground cover recovery before the next storm season.

Project support: This work was supported by ACTEW Corporation

Publication: Wade A, White I, Worthy M, Gill AM, Mueller N, Wasson RJ (2009). Natural and Management-Induced Post Fire Impacts on Water Quality in a Major Water Supply Catchment. Australian Journal of Water Resources (Submitted).

5. Surface-Groundwater Interactions

Sources of Salinity in the Upper Murray Darling Basin

Estimates of catchment salt balances throughout the Murray-Darling Basin (MDB) suggest mobilisation of salt stores and generally increasing stream salinities. It is widely assumed these salts are rainfall-deposited, marine-aerosol-origin, cyclic salts, concentrated by evapo-transpiration, stored in groundwaters and mobilised by clearing of native vegetation. In this paper, the assumptions about the sources of salts, in upland catchments in the south-eastern region of the MDB are re-evaluated. The estimation of dissolved salts is re-examined using electrical conductivity (EC), the assessment of stream salt-loads from sporadic EC measurements, and the sources of salts in upland catchments. It is concluded that, although evapo-transpiration plays a significant role in the concentrations of salts in the lower MDB, mineral weathering is a major contributor to stream salt-loads in upland rivers of the MDB that supply over 80% of surface runoff to the Murray River.

Project support. This work was supported by the Australian Research Council.

Publication:

White I, Macdonald BCT, Somerville P and Wasson R (2009) Evaluation of salt sources and loads in upland areas of the Murray-Darling Basin, Australia. Hydrological Processes, 23, 2485-2495.

1.2.4 Hydrology for Environment, Life and Policy (HELP)

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

Lower Murrumbidgee Catchment

Cooperation between researchers, farmers and industry in the Lower Murrumbidgee catchment, and its power to achieve useful and practical on-ground results, is the focus of this HELP initiative. The southern New South Wales catchment has been named as the UNESCO HELP program's first global reference basin. This means that the region's farmers, researchers and irrigation companies will be used as an example to showcase practical solutions for water resources management under competing water uses and economic concerns. The research efforts in the area are addressing problems including rising water tables and salinity, reduced river flows, legislative reforms, competition between water users (including the environment) and falling deep aquifer pressure levels. The catchment is significant; with 2730 farms spread over 560,000

hectares in the Murrumbidgee and Coleambally irrigation areas. Almost a quarter of the water extracted from the Murray-Darling Basin each year is used to produce more than \$1 billion worth of crops – almost 16% of Australia's agriculture produce. The lower Murrumbidgee catchment presents an excellent example of community involvement in hydrological research and the development of integrated catchment management policies using a range of tools. In addition, CSIRO Griffith and Charles Sturt University Wagga Wagga have been accepted as a Regional Coordinating Unit for HELP.

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

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

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

1.2.6 National Plan for water security

As a result of 10 years of drought across a large portion of the country, in recognition that past management of water resources has not been effective, 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

1.3 Educational and training courses

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 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.

1.4 Publications

There are numerous Publications from various conferences and Journals but just a few in addition to those already mentioned above, are included here.

Lambert, Martin, Daniell, Trevor M. and Leonard, Michael (eds) (2008) Proceedings of Water Down Under 2008, incorporating the 31st Hydrology and Water Resources Symposium and the 4th 4th International Conference on Water Resources and Environment Research, 14-17th April, 2008, Adelaide, CDROM.

Daniell; Trevor, Nathan Rory, Chiew Francis and Osti Alexander, (2009) Chapter 11, Low Flow Forecasting, in World Meteorological Organisation, 2009, Manual on the Estimation and Prediction of Low Flows, Contribution to the topic Disaster Mitigation: Floods and Droughts (hydrological aspects), WMO

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

1.5 Participation in international scientific meetings

1.5.1 Meetings hosted by Country

See Section 1.2.1 of this report for international conferences hosted.

1.5.2 Participation in meetings abroad

Australian National Commission for UNESCO program supported participation of Trevor Daniell in UNESCO IHP projects/meetings South-East Asia/Pacific for 2008 to attend the 16th meeting of the UNESCO International Hydrological Program (IHP) Regional Steering Committee and related meetings in Ulaanbaatar, Mongolia, September/October 2008

Prof James Ball attended the Workshop in Ho Chi Minh on IFDs and Flood Estimation in February 2009

1.6 Other activities at a regional level

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

The Pacific HYCOS Project proposal developed by WMO in 2001 has received funding through the European Union. The Pacific HYCOS Project was launched at a workshop in Brisbane,

Australia 16-19 April 2007 organized by 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 in 2009 /10

- 12th INTERNATIONAL RIVERSYMPOSIUM CONFERENCE, Brisbane, September 2009.
- National Water Week, October 2009 Irrigation Australia Conference 2009, Swan Hill 18-21 October 2009
- **32nd Hydrology & Water Resources Symposium 2009**, 29 November 2009 to 04 December 2009
- OZwater 10 will be held at the Brisbane Convention and Exhibition Centre, Brisbane, Queensland from 8 to 10 March, 2010
- [International Workshop on Evaporation from Reservoirs](#) Gold Coast, Australia, Dec 9-11, 2009.
- ENVIRO 2010, Solutions For a Sustainable Future, 21-23 July 2010, Melbourne.

2.2 Activities Planned for 2008-2009

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

2.3 Activities envisaged in the long term

Continuation of supply of Data - Catalogue of Rivers by Ross James from the Bureau's Data base. It is envisaged in the future direct access to the large data base of flow and associate data will be available to all.

COUNTRY REPORT ON NATIONAL IHP RELATED ACTIVITIES

OF

THE CAMBODIA FOR THE REGIONAL STEERING COMMITTEE MEETING, 5-6TH NOVEMBER 2009, WUHAN, CHINA

ACTIVITIES UNDERTAKEN IN THE PERIOD November 2008 – November 2009

1. National Activities

- To attend the workshop on strategic study of groundwater resources water for supply and irrigation in Prey Veng and Svay Rieng (Phase 2) for Final Stakeholder Workshop held in 28 November 2008
- To attended with training courses for modeling on hydrological and water resources management supported by Mekong River Commissions Secretaries MRC.
- Participation with the national modeling on case studies for two river basin by using three model as SWAT, IQQM, ISIS for analysis of hydrology and water resources managements and flood impact the basin is located in the north part of the Cambodia, the catchment area is covered 1,964 km² it river basin area is cover three provinces, for the second river basin for flood assessment is the lower part of mekong basin is southeast Cambodia funded by Mekong River Commissions Secretaries MRC.
- Attend the field trip with the national modeling team on case studies for data collection for model data input for two river basin for five provinces, to meet with the line agency at the provincial levels to discussion on data available and existing to interviews with the stakeholder. The field visit was started from 20-24 April 2009 and covered the following topics:
 - To verification for flood area event for model ISIS for Preak Ta Nu catchments in Svay Rieng and Prey Veng Province
 - To estimate of primary on hydrological regime in both river basin
 - To interview with the stakeholders of history for flood effective with the area and activities in the river basin.
 - To meet with the line agency that related as Water Resources and Meteorology Department in Provincial
 - On 20 April 2009 the team meet Deputy Director and observer of hydro-meteorology of Svay Rieng, Provincial Service of Water Resources and Meteorology about history of time series for hydro-meteorological data as water levels discharge rainfall, included the climate data as temperature wind speed, humidity solar radiation but his mention that the data is send to Phnom Penh, Therefore the hydrological station is available two station once is hydrological Vico, is available only water levels and second is Don Sor established since 2005 the station have water levels and flow they have one year for flow only three time they measurement we are discuss on density of agriculture area, irrigation reservoir location and discuss about histories of flood and event flooded in

the Svay Rieng Province after discussions the team leave to field to meet with the local people that leaving in the area basin of Ta Nu to verify of flood, hydrological regime histories, the team went to the downstream of Ta Nu at the Bayab bridge location in Svay Chrum District, Svay Chrum Village, we meet with the oldest villager 75 years old, who was born in that river basin and until now no migration at any place he mentions that this area the flood is natural phenomenon from the Mekong River basin it start from middle of July until the end of November and also he mentioned that the area has been effected by tidal.

- On 21 April 2009 the team back from Svay Rieng go to Prey Veng to meet Deputy Director of Provincial Department of Water Resources and Meteorology, to discuss the hydro-meteorological data at Prey Veng climate station, we collected rainfall data 2001 to 2008. Other data including wind speed, temperature, humidity is available only monthly and for the sunshine duration, solar Radiation as a result of not having equipments for measurements after discussion the team go to field to check the flood marks at the middle of the flood plain in Rong Village, Chab Commune Kompongtrabak district, the team go by boat from middle of river upstream to the junction of Preak Ta Nu and Preak Kompongtrabek (from West to East of the province). The team estimated that the main water source of Preak Ta Nu comes from the Mekong River. By visiting the same village to interview for flood historical the villager they mentions that the area during the wet season is covered by flood around five months every year. Therefore, the people living in that area can grow the rice crop only during the dry season.

- On 22 April 2009 the team went to Stung Stoung river basin, in the afternoon we are met Deputy Director of Water Resources and Meteorology of Kompong Thom Province, to discuss about history of time series for hydro-meteorological data including water level, discharge, rainfall, climate data, temperature, wind speed, humidity, and solar radiation. He mentioned that all the data had been sent to Department of Hydrology and River Works and Department of Meteorology based in Phnom Penh. He continued that there is one hydrological station there called Kampong Chen. During our survey there, we discussed on density of agriculture area, reservoir location and history of flood and event flooded, we met in the hydro-meteorological office to request the climate and hydrological data time series as water levels, discharge in Kompong Thom Province as well as discussions about situation of three hydrological Stations under responsibilities of Service of Water Resources and Meteorology Kompong Thom Province they mention that a some stations were broken as staff gauges and some rain gauges were abandoned however they provided team with the same data of water levels, rainfall.

- On 23 April 2009 the team with local staff went to field to collect information on the node location of reservoir for input into the model in the river basin to Ou Snay reservoir X: 473256, Y: 1448489, reservoir Ou Sdav X:467473,Y:1433886 and reservoir 30 September X:469485, Y1435158, gate 30 September X:469526,Y:1434488. The field visit was guided by local staff and villager, manager of reservoir 30 September. It

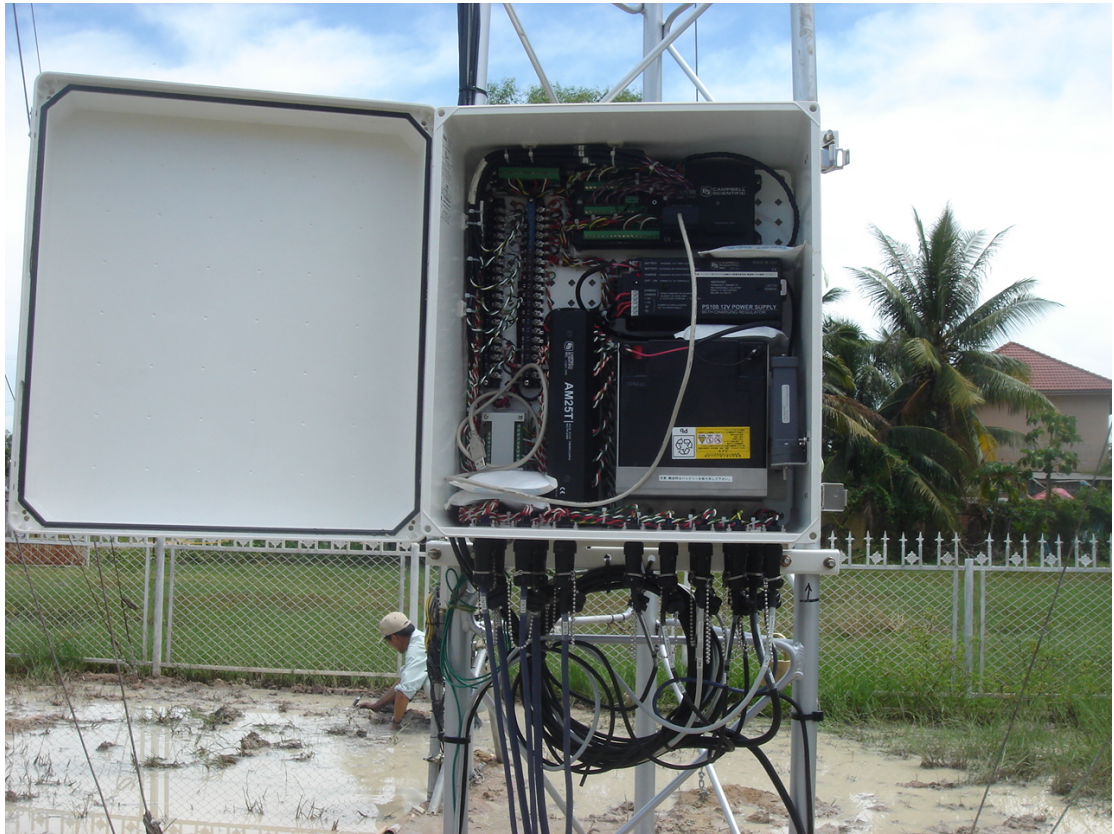
was informed that most of reservoir constructed since Pol Pot regime. Finally, the team went to downstream to visit the hydrological station at Kopong Chen X: 453528, Y: 1430806 in Stung Stoung river basin. On 24 April 2009 the team returned back to Phnom Penh.

2. International Activities and Cooperation

- Attended the 4th International Coordination Group (ICG) meeting of the GEOSS Asian Water Cycle Initiative (AWCI) Held at the Kyoto Research Park, Kyoto, Japan, 6-7 February 2009.
- Attended the 1ST SAFE WORKSHOP From 25-26 May 2009 in Pattay Thailand sponsor by JAXA CEOP/AWCI/GEOSS.
- Attend the workshop on 10-15 April 2009 on technical model calibration for SWAT and IQQM model held at Mekong River Commission MRC in Lao PDR, supported by MRC.
- Participant and cooperation on field trip from 10 September 2009 to 25 October 2009 on data collection and soil moisture and rain gauge and automatic weather station AWS installation on southwest part of Ton le Sap Lake for the 10 rain gauge eighth soil moisture station and one automatic weather station for Asian Water Cycle Initiative AWCI programs supported by the research institute of Tokyo University attach with the Picture.



Picture A: Soil moisture sencer connected with data logger with AWS



Picture B: Data logger box AWS



Picture C: Automatic weather station



Picture D: Automatic rain gauge station



Picture E: Soil moisture sencer data logger station



Picture E: Data download soil moisture from data logger station

CHINA

National Report on IHP Related Activities

for

The 17th RSC-IHP meeting for the Southeast Asia and the Pacific

Wuhan China 5-6 November 2009

Chinese National Committee for the IHP

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1. ACTIVITIES UNDERTAKEN IN THE PERIOD October 2008 – November 2009

1.1 Meetings of the Chinese National Committee for IHP

1.1.1 Decision regarding the composition of the Chinese National Committee

Since April 2008, new members have been recommended and working for the National Committee. Some of them were shifted their positions and alternatives were recommended. The current committee consists of 29 distinguished water experts who are active in hydrology and water resources work in China. Their participation will strengthen the implementation of IHP activities/projects and facilitate IHP China with broad and effective contributions.

1.1.2 Status of IHP-VII activities

China national committee has arranged projects and activities in all themes and almost all focal points of IHP-VII through national committee members, focal points and working groups around the country. Some activities, mainly deal with output of the projects, 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.

On 20-21 April 2009, Jointly with UNESCO IHP, Changjiang Water Resources Commission (CWRC) organized a workshop on “Climate change and city water safety” as one of the sub-forum under the framework of the 3rd Yangtze Forum held in Shanghai. The 3rd Yangtze Forum comprises a Summit Forum and five parallel Sub-forums, i.e. “Estuary Regulation and Ecological Protection”, “Climate Change and City Water Safety”, “Integrated River Basin Management”, “Corporate Engagement” and “River Ecosystem Monitoring and Adaptive Management”. The sub-forum of “climate change and city water safety” aims at bringing together excellent international scientists, experts and stakeholders to share their views, and to search for means to cope with climate change impacts on water and city safety in a sustainable and adaptive way.

The presentations cover experiences from Poland, The Netherlands, France, UK, Australia and China. Dr. Dr. A. Szollosi-Nagy, representing UNESCO IHP, has provided keynote speech for the workshop. This workshop has not only benefited water management practical needs in China particularly on Changjiang (Yangtze) River, but also contributed to the IHP-VII objectives with sharing and developing knowledge and experiences on climate change impact and water resources management from different region and rivers.

The IRTCES Silver Jubilee Celebration & Seminar on Integrated River Basin Management under Global Climate Change were held on July 29, 2009 at Media Center in Beijing. Mr. Chen Lei, Minister of Water Resources of China attended the celebration and made an important speech. Mr. Walter R. Erdelen, Assistant Director General for Natural Sciences of UNESCO attended the celebration and made an address of congratulation.



IRTCES Silver Jubilee Celebration

Minister Chen Lei extended his congratulations on the 25th anniversary of International Research and Training Center on Erosion and Sedimentation (IRTCES), and fully affirmed the great achievements made by IRTCES and its outstanding contribution to the international cooperation in the past 25 years. In his view, IRTCES, under the concern and support of the UNESCO as well as the direct leadership of the Ministry of Water Resources, has strived for progress and devoted in pioneering innovation. The achievements of IRTCES have won wide international and domestic recognition and received high remarks from UNESCO officials and successive representatives of the UNESCO Office Beijing.

At the meeting, on behalf of UNESCO, Mr. Erdelen conveyed his congratulations to the 25th Anniversary of IRTCES and affirmed the great contributions that the IRTCES. He also points out that UNESCO is honored to have such an international and regional center on settling problems of water and sustainable development. Mr. A. Singh, Director and Representative of UNESCO Office to DPR Korea, Japan, Mongolia, PR of China and Republic of Korea, and several distinguished delegates and experts delivered talks regarding IRTCES's contribution to sediment science and technology.

The **Seminar on Integrated River Basin Management under Global Climate Change** was convened in the afternoon. Prof. W. R. Erdelen, Academician Liu Changming of Chinese Academy of Science, Prof. M. Spreafico, and Prof. Wang Zhaoyin, Chairman of IRTCES Advisory Council gave sagacious and wonderful academic lectures centering on the related issues.



Rostrum platform

Leaders from related ministries of the State Council, departments and river basin institutions of the Ministry of Water Resources, water conservancy and hydropower sectors, academies and institutes and institutions of higher learning, academicians, well-known experts, guests from international organizations, related embassies in China and many other countries, and representatives of staff members and graduate students from China Institute of Water Resources and Hydropower Research (IWHR) and the IRTCES, a total of 350 participants took part in the meeting.

1.1.3 Decision regarding contribution to/participation in IHP-VII

In the annual meeting of China-IHP last year, it was decided to **fully participate in all themes**. Some working groups were proposed, and more detail participation plan were decided in the annual meeting on 1 November 2009 in Wuhan, China.

On 1 November 2009, the annual meeting of China-IHP national committee has been held in Wuhan China. The chairman, vice chairmen, secretary-general, deputy secretary-general and committee members attend the annual meeting. During the meeting, the secretary-general of China-IHP national committee introduced IHP national committee organization and the members. Certificates have been authorized to each member of the national committee.

Mr. Deng Jian, Chairman of China-IHP national committee delivered an excellent talk in the meeting. He has reviewed the IHP work and has pointed out that the committee should continue its work style, i.e. broaden the communication among members and their organization so that to further develop water-technology and concepts to benefit water resources management in China.

Mr. Liu Heng, the vice chairman of China-IHP national committee reviewed the past year work of the committee and propose a plan for participation of IHP-VII. Regulations of China-IHP national committee work has been reviewed and agreed. The meeting has also discussed other relevant issues regarding water development in China, focus and key fields have been identified

for the future work.

The meeting has brought together most of the members of the China-IHP national committee, and created an opportunity for the members to share their understanding, idea of IHP work in China and in general, which has effectively promoted IHP work and communication inside China.

1.2 Activities at national level in the framework of the IHP

1.2.1 National/local scientific and technical meetings

(1) Workshop on the 12th 5-year plan on water information management was held in Changsha, Hunan province, in 16-17 October 2009. The workshop was organized by the water information management committee of the Chinese Hydraulic Engineering Society (CHES). The objectives of the workshop were to: implement the work plan from the annual work meeting of water information management; review the results from the 11th 5-year work, analyze and discuss existing problems and sharing knowledge and experience obtained on how to integrate information and resources. The workshop also aimed to discuss and review the planning work for the 12th 5-year on water information management in China.

The vice director of information center, ministry of water resources, Mr. Cai Yang presented in the workshop and delivered important speech. Vice director of Department of water resources of Hunan province, Mr. Lian Shijie also attended the workshop and made presentation. Members of water information management committee were invited to attend the workshop.

The workshop discussed direction and plans for the 12th 5-year plan of water information management, presented achievement from the first phase state decision support system of flood control and drought relief system. Results of data organizing and information reporting platform have been as well presented and reviewed.



Opening ceremony of the workshop on the 12th 5-year plan on water information management

(2)The 7th China water forum was held on 19 September, 2009 in Beijing. The theme of the forum is “water system and water resources management”. Mr. Hu Siyi, the vice minister of the ministry of water resources gave the opening the speech. He has pointed out that attention should be given to technical and scientific support based on in-depth research on water management.

During the form, 4 focus have been identified on WRM in China: 1) give ways to floods and rivers, control and management floods based on scientific analysis, and try to optimize water resources utilization by making use of the floods. This will be an more positive solution to the floods and drought disaster in China; 2) to promote water saving in the society. 3) based on natural restoring capacity, combining with human activity such as ecological restoration, to resolve the soil erosion problems; 4) control pollution release, promote green economy, protect water resources and maintain river sustainability

China Water Forum (CWF, the original title was China Water Issue Forum) was started in 2003. 6 times CWF have been successfully held. Various academia from China academy of science and many professionals, water experts attended the forum.



7th China Water forum opening ceremony

(3) Meeting on hydrological work plan framework was held in 7-8 July 2009, Wuhan. Mr. Cai Jianyuan - vice director of the bureau of hydrology (BOH), Ministry of Water Resources (MWR), Mr. Jin XingPing - deputy chief engineer of Changjiang Water Resources Commission (CWRC), Mr. Wang Jun - director general of BOH CWRC, have attended the meeting. The meeting was chaired by the Mr. Teng Jianren - director general of the bureau of planning, CWRC.



Discussion & reporting

Mr. Wang Jun - director general of BOH CWRC, gave a talk in the meeting. In his talk, Mr. Wang clarified the requirement and principle for the planning work. He has also provided ideas for the next steps to finalize the work plan. Each group (office) reported the conference about their work progress, discussed about the framework (or contents) of the work plan report. In total there were 70 people from relevant offices from the ministry, commission and regional level attend the meeting and made excellent discussions on this very objective.

(4) State work meeting on hydrology was held on 21 May 2009, Shenyang, Liaoning province. The objectives of this meeting were: review and summaries work effectiveness, efficiency and results of hydrology work in China; analyze the state-of-the-art of hydrology work, enhance the position of hydrology in social-economic development, and identify work focus of current hydrological work and set up work plan for the next stage.



Meeting room, Mr. Chen Lei was giving report

Mr. Chen Lei – minister of water resources, gave important speech. Representatives (mostly

director general) of all hydrological authorities at all level including ministry level, provincial level and basin level attend the meeting.

(5) The 2009 International Forum on Water Resources and Sustainable Development was held in Wuhan on September 23-24, 2009. The forum was under the sponsorship of Chinese Academy of Engineering (CAE) and Ministry of Water Resources of P. R. China. Madam Qian Zhengying, Vice Chairman of CPPCC and former Minister of Water Resources presented at the forum. Mr. Chen Lei, Minister of Water Resources also presented at the forum and delivered a speech.



Forum meeting room – opening ceremony



The audience in the forum

The other participants include high-ranking governmental officials of Hubei Province, officials from the Ministry of Water Resources and chairman of Chinese Hydraulic Engineering Society (CHES), Commissioner of Changjiang Water Resources Commission (CWRC) and representatives from International Association of Hydraulic Engineering and Research (IAHR), International Commission on Irrigation and Drainage (ICID), International Water Resources Association (IWRA), International Water Management Institute (IWMI), Ohio State University (OSU), China Society for Hydropower Engineering (CSHE) and EU-China River Basin Management Programme (RBMP) etc.

The main topics of the forum cover four respects, namely the spatial-temporal variation of water resources and its allocation, efficient and sustainable use of water resources in agriculture, watershed management and health of rivers from sources to sea, development of hydropower resources and protection of environments and ecosystems. More than 300 academicians, scholars and experts participated the forum. Wide-scope discussion was conducted centered on the theme of “water resources and sustainable development”.

(6) National hydrology work meeting was held during 1-2 April 2009 in Guangzhou. Director general of the bureau of hydrology, MWR, Mr. Deng Jian, gave important speech in the meeting. Other participants from ministry and different basin/provinces BOHs have also

participated the meeting. In total there were around 100 participants.



The meeting has briefed the participants about the capacity building work progress of China, representatives also presented their work situation and shared with the audiences of their experiences. Rewards have been also issued for those firms that have made excellent progress in hydrology work.

The meeting room – reporting and discussion

1.2.2 Participation IHP Steering Committees/Working Groups

Participated short course organization work for the Hindu Kush Himalayan flow Regimes From Experimental Network Data (HKH-FRIEND) during 2008-2009. Jointly UNESCO, ICIMOD, the Nepal National IHP Committee, the coordinator of HKH-FRIEND, Dr. Huang Y., the deputy secretary general of China-IHP national committee, have jointly organized two short study courses in the HKH region.



One of the training courses was focus on the Yala glacier in Langtang, Nepal, on monitoring of glacier growth, and retreat held from 27 April to 15 May 2009. 18 trainees from Nepal, Bhutan, China, India, Kazakhstan, Kyrgyzstan, and Pakistan learned how to make measurements and calculate the total mass of a glacier through lectures and practical exercises.

The participants are learning how to measure glacier

Another course is now in organizing and preparation stage, which will focus on climate change, hydrological drought and flood, and will take place in Thimpu, Bhutan, during 18-24 April 2010. The main objective is to train researchers from the HKH region to learn about methods and characteristics of drought and floods, and to understand the impacts of climate change on

the hydrological extreme events and countermeasure. 6~8 participants are selected from HKH region countries and the UNESCO offices are currently allocating resources to sponsor those participants.

Currently, together with regional FRIEND coordinators, as the editor in chief, Dr. Huang is working on the global FRIEND report for 2006-2009.

1.2.3 Research/applied projects supported or sponsored

The website of the Chinese National Committee for IHP has been supported by UNESCO Beijing office and has been updated regularly. It was updated regularly for distributing messages to the public. Official home page is <http://www.chinaihp.org>

A couple of research projects for participation of AP-FRIEND, Himalaya-FRIEND have been supported by the National Committee.

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

(1) Technical exchange program between USGS and the bureau of hydrology (BOH), Changjiang Water Resources Commission (CWRC) has been carried out in USA, 12-31 Oct 2009. Led by Mr. Chen Songsheng, the deputy chief engineer of BOH-CWRC, in total 10 engineers from BOH-CWRC have paid a 20-days visit to the regional offices of USGS at the USGS-Missouri Water Science Center, USGS local office at Baton Rouge, Louisiana (LA), the headquarter of USGS in Virginia, and hydrometric instrument manufactories of Teledyne RD Instruments and SonTek manufacturing in San Diego California State (CA). The technical exchange aimed to exchange ideas and technology regarding hydrometric work on measuring discharge, water level, sediment, water quality, and information management. The Chinese engineers have experienced and practiced gauging processes following the supervising of the USGS experts, the USGS experts have also learnt from Chinese engineers on how those work are conducted in China, in particularly in Yangtze River. The exchange program consists of indoor lecturing, communication and discussion, filed trips and on-site practices. Chinese engineers also learnt how database and other information management tools and system are working in US system. The two sides have also exchanged ideas and experiences and views on administrative and management work in both country/system.



The exchange program has turned out a very successful activity which first of all bordered the vision and knowledge of our engineers on hydrometric and new monitoring technologies, which should certainly benefit our future work in hydrological monitoring and information management work in Changjiang River.

(2) International symposium on hydrological model was held on 24 Oct 2009 in Beijing Normal University. The symposium was launched by the institute of water research, Beijing Normal University. It aims to promote knowledge sharing and technical development on hydrological modeling research and practices.



Prof. Szollosi-Nagy, Rector of IHE, gave opening speech



Prof. Xu Zongxue, member of CNC-IHP, Beijing Normal university

The reactor of IHE Delft, Prof. Szöllösi-Nagy, academia Mr. Liu Changming made presentation in the symposium. The symposium was chaired by Prof. Xu zongxue, the vice director of the institute of water research, Beijing Normal university. Around 170 participants coming from America, Germany, the Netherlands and Switzerland etc., participated this event. They have presented their latest research and practical results, direction of new development of hydrological models and their application are high lightened.

(3) The 4th International Yellow River Forum launched by the Yellow River Conservancy Commission under the Ministry of Water Resources opened on October 20, 2009 in Zhengzhou of Henan Province. Mr. Chen Lei, the Minister of Water Resources made an address at the opening ceremony. The forum themed as “Ecological Civilization and River Ethics” and held every two years will last for three days. More than 1500 experts and officials from 61 countries and international organizations are attending the forum, and discussing on nine topics including social and environment impact of climate change, sustainable water resources development, scientific meanings of ecological civilization and methods for river restoration and so on.



Opening ceremony of the 4th Yellow River Forum

(4) “Hydropower for Today Forum” was held on 11 May 2009 in Hangzhou. Sponsored by the ministry of water resources and United Nations Industrial Development Organization



(UNIDO), the international center of small hydropower has organized the 5th “today’s hydropower forum” in Hangzhou. Minister Mr. Chen Lei presented in the forum and delivered important speech. He emphasized that we should promote hydropower, improve people’s life condition in terms of water resources management, thus to promote social-economic development.

The theme of the forum was to promote small hydropower and to benefit people’s life, focus on discussion of the functionality and potential of small hydropower in social economical development. The forum also aimed to present the achievement of small hydropower in China in particular in countryside areas. The forum created an excellent opportunity to establish possible cooperation and joint-development.

In total there were 120 participants joined the forum, including more than 50 foreigners coming from 26 countries, UNIDO, IAHR etc.. Others were professional and directors of water at different

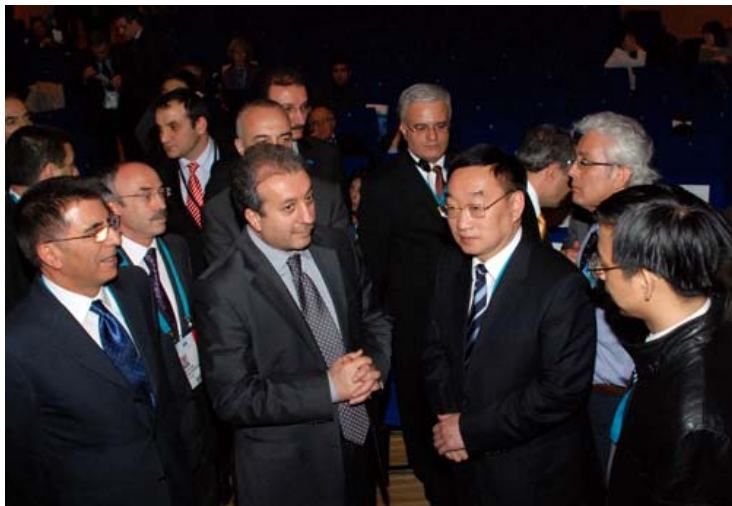
level in China. The forum lasted for 2 days. In between, meeting of steering committee member of international small hydropower was as well held.

(5) The 5th World Water Forum was held 16-22 March, 2009 in Istanbul Turkey. Invited by the minister of forest, minister Chen Lei and his delegation attend the international water forum. Over 30,000 participants from 185 countries attended this forum. The form aims to exchange experiences and ideas through open and all-inclusive dialogue in view of “Bridging Divides for Water”. 6 themes were identified as: (1) Global Changes and Risk Management, (2) Advancing human Development and the MDGs; (3) Managing and Protecting water resources and their supply systems to meet human and environmental needs; (4) Governance and Management; (5) Finance, and (6) Education, Knowledge and Capacity Building.

The World Water Forum, started in 1997, was organized every three years by the World Water Council in close collaboration with the authorities of the hosting country, is the largest international event in the field of water. It primarily serves four main purposes:

- To raise the importance of water on the political agenda
- To support the deepening of discussions towards the solution of international water issues in the 21st century
- To formulate concrete proposals and bring their importance to the world's attention
- To generate political commitment

The 5th World Water Forum mobilized a wide range of stakeholders in order to seek solutions to the challenges relating to water with the help of their cumulative experience and with their motivation for coordinated impetus and action. In addition, the 5th World Water Forum convened Ministers, Parliamentarians and Local Authority Leaders, i.e. the three levels of government, ensuring a comprehensive interaction, not only within each political group, but



also among them, including stakeholders. The outcome of the forum, the Istanbul Ministerial Statement, among many other important elements, stresses good governance in the water sector by means of institutional reforms, strengthened legal and administrative frameworks and their effective enforcement, transparency in decision making processes and prevention of corruption.

Ever since the first time when the world water forum was organized in 1997, delegation from China have participated the 2nd, 3rd, 4th and 5th. The participation has promoted and exchange ideas on water management knowledge and technology, also contributed the water development in the world.

(6) The Workshop of the Safety and Management of DAM was held in 2008 in Nanjing city, sponsored by the Ministry of water resources, World Bank and Nanjing hydraulic institute together. Vice Minister Jiao Yong of MWR, Vice director Ede Jorge

IJJASZ-VASQUEZ of China-Mongolia sustained bureau of World Bank and Luis Berga, Chairman of international Dam commission attended the forum and delivered opening speech.

Mr. Jiao mainly presented that the safety of Dam has always been the issue emphasized by almost different governments in the world and will have large effects on the fields of flood-prevented, water –supply, electricity-generation, environment & ecosystem etc. Chinese government has always put largely importance on the job of Dam Safety and management, especially try hard to construct the protecting system for Dam safety by the measures of making new rules, reinforcing of the dam, reform of management etc. and evident effect have been made so far.

This workshop has lasted for two days. During the meeting, technology exhibition area has been set up and several manufacturers represent their Dam-monitoring instruments, software of analysis and estimation, also other technological productions with new technology, new material and new instruments have been exhibited involved to the main topics of this workshop. More than 100 delegates have attended this meeting from more than 30 countries.

(7) The international workshop of Three Gauges Project and development and protection of water resources was held in Yichang city in Oct. 28, 2008. Both Mr. Li Yong'an, the general manager of TGP, Ms. Cai Qihua, Commissioner of CWRC have addressed respectively on behave of the sponsors.

More than 130 participants from 18 countries such as US, Russia, France, Brail, Germany, Netherlands, Canada, India and China etc. have discussed the topics involved into the sustainable development and protection of water resources, hydroelectric etc.

Mr. Li YongAn addressed that TGP is the key project which can take suit benefit on the safety of flood-prevention, utilization of hydropower and improvement of river transportation in Changjiang River. Now the TGP have almost been constructed, its comprehensive effects have been obtained. We will exercise in our future jobs with international sustainable development ideas and successful experiences in order to obtain success both development and protection of water resources.

This is sponsored by TGP, CWRC, and International hydroelectric association, Nature protection association etc. more than 50 papers have been submitted.



(8) 2nd Workshop of China and Switzerland on Flood Control and Disaster Relief was held in Bern, Switzerland, on 10 Nov 2008. Mr. Chen Lei, Minister of Water Resources delivered a speech titled “Flood Control, Drought Relief and Disaster Reduction in China”. During his speech, he briefed the

condition and feature of flood and drought disasters in China, as well as working target and strategy of flood control and drought relief and emergency management mechanism for encountering flood and drought disasters. He also summarized the main achievements made in flood control and drought relief and presented typical cases of flooding and typhoon disasters. Finally measures for furthering cooperation between China and Switzerland in the future are proposed.

The Vice Director-General of Swiss Environment Agency made a keynote speech by introducing experiences made in protection of mountain flood and dammed lake. Specialists from China and Switzerland held discussion and made presentations in terms of water, environment and disaster protection during the workshop.

(9) International summit of hydropower and hydroelectric was held in Oct.17 2008 in Beijing city, sponsored by Ministry of Water Resources. Mr. Chen lei, Minister of MWR have made an important speech. The global topics concerned about water resources, hydropower, ecosystem, climate change and extreme natural disasters etc. have been discussed and exchanged, 8 sub-forums have been organized and more than 400 participants from 20 countries or districts attended.

(10) International Small Hydropower Center organized a training workshop on small hydropower and community sustainable development in Hangzhou, from 21 April to 5 May 2008. 46 participants from 23 developing countries participated in the workshop. The course is directly link to IHP-VII theme related to water and energy.

A special training course for hydrology and water resources assessment was organized by Bureau of Hydrology, Ministry of Water Resources from 13-17 November, 2007. The course was 15th regularly activity for improving national water resources assessment level. 172 participants passed examination and received certificate for their professional position. China-IHP experts delivered lectures during this and last courses.

Each year about 20 participants were sent to UNESCO-IHE with academic recommendation from China-IHP. Proceedings of Workshop on Ecological Effect of Hydro-Engineering, 11-12 November 2007.

(11) Sino-Swiss Water Forum was held on 4/June 2009 in Shanghai. Mr. Hu Siyi, vice minister of the ministry of water resources attended the forum and delivered opening speech. He reviewed the past cooperation between Switzerland and China, and gave suggestions for future cooperation. The form was organized by Swiss Shanghai consulate. It aimed to promote by-nature cooperation between Switzerland and China on water resources management and protection, in particular to maintain and gain sustainability in WRM. The forum also introduced waste water treatment techniques from Switzerland. Water authorities and various enterprises participated the forum.



Group picture of vice minister Hu Siyi and Mr. A. Goetz from FOEN Switzerland, and other participants.

The next Sino-Swiss workshop on climate change and water resources management will be held later this month in the ministry of Water Resources, Beijing.

(12) The 10th Sino-Dutch joint steering committee meeting was held on 23 Sept in Beijing, China. During the meeting, both parties reviewed the mutual water resources cooperation last year, involving key activities and exchange on new cooperative intents. Both parties also exchanged ideas on the progress and problems of the projects. Future cooperation and plans for the next year were discussed in the end. After meeting, the delegation from the Netherlands had a short meeting with vice Minister Hu Siyi. The meeting has brought together two sides of professionals from the Netherlands and China, and provided opportunities for future cooperation – where both sides can make agreement on what should be done for the next stage.

According to the work plan, there will be a few projects to be continued or extended, for instance in Changjiang River the cooperation between Rijkswaterstaat and the Bureau of Hydrology, CWRC will continue the cooperation on real time water quality monitoring. The project maybe extended to water quality modeling in the coming phases.

1.2.5 Other initiatives

International research center on Karst has been established in Guilin China. This is the second Category II center on water in China. Chinese National Committee will invite the center to propose some new initiatives for IHP-VII phase and integrate them to the national work plan.

1.3 Education and training course

1.3.1 Contribution to IHP courses

International Small Hydropower Center organized a **training workshop** on small hydropower and community sustainable development in Hangzhou, from 7 April to 21 May

2009. 23 participants from 18 developing countries participated in the workshop. The course is directly link to IHP-VII theme related to water and energy.

IRTECS organized a course on integrated river basin management in Beijing from 28 July to 3 August. About 40 participants with support of UNESCO Office, Beijing attended the course.

1.3.2 Organization of specific courses

With support of Ministry of Water Resources, the 6th **national hydrological bureaus training course for managers** were held from 20 October. The period is one week. 68 trainees were from 7 large river basins and 30 provinces. The training contents of the course included hydrology and water resources management, flood control and forecast, and specially focused on new technology application.

1.3.3 Participation in IHP courses

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

1.4 Publication

Proceedings of International Conference on Hydrology and Disaster Management Workshop, 2-6 November 2009.

1.5 Participation in meetings abroad

IHP representative attended the UNESCO 35th conference on the particular aspects of Natural Science during 14-16 October 2009 in Paris. Dr. Huang Yan, the deputy secretary of IHP China national committee, attended the 35th general conference which aims to discuss on the budget plan for the coming two years, particularly on natural science 35C/5 Draft Resolutions 2010–2011, Volume II Major Programme II – Natural Science. On behalf of IHP China we extended our support to the focus of freshwater and integrated water resources management, and delivered our support to the establishment of the category II water centers. Dr. Huang also participate the other discussion and general meeting throughout 14-16/Oct on issues related to natural science.

In addition to the participating of the 35th general conference, Dr. Huang also discussed with UNESCO IHP officers on the issues regarding the Global FRIEND report and the international conference of the FRIEND that will be held in Morocco in Oct 2010.

1.6 Other activities at a regional level

1.6.1 Institutional relations / co-operation / exchanges

During 2-3 November 2009, international conference of “hydrology and disaster management” was held in Wuhan, China. The conference was organized jointly by China IHP national committee, and UNESCO Jakarta office. Nearly 80 participants from countries of Southeast Asia Pacific area attended the conference and exchanged ideas and experiences on water management.

Opening ceremony of the international conference on H&DM 2009



The international conference on H&DM 2009 has received 30 papers which covers broad scale in related to Hydrology and disaster management in particular knowledge and experiences developed in practical works from different countries and regions. Experts from the SEAP region have exchanged ideas on their interested topics, and expressed to each other the interests for developing future cooperation opportunities. The international conference has provided a platform to sharing knowledge and idea, and also an opportunity to bring together hydrological professionals among the SEAP region.

1.6.2 Completed and ongoing scientific projects

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

A joint programme entitled “climate change partnership framework” (2008-2010). The joint programme has been developed by the nine UN Agencies with Spanish fund in coordination with the respective counterpart Ministries/National/Local Agencies, scientific community, and the private sector, and under the coordination of the UN Theme Group on Energy and Environment, the Ministry of Commerce (MOFCOM) and the Office of National Climate Change Coordination Committee at the National Development and Reform Commission (NCCCC/NDRC). Yellow river is selected as the case study area. The case study of the Yellow River basin regarding Climate Change Impact and Water Resources Assessment will identify the water resources situation, development strategies and policies etc. of the river basin, provide suggestions of approaches and methodologies, and help to build effective indicator system for the Yellow River basin and adapting the river basin management to climate

change.

2 FUTURE ACTIVITIES

2.1 Activities planned to until December 2009

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 2009-2010

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

- Annual IHP national committee meeting shall be held 2010. The objective is to strengthen participation from members and cooperation between them. Framework of how IHP China should contribute the hydrology and water work at national and international level shall be discussed and determined.
- Continue to implement collaborative researches project with IRTCES on erosion and sedimentation, initiate research projects with IRCK for Karst
- Continue researching and collaboration on climate change impact on the hydrological cycle and water resources
- Further continue collaborations with international counterparties (e.g. Switzerland and the Netherlands) to promote and develop risk management in terms of flood management and drought management.
- Cooperate with regional IHP national committees to develop a development strategy on Small Hydropower
- Organizing symposium on sediment in South Africa in 2010
- Implement a research project on risk management focusing environment and society with case of South-North water transfer project
- Participate in national rural drinking water planning and national drinking water sources area protection planning
- Participate in national rural drinking water safety evaluation and planning, develop water quality protection technology
- Workshop on trans-boundary river water ecosystem security (Cooperate with CITWES: Center of International Trans-boundary Waters and Ecosystem Security of Tsinghua

University)

- Refresher course for UNESCO-IHE alumni on IRBM

2.3 Activities envisaged for the long term

China IHP National Committee will make more contributions to IHP, especially, may host RSC meeting/workshops or join co-team for regional and international cooperation. In the phase IHP-VII, some working groups will be established for more cooperation activities. The programme will also promote and encourage young scientists to be actively involved in IHP work at national and international level.

DPR Korea
National Country Report on IHP Activities

The 17th Regional Steering Committee Meeting
for Southeast Asia and the Pacific - UNESCO IHP

November 2-6 2009

Wuhan China

National Committee of DPR Korea for IHP UNESCO

Country Report on IHP Related Activities in 2009

DPR Korea National Committee for IHP

In the years, our country suffered from harmful hydro-meteorological disasters such as heavy rain, thunder storm, flood and landslide and so on. So, the National Committee of the DPR Korea for IHP has kept the accent on saving the peoples' livelihood form hydrological disasters and realization of the comprehensive water resources management.

The activities in this context are as following.

1. National workshop

- The national workshop on the “Community-Unit Early Warning System (CUEWS)”.

It was held March 2009 in Pyongyang. Some central and local administrative structures and the institutes, related with CUEWS, were attended the workshop.

In the workshop, the necessity and opportunities and challenges for CUEWS were discussed, the scientific and technical experiences and lessons got in operating the system were introduced.

- The national workshop on the “Adoption of the Local Flood Dangerous (ALFD)”.

Under the commission of the National Government, a project on the ALFD was launched in November 2008.

In the framework of the project, the national workshop for discussing the detailed action plan was proceeded at the SHMA December 2008.

2. Research Work

- The nationwide investigation for ALFD has been conducted.
- The research on introducing the flood forecasting method by the experimental and statistical way into small and medium basins ($F < 3000 \text{Km}^2$) is in progress now.

The areas of the small and medium basins are so small that their lag-times are very short. So, the experimental and statistical model has been being recognized as an appropriate one for observing the flood forecasting time limit.

The flood forecasting method has been introduced to 8 small basins, in which had been fulfilled enough data to establish the experimental and statistical flood forecasting methods.

- By using the terraced reservoir system of the Taedong River basin, the flood controlling method to lower the flood peak to the possible lowest degree (the Optimum Flood Control) at Pyongyang city was worked out and introduced.

The OFC system made the flood peak at Pyongyang city falling down to 26 % July in this year by operating the reservoir system.

- The controlling method of the Sohae Lock Gate has been researched for draining off the standing water in farmland on the riverside around of the Sohae Lock Gate.

The purpose of the research is to lower the water level of the Sohae Lock Gate to the possible minimum in the farming season and sustaining the water demand for national economy simultaneously.

- The conception framework has been established for developing the long-term water resources developing scenarios according to various climate scenarios until 2100.

The methodology was formed for removing the systemic errors and the improper values from the climate scenario A2, B2. Also the daily data of the

base period, necessary to develop the long-term water resources scenario, has been collected and the daily outflow model is in researching now.

- The research works on the method for developing and reasonable using of the groundwater resource, based on the GIS, in residential area of the lower basin of the Taedong River, has been progressed.
- In the region of the Taedong River, the estimating method of the water value based on the balance between demand and supply has been established.
- Based on GIS methodology, the real-time determining method of flooded areas in the Rungla Islet, the Yangkak Islet and the Duru Islet of the Taedong River has been studied and the service system has been introduced into the operation.
- The investigation for establishing the landslide warning system has been progressed in the North Hamgyong Province.
- The current section survey to establish the service system for flood forecasting and controlling was conducted in the Chongchon River basin and the database has been constructed.

3. Hydro-Information service

- The hydro-meteorological data and information are serving to the decision-makers, related agencies and terminal users by TC-network in real-time.

During the rainy season this year, over 10 times of flood forecasting were distributed to decision-makers and the relevant agencies to make them take positive measures before the flood disaster hit.

- For the project “Save Taedong River Clean Water Project”, the water exchange program of the Taedong River made up and suggested to the National Cabinet to conduct the working for protection the water environment of the river from the water pollution.

- On-the-spot forecasting groups were sent to the important construction fields including the Huichon and the Kumya hydro-power station to serve the hydro-meteorological information and solve the hydro-meteorological problems which are produced in building work in the field.

4. Education

- A ten day's training course for the forecasters of the provincial Hydro-met bureau was held in April 2009.

The training course mainly stressed on the analysis, collection and management of the hydro-meteorological data and analysis and issuing of forecast result.

- The lectures on the hydrological model and the forecasting method were taken July 2009 at SHMA for improvement of the on-the-spot forecasting skill of the student.
- A training course for setting-up the CUEWS has been conducted at the Yangdok County of the South Pyongan Province May 2009.

5. Related Activities

- On the occasions of “World Water Day”, “World Habitat Day”, “World Meteorological Day”, the main publications of DPRK carried the articles of the themes on the efforts of the government of DPR Korea and bilateral and multilateral activities with the international organizations and the other countries to solve the global focused matters including the natural disasters, global climate changes and environmental pollution and so on.

Especially, the bilateral working group meeting on the hydrological cooperation in the Amnok and Duman River Basin between SHMA DPRK and MWR China was successfully conducted 10-12 September 2009. In the meeting, the detailed cooperation items were discussed.

The meeting is, taken every two years, and the very important international cooperation chance for the National Committee.

- The educational materials on the flood disasters for population were published in the newspapers and spread by TV May ~ August 2009.
- Through the periodical journal “Scientific and Technologic Bulletin on Hydro-meteorology”, the scientific and technologic achievements yielded in the nationwide and the worldwide are normally introduced.
- The multimedia programs on natural disasters were made up and propagated through the National Program Exhibition in September 2009.

Ladies and gentleman, it is my great happy to attend the 17th Regional Steering Committee Meeting for Southeast Asia and the Pacific - UNESCO IHP and present the Country National Report on IHP Activities in the DPR Korea.

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I conclusion I can say that the works of the National Committee of the DPRK 2009 was very successful.

We would like to make an active contribution for the development of the regional hydrological works through the national activities in 2010 under the close connection with UNESCO IHP.

Thanks for the attention of everyone.

**REPORT OF THE
INDONESIAN IHP NATIONAL COMMITTEE
WUHAN, CHINA
2 – 6 NOVEMBER 2009**

1. ACTIVITIES UNDERTAKEN IN THE PERIOD OCTOBER 2008 – OCTOBER 2009

1.1 Meetings of the IHP National Committee

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

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

The present composition of the National Committee is:

Chairman : Hery Harjono
Vice Chairman : Arie Setiadi
Secretary I : Gadis Sri Haryani
Secretary II : Deddy Setia Permana

Members:

1. Dr. H. Arief Rachman	Department of National Education
2. P.E. Hehanussa	LIPI
3. Hidayat Pawitan	Bogor Agriculture Institute (IPB)
4. Danaryanto	Department of Energy and Mineral Resources
5. Satriyo Hadipurwo	Department of Energy and Mineral Resources
6. Sudarto Notosiswoyo	Technology Institute of Bandung (ITB)
7. Endro Santoso	Bureau of Meteorology and Geophysics
8. Bogie Soedjatmiko	LIPI
9. Igna Hadi Suparyanto	LIPI
10. Edi Iswanto Wiloso	LIPI
11. Indreswari Guritno	University of Indonesia (UI)
12. Istiqlal Amien	Department of Agriculture
13. Imam Anshori	Department of Public Works
14. Yudha Mediawan	Department of Public Works

The committee hold bimonthly coordination meetings and in additional several technical meetings as needed for the planning and implementation of seminars and workshops organized under coordination of the committee. The committee routine meetings is attended by the Chairman of the Indonesian Committee for UNESCO and by Program Specialist of the UNESCO Jakarta Office. Members of

the national committee through regular meetings distribute informations gathered during the meeting as well as report to the meeting hydrological and related activities in their organizations.

The mailing address is as follows :

Dr. Gadis Sri Haryani
Indonesian National Committee for IHP
Research Centre for Limnology LIPI
Indonesian Institute of Sciences
Cibinong, 16911, INDONESIA
E-mail: gadis@limnologi.lipi.go.id

And/cc to

Bureau of Science and Technology Cooperation and
Promotion, the Indonesian Institute of Sciences (LIPI)
Jln. Gatot Subroto No. 10, Jakarta, 12710, INDONESIA
Telp.: 62-21-5225711/5251834
e-mail: bkpi@lipi.go.id

- 1.1.1 Status of IHP-VII activities
- 1.1.2 Decisions regarding contribution to/participation in IHP-VII
- 1.2 Activities at national level in the framework of the IHP
 - 1.2.1 National/local scientific and technical meetings
 - 1.2.2 Participation in IHP Steering Committees/Working Groups
Annual meetings of the Regional Steering Committee for IHP in the Asia Pacific region are held in rotational base locations. Indonesia has always participated in these yearly meetings.
 - 1.2.3 Research/applied projects supported or sponsored
 - 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 Cooperation with the UNESCO-IHE Institute for Water Education and/or international/regional water centres under the auspices of UNESCO
- 1.5 Publications

1.6 Participation in international scientific meetings

- 5-8 January 2009, Prof. Peter Hehanussa and Prof. Hidayat Pawitan presented activities and plans of the Asia Pacific Center for Ecohydrology (APCE) to the Water Forum Meeting in AIT-Bangkok, Thailand. The participants in general accept that hydrological planning should go hand in hand with ecological health programs.
- Prof. Peter Hehanussa presented a paper entitled Adaptation To Water Improvement Technologies For Future Cities; Knowledge role-sharing by APCE in National Workshop “SWITCH – Integrated Programme for Asia, Indonesia Component”, May 19-20, 2009, Jakarta
- Dr. Gadis Sri Haryani presented a paper entitled Action Research on Ecotechnology in National Workshop “SWITCH – Integrated Programme for Asia, Indonesia Component”, May 19-20, 2009, Jakarta

1.6.1 Meetings hosted by the country

- Regional Workshop in Water Education, 11 -12 February 2009
Objectives of the regional workshops

The regional workshops have the following objectives:

- To identify examples of best practices on water education in the region at all educational levels;
- To analyze examples of best practices to identify barriers and opportunities;
- To propose recommendations to enable effective water education in the region at all educational levels for: (1) the international community, in particular for UNESCO; (2) National Governments, in particular the ministries in charge of education and freshwater; (3) local authorities; (4) educational practitioners, including academics, researchers, trainers, teachers and mass media professionals.

By “all educational levels” it is meant the levels associated with the focal areas of the Water Education Workplan, i.e.: “Tertiary education and professional development of water scientists, engineers, managers and decision makers”, “Education and training of water technicians”, “Water education in schools”, “Community and stakeholder education”, and “Water education for mass-media professionals”.

1.6.2 Participation in meetings abroad

- Prof. Hidayat Pawitan participated UNESCO IHP 16th RSC Meeting for Southeast Asia & The Pacific (SEAP), Ulaanbataar, Mongolia, 29 September – 3 October 2008. in conjunction with a " International conference “Uncertainties in Water Resource Management: causes, technologies and consequences” /WRM-Mon2008
- Dr. Hery Harjono, Chairman of Indonesian National Committee for IHP, present in The 35th Session of the General Conference of UNESCO, 14 – 20 October 2009 in Paris. The general conference have agreed for the establishment of APCE (Asia Pacific Center for

Ecohydrology) become a category two center under the auspices of UNESCO.

1.7 Other activities at regional level

1.7.1 Institutional relations/cooperation

- December 2008 Visit by Mr. Shahbaz Khan, Chief of Sustainable Water Resources Development & Management Section, UNESCO Headquarters, to Jakarta, discuss the current and ongoing activities of APCE in Indonesia. Visits to UNESCO, Limnology, and LIPI Jakarta.
- April 2009 visit by a feasibility study team (Mr. Shahbaz Khan, Chief of Sustainable Water Resources Development & Management Section, UNESCO and two non-UNESCO scientist) to evaluate APCE activities to evaluate the institute for a category two Institute of UNESCO. The team has visited and discussed the matter in LIPI Jakarta as well as to the field
- August 2009, visit by AP-FRIEND delegation: Indonesia, Malaysia, and Vietnam to discuss past and future related problems. There were initial meeting in Research Center for Limnology LIPI which was followed by other visits to IPB-Bogor.
- September 2009, SWITCH-IPA internal meeting to identify and prepare for a symposium to be held at the end of 2009 on examples on new technologies in water management. APCE will participate on two activities on eutrophication elimination and phytotechnology in the Saguling Reservoir and one activity on recharge of ground water technology in the Lembang area.
- October 2009: visit by Mr. Fakhruddin to Vietnam. This was an activity related to data and information system in conjunction with Flood Forecasting and Warning System in Tropical Area activities.

1.7.2 Completed and ongoing scientific projects

2. FUTURE ACTIVITIES

2.1 Activities planned until December 2009

- Organize SWITCH-in-Asia Regional Partnership Workshop which will be held in Jakarta, 8 – 10 December 2009
- Participation in IHP-Training course at Nagoya University in November 2009

2.2 Activities foreseen for 2010-2011

- Participation in IHP-RSC meeting Asian Pacific FRIEND
- Participation in IHP-Training course at Nagoya University

2.3 Activities envisaged in the long term

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

NATIONAL REPORT ON IHP-RELATED ACTIVITIES

Japan

Various activities of UNESCO have been implemented under the support of the Japanese National Commission for UNESCO with financial contribution in the form of Fund-in-Trust (JFIT) for the Promotion of Science for the Sustainable Development. The following summary includes the activities of Japanese National Committee for the International Hydrological Programme (IHP) of UNESCO undertaken during October 2008 to October 2009.

1. ACTIVITIES UNDERTAKEN IN THE PERIOD OCT. 2008 – OCT. 2009

1.1 Meetings of the IHP National Committee

1.1.1 Decisions regarding the composition of the IHP National Committee

The composition of the Japanese IHP National Committee is as follows:

Members of the IHP National Committee as of October 2009.

	Name	Position	E-mail
Chair *	TAKEUCHI Kuniyoshi	Director, ICHARM	kuni.t@pwri.go.jp
*	NAKANISHI Hisae	Prof., Nagoya Univ.	nakanishi@gsid.nagoya-u.ac.jp
*	YAMAGATA Toshio	Prof., Univ. of Tokyo	yamagata@eps.s.u-tokyo.ac.jp
	UYEDA Hiroshi	Prof., HyARC, Nagoya Univ.	uyeda@rain.hyarc.nagoya-u.ac.jp
	OKI Taikan	Prof., IIS, Univ. of Tokyo	taikan@iis.u-tokyo.ac.jp
	KURAJI Koichiro	Lecturer, Univ. of Tokyo	kuraji_koichiro@uf.a.u-tokyo.ac.jp
	KOIKE Toshio	Prof., Univ. of Tokyo	tkoike@hydra.t.u-tokyo.ac.jp
	SHIMIZU Yoshihisa	Prof., Kyoto Univ.	shimizu@biwa.eqc.kyoto-u.ac.jp
	JINNO Kenji	Prof., Kyushu Univ.	jinno@civil.kyushu-u.ac.jp
	TAKARA Kaoru	Prof., DPRI, Kyoto Univ.	takara@flood.dpri.kyoto-u.ac.jp
	TANAKA Shigenobu	Deputy Director, ICHARM	s_tanaka@pwri.go.jp
	TANAKA Tadashi	Prof., Univ. of Tsukuba	tadashi@geoenv.tsukuba.ac.jp
	NAKAYAMA Mikiyasu	Prof., Univ. of Tokyo	nakayama@k.u-tokyo.ac.jp
	WATANABE Tsugihiko	Prof., RIHN	nabe@chikyu.ac.jp

Notes:

- * Member of the Japanese National Commission for UNESCO;
- ICHARM: The International Centre for Water Hazard and Risk Management (UNESCO Category II Centre);
- RIHN: Research Institute for Humanity and Nature;
- HyARC: Hydrospheric Atmospheric Research Center, Nagoya University;
- IIS: Institute for Industrial Sciences, University of Tokyo; and
- DPRI: Disaster Prevention Research Institute, Kyoto University.

Secretariat of the Japanese National Committee for IHP, UNESCO:

c/o Mr. SHIMIZU Nobuhiko

Japanese National Commission for UNESCO

Ministry of Education, Culture, Sports, Science and Technology (MEXT)

3-2-2 Kasumigaseki, Chiyoda-ku, Tokyo 100-8959, Japan

E-mail: nshimizu@mext.go.jp

TEL: +81-(0)3-6734-2595 / FAX: +81-(0)3-6734-3679

http://flood.dpri.kyoto-u.ac.jp/ihp_japan/index.htm

1.1.2 Status of IHP-VII activities

Various activities relating to IHP-VII (2008-2013) Themes have been implemented since 2008 as follows.

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

- Global water cycle assessment: IHP contribution to GEOSS [Univ. of Tokyo]
- Interaction between hydrological cycle and physical/biochemical oceanography by cooperation between IHP and IOC [JAMSTEC, Univ. of Tokyo, Kyoto Univ.]

FA 1.2 – Climate change impacts on the hydrological cycle and consequent impact on water resources

- Climate change research focusing on impacts on water-related disaster risk using “Earth Simulator”: MEXT Kakushin Project (2007-2011).
- Global Earth Observation System of Systems (GEOSS) and Asian Water Cycle Initiative (AWCI) 3rd GEOSS Asia-Pacific Symposium, Kyoto, Japan, 2-4 February 2009:
http://www2.restec.or.jp/geoss_090415/index.html
- GWSP-Asia: HydroChange2008 Conference, Kyoto, Japan, 1-3 October 2008:
http://www.gwsp.org/gwsp_asia.html
- Groundwater research such as GRAPHIC.
- GWES (Groundwater in Emergency Situations).
- Collaboration with Mongolian UNESCO Chair on Groundwater.
- Second Phase of PUB project in cooperation with IAHS [Kyoto Univ.].

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

- A Global Center of Excellence (GCOE) Program at Kyoto University “Sustainability/Survivability Science for a Resilient Society Adaptable to Extreme Weather Conditions” adopted for 2009-2014
- A new task force on frequency analysis for non-stationary hydrological time series in ICHARM initiated since 2009
- Improving the predictability of hydrological extremes in ungauged or poorly gaged basins using new measurement technology and promoting the local use of satellite information for improved river basin management in partnership with GEOSS
- Case studies on human security and water-related disasters
- Best practices on water risk management
- Provide ICHARM coordination as focal point for possible networking activities
- Flood forecasting and management [MEXT Kakushin Program, ICHARM, PWRI, IFNet]

FA 1.4 – Managing groundwater systems’ response to global changes

- Groundwater resources assessment under the pressure of humanity and climate change (GRAPHIC) [Research Institute for Humanity and Nature (RIHN)]

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

- Hydrological and ecological impact assessment of long-term global warming on river basins in the world [Kyoto Univ.]

THEME 2: Strengthening Water Governance for Sustainability

FA 2.1 – Cultural, Societal, and scientific responses to the crises in water governance

- Community-based integrated river basin management as a HELP follow-up [Univ. of Tokyo, Kyoto Univ.]

FA 2.2 – Capacity development for improved governance; enhanced legislation for wise stewardship of water resources*

- Research on “virtual water”
- Collaboration with IHP-LAC for Rio de La Plata Basin Workshops
- Relative impact evaluation in water resources dynamics and social system with large development in river basins [Kyoto Univ.]

THEME 3: Ecohydrology for Sustainability

FA 3.1 – Ecological measures to protect and remediate catchments process

- Participation in ecohydrology research development
- Effect of forest devastation on water resources and environmental issues [Univ. of Tsukuba, Kyoto Univ., Kyushu Univ., Univ. of Tokyo, Tokyo Univ. of Agriculture and Technology]
- Ecohydrology symposia and sessions at AOGS meetings

FA 3.4 – Groundwater-dependent ecosystems identification, inventory and assessment*

- Frontier of sustainable groundwater management systems based on groundwater flow process in arid/semi-arid region in cooperation with China and Mongolia [Univ. of Tsukuba, Hiroshima Univ., Kumamoto Univ.]

THEME 4: Water and Life Support Systems

FA 4.3 – Achieving sustainable urban water management

- Hydrogeological and sociological survey on development processes of East-Asian cities co-existing with floods [Kyoto Univ.]
- Vulnerability assessment of urban groundwater resources in Asia and Oceania [Geological Survey of Japan]
- New CREST (Core Research for Evolutional Science and Technology) research projects supported by the JST (Japanese Science and Technology Agency) since 2009
- A special UNESCO session at the Rainwater Harvesting Conference was held in Tokyo, Japan, 9 September 2009.

FA 4.4 – Achieving sustainable rural water management*

- Development of a new flood management method utilizing paddies into river management against global warming [National Institute for Rural Engineering (NIRE), Univ. of Tsukuba, Univ. of Tokyo]

THEME 5: Water Education for Sustainable Development

FA 5.1 – Tertiary water education and professional development

FA 5.2 – Vocational education and training of water technicians

FA 5.3 – Water education in schools

FA 5.4 – Water education for communities, stakeholders and mass-media professionals

- Nagoya University Training Courses and a Doctor degree course in Graduate School of Science in cooperation with a number of Japanese universities
- ICHARM Training Programmes and a one-year Master Degree Program on water-related risk management in cooperation with the National Graduate Institute for Policy Studies (GRIPS) supported by JICA.
- Capacity building and education for observation experts for continuous monitoring of terrestrial environments in Asia [Univ. of Tsukuba]

Other regional and cross-cutting themes activities includes:

- (1) **Catalogue of Rivers:** The format of the Catalogue of Rivers for Southeast Asia and the Pacific, Vol. 6 was announced 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. No remarkable progress so far. The information of previous five volumes locates at:
http://flood.dpri.kyoto-u.ac.jp/ihp_rsc/riverCatalogue/index.html
- (2) **Asian Pacific FRIEND:** Prof. Takara and Dr. Kobayashi attended the Asian Pacific FRIEND Workshop, Ho Chi Minh City on 5-6 March 2009.
- (3) **Hydrology for Environment, Life and Policy (HELP):** No activities during this period.
- (4) **Prediction in Ungauged Basins (PUB) by IAHS:** Prof. Takeuchi (ICHARM), Dr. Tachikawa (Kyoto Univ.) and others in PUB-Japan attended a PUB meeting held in Chéngdū, China on 7-9 November 2008.
- (5) **International Flood Initiative (IFI), International Sediment Initiative (ISI) and International Programme on Landslides (IPL):** ICHARM is playing a role of the Secretariat of IFI. IFI was launched at a Session organized by UN agencies, ICSU, WFE0 and the International Consortium on Landslides (ICL) at the World Conference on Disaster Reduction (WCDR) in Kobe, Japan in January 2005. Since then both IFI and IPL are promoted continuously and actively. IPL also have a linkage with the International Sedimentation Initiative (ISI). Prof. Takara attended ISI Workshop held in Beijing, China on 5-6 November 2008. His colleague attended a Workshop on Sediment Problems and Sediment Management in Asian River Basins co-convened by ICCE, ISI and WASER at IAHS General assembly in September 2009.

1.2 Activities at national level in the framework of the IHP

1.2.1 National/local scientific and technical meetings

- (1) The JFIT Annual Review and Evaluation Meeting on the Proposed Science Sector Activities of UNESCO Office Jakarta for the period 2009-2011 was held in the UNESCO Jakarta Office in May 2009. Two MEXT officers (Ms. Watanabe and Ms. Iwashita) attended. The status and progress of

the UNESCO science programmes in the region were reported and evaluated. Jakarta Office explained the IHP-WINGA ASPAC (Water Interoperability Networks for Global Change Adaptation in Asia and Pacific Region) project, which includes four components: RSC activities, IHP Training Course, Flood Prevention and Mitigation Measures in ASPAC region, and Sustainable Water to Improve Tomorrow's Cities Health – Integrated Programme for Asia (SWITCH – IPA). Flood Prevention and Mitigation Measures in ASPAC region includes AP-FRIEND, Flood Forecasting and Warning System and Disaster Reduction Hyperbase (DRH) managed by Prof. Kameda, National Research Institute for Earth Science and Disaster Prevention (NIED).

(2) No IHP National Committee meeting was held during this period.

(3) IHP Training Course task force meetings were held twice in Uji (Prof. Uyeda, Prof. Takara, Prof. Kojiri and Dr. Takemon) and in Kyoto (Prof. Uyeda, Prof. Takara) to discuss the organization the 19th Course in Kyoto from 29 November to 11 December 2009, as well as the future plan of the course.

1.2.2 Participation in IHP Steering Committees/Working Groups

Regional Steering Committee (RSC) for IHP in Southeast Asia and the Pacific (SEAP):

(1) The 16th RSC was held in Ulan Bator, Mongolia in conjunction with the International Conference “Uncertainties in Water Resource Management: causes, technologies and consequences /WRM-Mon2008” on 29 September to 2 October 2008. The RSC adopted two resolutions for honoring achievements in the region, and inviting new countries: Singapore, Brunei Darussalam and Timor Leste. RSC Secretariat Prof. Takara was re-elected for 2008-2010.

(2) Prof. Takara and Dr. Kobayashi attended the Asian Pacific FRIEND Workshop, Ho Chi Minh City on 5-6 March 2009.

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) Some committees in the Science Council of Japan (SCJ),

(2) The national government and its branches relating to hydrology and water resources administration,

(3) Nagoya University for IHP Training Courses and Graduate School and other universities and research institutes,

(4) The Japan Water Forum (JWF),

(5) World Meteorological Organization (WMO), and

(6) International NGOs/NPOs such as the International Association of Hydrological Sciences (IAHS), the International Water Resources Association (IWRA) and the International Consortium on Landslides (ICL).

1.2.5 Other initiatives

Some initiatives are described above.

1.3 Educational and training courses

1.3.1 Contribution to IHP courses

Eighteen UNESCO IHP Nagoya Training Courses have been held since 1991 every year. Topics of the course were relevant to Water Resources for Sustainable Development, Hydrology and Water Resources under Vulnerable Environment, and Water Interactions (Systems at Risk and Social Challenges). About ten participants from East and Southeast Asian countries took lectures and

practices every year in the training course. A few students of IHP special program for foreign students in Nagoya University (see (1) below) participated in the course every year. In late years, some of trainees are participating in the course at their own expenses. The training course is expected to be continued with strong requests of East and Southeast Asian countries. Activities of the UNESCO IHP Nagoya Training Course are introduced on the website, <http://www.ihpnagoyaforum.org/>. Based on these experiences, the training course will be further renewed to fit to the themes of IHP Phase VII (2008-2013).

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

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

(2) IHP Training Courses:

The 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 18th IHP Training Course with the theme “Satellite Remote Sensing of Atmospheric Constituents” was held in Nagoya on 3-15 November 2008. The training course offered introductory lectures on the basics of meteorological satellite observations and the physical principles of retrieval algorithms, as well as a practical training to establish basic skill to analyze satellite data.

1.3.2 Organization of specific courses

ICHARM has been providing a training course on flood hazard mapping (5 weeks every year) since 2004. In November 2007, 16 trainees participated from 8 countries in Asia Pacific region. New one-year Master Degree Program (Disaster Prevention Policy Programme, water-related risk management course) was initiated in October 2007 in cooperation with the National Graduate Research Institute for Policy Studies (GRIPS), supported by JICA. About 10 practical engineers from 5 countries are attending the course. In addition to

1.3.3 Participation in IHP courses

N/A

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

(1) **ICHARM: 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 33rd General Conference of UNESCO. Dr. Kuniyoshi Takeuchi, the chairman of the Japanese National Committee for UNESCO-IHP, was assigned as the founding Director of ICHARM. ICHARM was established as the core of research, training, and information networking activities on water-related disasters at global levels. The activities are expected to contribute in the prevention and reduction of water-related disasters, focusing on flood related disasters at the initial stage. It is important to cooperate with existing UNESCO water Centers such as IHE in the Netherlands, IRTCES in China, HTC in Malaysia and RCUWM in Iran, etc. The outline of ICHARM is as follows.

1) Objectives: The objective of the Centre is to function as the world centre of excellence to provide and assist implementation of best practicable strategies to localities, nations, regions and the globe to manage the risk of water related disasters including flood, drought, landslide, debris flow, storm surge, tsunami and water contamination. The Centre conducts research, capacity building and information networking activities in an integrated manner for preventing and mitigating the impacts of water related disasters and thus to achieve sustainable and integrated river basin management.

- 2) Functions:
- (i) to promote scientific research and to undertake effective capacity-building activities at the institutional and professional levels;
 - (ii) to create and reinforce networks for the exchange of scientific, technical and policy information among institutions and individuals;
 - (iii) to develop and coordinate cooperative research activities, taking advantage particularly of the installed scientific and professional capacity of the IHP networks, WWAP, the IFI/P and relevant programmes of non-governmental organizations, international institutions and networks;
 - (iv) to conduct international training courses for practitioners and researchers on the global level; and
 - (v) to organize knowledge and information transfer activities including international symposia or workshops, and to engage in appropriate awareness-raising activities;
- 3) Structure: The center is established as a part of the Public Works Research Institute (PWRI) and operated under the responsibility of its Chief Executive, with the advice from the Advisory Board.
- 4) ICHARM 2nd Advisory Board meeting was held in Tsukuba in October 2008.
- See other information at: <http://www.icharm.pwri.go.jp/html/about/index.html>

(2) International Symposium “Water, Cultural Diversity and Global Environmental Change: Emerging Trends, Sustainable Futures?” was held at the Research Institute for Humanity and Nature (RIHN), Kyoto on 1-3 October 2009, co-organized by RIHN, UNESCO-IHP and UNU-IAS. Open Symposium for the general public was held at Kyoto International Conference Hall on 2 October 2009. The former UNESCO-IHE Rector Dr. Richard Meganck attended this international symposium as Keynote Speaker and Panelist. This symposium is also linked with UNESCO-MAB.

(3) Former UNESCO-IHE Rector Richard Meganck visited Kyoto University President Hiroshi Matsumoto on 2 October 2009 to discuss future cooperation between UNESCO-IHE and Kyoto University. [Prof. Tanaka, Prof. Takeuchi, Prof. Takara]

(4) UNESCO Chair Workshop on International Strategy for Sustainable Groundwater Management: Transboundary Aquifers and Integrated Watershed Management was held at the University of Tsukuba, Japan on 6 October 2009. The representatives of UNESCO Chair in Mongolia and Mr. Chusei Yamada, Special Assistant to the Ministry of Foreign Affairs (Former Special Rapporteur on Shared Natural Resources of the U International Law Commission) attended. [Prof. Tanaka, Prof. Takeuchi, Prof. Takara]

1.5 Publications

1. «For the Sustainable Groundwater Resources Management: Through the UNESCO Chair in Mongolia» -2007 University Student Exchange Programme-, Published by Prof. Tadashi Tanaka, Terrestrial Environmental Research Center (TERC), the University of Tsukuba, March 2008.
2. «For the Sustainable Groundwater Resources Management: Through the Japanese Activities on Countermeasures for the Remediation of Public Hazards» -2008 University Student Exchange Programme-, (Eds.) Maki Tsujimura and Tadashi Tanaka, Terrestrial Environmental Research Center (TERC), the University of Tsukuba, October 2008.
3. «UNESCO Chair Workshop on Sustainable Groundwater Management in Arid and Semi-arid Regions» Proceedings, Institute of Geo-ecology, MAS, Ulaanbaatar, Mongolia, 1 October 2008, (Eds.) Tadashi Tanaka, Ramasamy Jayakumar and Badamgarav Erdenechimeg, IHP VII Technical Document in Hydrology, No. 1, UNESCO Office Beijing, 64 pp., 2009.
4. «Satellite Remote Sensing of Atmospheric Constituents» -The Textbook for 18th IHP Training Course in 2008-, Hydrospheric Atmospheric Research Center, Nagoya University and United Nations Educational Scientific, November 2008.
5. «IWRM Guidelines at River Basin Level» Part 1: Principles, UNESCO-IHP, WWAP and NARBO, 24 pp., ISBN: 978-92-3-104100-6.
6. «IWRM Guidelines at River Basin Level» Part 2-1: The Guidelines for IWRM Coordination, UNESCO-IHP, WWAP and NARBO, 173 pp., ISBN: 978-92-3-104101-3.
7. «IWRM Guidelines at River Basin Level» Part 2-2: The Guidelines for Flood Management, UNESCO-IHP, WWAP and NARBO, 76 pp., ISBN: 978-92-3-104102-0.

8. «IWRM Guidelines at River Basin Level» Part 2-3: Invitation to IWRM for Irrigation Practitioners, UNESCO-IHP, WWAP and NARBO.

1.6 Participation in international scientific meetings

1.6.1 Meetings hosted by the country

- (1) HydroChange 2008 “Hydrological Changes and Managements from Headwater to the Ocean” was held in Kyoto, 1-3 October 2008 [Dr. Taniguchi (RIHN)].
- (2) IAH (International Association of Hydrogeologists) meeting in Toyama, Japan in October 2008 including GRAPHIC discussion [Dr. Taniguchi (RIHN)].
- (3) The 1st World Landslide Forum was held at UNU, Tokyo on 18-21 November 2008. ICHARM and other UNESCO-related organizations (ICHARM, Ristumeikan Univ. and UNU) attended it as well as a pre-event on 17 November 2008.
- (4) Japan is managing PUB (Prediction in Ungaged Basins) activities of IAHS. Asian PUB is developing quite well under Dr. Yasuto Tachikawa's initiative. Domestic PUB meetings were held in March 2009.
- (5) 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.
- (6) ICHARM and NARBO (Network of Asian River Basin Organizations) secretariat participated in the Regional Consultation Meeting for Candidate Water Knowledge Hubs held at the Singapore Public Utility Board on 29-30 October 2007. 26 representatives from 14 organizations discussed for establishing a novel network, called "water knowledge hubs", to share knowledge and experience on water management among Asia-Pacific countries. The meeting was a part of the preparation process for the Asia-Pacific Water Summit (December 2007). Dr. Wouter Lincklaen Arriens, Lead Water Resources Specialist of ADB (Asian Development Bank) and Dr. Jan Luijendijk, Professor of UNESCO-IHE, led the meeting. The two-day meeting concluded that ICHARM would be a candidate water knowledge hub on water related disaster management in the region.
- (7) Asian Water Cycle Symposium. See further at <http://monsoon.t.u-tokyo.ac.jp/AWCI/>.
- (8) GWSP-Asia (Global Water System Project) Working Group activities includes discussion on data collection and future research direction [<http://www.chikyu.ac.jp/USE/GWSP/GWSPasia.htm>; Dr. Makoto Taniguchi (RIHN)].
- (9) International Symposium “Water, Cultural Diversity and Global Environmental Change: Emerging Trends, Sustainable Futures?” was held at the Research Institute for Humanity and Nature (RIHN), Kyoto on 1-3 October 2009, co-organized by RIHN, UNESCO-IHP and UNU-IAS. [Prof. Watanabe, Prof. Takara]
- (10) UNESCO Chair Workshop on International Strategy for Sustainable Groundwater Management: Transboundary Aquifers and Integrated Watershed Management was held at the University of Tsukuba, Japan on 6 October 2009. [Prof. Tanaka, Prof. Takeuchi, Prof. Takara]
- (11) The 9th IIASA-DPRI Forum on Integrated Disaster Risk Management in Kyoto, 12-16 October 2009. During this conference, there was DRH Consortium Symposium on 12 and 15 October 2009. Collaboration between DRH and IHP is discussed and approved.

1.6.2 Participation in meetings abroad

Japan has played important roles in the IHP Intergovernmental Council (IGC) as a member. In particular, Prof. Kuniyoshi Takeuchi had been the Chairperson of the Council and Bureau of IHP from 1998 to 2000 then served as Vice Chairperson (2000-2002). Prof. Takara has also elected as Vice Chairperson for 2008-2010.

Japan participated in the establishment of the Regional Steering Committee (RSC) for Southeast Asia and the Pacific in 1993. The first RSC chairperson was Prof. Yutaka Takahasi (Univ. of Tokyo), who used to be the Vice Chairperson of the IGC (1990-1991) elected from the Group IV, Asia and the Pacific. Since the establishment of RSC, at least a couple of Japanese National IHP Committee members have attended and participated actively in all of the annual meetings of the RSC. Prof.

Takeuchi had served as the RSC Secretary (1993-1999) and the Chairman of the Technical Sub-Committee (TSC) for Asian Pacific FRIEND (APF) Phase I (1997-2001) in the framework of the RSC, while Prof. Takara is playing a role of the RSC Secretary (1999-) and a member of TSC-APF Phases I (1997-2001) and II (2002-).

- (1) The 4th International Conference of Association of Asia Pacific Hydrology and Water Resources (APHW2008) was held in Beijing on 3-5 November 2008. A PUB Session was also convened.
- (2) The Fifth World Water Forum in March 2009. [ICHARM, Takara and others]
- (3) IHP National Committee's Meeting held in Tehran, Iran on 27-28 July 2009. Prof. Takara reported the activities of RSC in Southeast Asia, of Japanese IHP National Committee, and of ICHARM. The Meeting decided to initiate some action for launching International Drought Initiative (IDI).

1.7 Other activities at regional level

1.7.1 Institutional relations/cooperation

N/A

1.7.2 Completed and ongoing scientific projects

N/A

2. FUTURE ACTIVITIES

2.1 Activities planned until December 2009

- (1) The 17th Session of the IHP Regional Steering Committee (RSC) for Southeast Asia and the Pacific will be held in China in 2009.
- (2) Attending Urban Water Conference that will be held at UNESCO Headquarters on 25-27 November 2009.
- (3) The 19th IHP Training Course with the theme "Water Resources and Water-Related Disasters under Climate Change" will be held on 29 November to 12 December 2009. See details at <http://www.ihpnagoyaforum.org/>.

2.2 Activities foreseen for 2010-2011

- (1) Participation in RSC-SEAP activities including Asian Pacific FRIEND, the Catalogue of Rivers, IHP-DRH activities.
- (2) The 20th anniversary of UNESCO IHP Training Course: Special lectures and meetings on "Adaptation to the impacts of global changes on river basins and aquifer systems" (to be confirmed).
- (3) The 21st IHP Training Course: Ecohydrology for sustainability" (to be confirmed).
- (4) Implementation of projects related to IHP-VII.
- (5) The 2nd Asia Pacific Water Summit, Dates and place T.B.D.
- (6) Research on HELP basins.
- (7) Collaboration with UNESCO-MAB and UNESCO-IOC activities.
- (8) The 5th International Conference of Association of Asia Pacific Hydrology and Water Resources (APHW2010). This meeting will be in conjunction with the 18 Session of RSC-SEAP in Vietnam.

2.3 Activities envisaged in the long term

- (1) Participation in IHP-VII projects and RSC activities.

- (2) Nagoya University IHP Training Courses.
- (3) Information dissemination through a web page of the National Committee.
- (4) University of Tsukuba UNESCO Chair in Mongolia.

**The 17th Regional Steering Committee Meeting
For Southeast Asia and the Pacific, UNESCO-IHP
2 – 6 November 2009, in Wuhan, China**

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

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 - 1.1.1. Decision regarding the composition of the IHP National Committee
 - 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
 - 1.2.3. Research / applied project supported or sponsored
 - 1.2.4. Collaboration with other national and international organization and / or programmes
 - 1.2.5. Other Initiative
 - 1.3. Education and Training Courses**
 - 1.3.1. Contribution to IHP courses
 - 1.3.2. Organization of specific 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 2010**

1. Activities undertaken in the period November 2008-October 2009

1.1. Meeting of the IHP National committee

1.1.1. Decision regarding the composition of the IHP National Committee

DMH was transferred from Ministry of Agriculture and Forestry to Water Resources and Environment Administration in July 2007.

The Lao National Committee for IHP has been not organized but Lao PDR has been UNSCO-IHP-RSC-SEAP member as observer, has nominated by Mr. Pheng PIENGPANYA, Director General of DMH as IHP Lao PDR.

1.2. Activities at National Level in the framework of the IHP

1.2.1. National local scientific and technical related activities

- Collect Hydro-meteorological data to provide forecasting and warning information to ensure the safety of the people, to enhance socio-economic development and to permit ecosystem sustainability.

1.2.2. Participation in IHP steering committees/working groups

Participant attended the UNESCO-IHP Regional Steering Committee Meeting for Southeast Asia and Pacific except 2008

1.2.3. Research / applied project supported or sponsored

None

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, ADPC 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 participated 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 assisted DMH: Doppler Radar, Satellite ground reception station.
- China has provided two earthquake stations

1.2.5. Other Initiatives

None

1.3. Education and Training Courses

1.3.1. Contribution to IHP courses

During 2008 – 2009 no have contribution to IHP Course

1.3.2. Organization of specific courses

Completed 2 year intermediate training course on Meteorology and Hydrology within DMH (50 trainees attended)

1.4. Publication

Hydrological Year Book for 2007

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.

3 participant attended Typhoon Committee Meeting In Cebu, Philippines 14-18 September 2009.

1.6. Other Activities at Regional level

1.6.1. Institutional relation / cooperation

DMH cooperate with :

- World Meteorological Organization (WMO)
- Typhoon Committee (TC)
- Asian Disaster Preparedness Committee (ADPC)
- Mekong River Commission (MRC)

1.6.2. Completed and ongoing scientific projects

7 stations under Mekong HYCOS Project is ongoing implemented.

Complete the extension of the Hydro-meteorological network in the Nam Ngum River Basin under Nam Num River Basin Development Sector Project (by ADB loan fund).

2. Future Activities

2.1. Activities planned until/December 2010

- Continue Hydro-meteorological data collection, forecasting and warning
- Publish hydrological year book for 2008
- Continue to cooperate with regional and international organizations in term of hydro-meteorological and earthquake related activities
- Implement the Early Warning System Project and IWRM Project
- DMH of Lao PDR will attend the annual Regional Steering Committee for Southeast Asia and the Pacific



COUNTRY REPORT 2009
OF
THE MALAYSIAN NATIONAL COMMITTEE FOR UNESCO-IHP
FOR
REGIONAL STEERING COMMITTEES MEETING
5 – 6 NOVEMBER 2009
WUHAN, CHINA

BY
AZMI MD. JAFRI
MALAYSIAN NATIONAL COMMITTEE FOR UNESCO-IHP

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INTRODUCTION

The Malaysian National Committee (MIHP) for UNESCO-IHP was established in 1975, and now comprises 30 governmental agencies and institutions of higher learning.

The composition of the IHP National Committee:

The EXCOs to serve for another two-year term (2007 – 2009) are as follows:

1. Universiti Sains Malaysia, (USM)
2. Universiti Tun Hussein Onn Malaysia (UTHM)
3. Malaysian Nuclear Agency (MNA)
4. National Hydraulic Research Institute of Malaysia (NAHRIM)

The permanent EXCO members are:

1. The Department of Irrigation and Drainage Malaysia (DID)
2. The Malaysian Meteorological Department (MMD)
3. The Department of Minerals and Geosciences (DMG)
4. The Malaysian National Commission for UNESCO (NATCOM)

The UNESCO-IHP Malaysia plans its activities through its Executive Committee, and they are carried out by the three standing committees. The three standing committees comprise:

1. The Committee on Research under the chairmanship of the Director of Humid Tropics Center, Kuala Lumpur (HTC KL).
2. The Committee on Education, Training and Public Information headed by the University of Technology Malaysia (UTM).
3. The Committee on Standardization of Hydrological Practices headed by the Department of Irrigation and Drainage (DID) Malaysia.

1.0 EXCO MEETINGS DURING THE PERIOD OF SEPT 2008 – NOVEMBER 2009

1.1 MEETINGS OF THE MALAYSIAN NATIONAL COMMITTEE

- 2nd EXCO Meeting for 2008 was held on 9 December 2008, Kuala Lumpur
- 1st EXCO Meeting for 2009 was held on 24 March 2009, Kuala Lumpur.
- 2nd EXCO Meeting for 2009 was held on 3 August 2009, Kuala Lumpur
- 3rd EXCO Meeting for 2009 was schedule on 13 November 2009, Kuala Lumpur

1.2 ANNUAL GENERAL MEETING

- 38th AGM Meeting was held on 9 December 2008 in Kuala Lumpur.

BACKGROUND UNESCO-IHP MALAYSIA

UNESCO-IHP Malaysia is a Malaysian National Committee for UNESCO-IHP was established in March 1975 to review the needs both for hydrological research and basic data. The main functions of the Committee were to coordinate investigation, research and the collection of hydrological data and to advise the Government on the best use of available water resources in the country.

ROLE:

- To play a leading role in the promotion of and advancement in hydrological sciences in the country and the region.

OBJECTIVES:

- To represent Malaysia on all issues related to the programmes of UNESCO-IHP and participate actively in those programmes.
- To promote and coordinate research programmes on hydrology and water resources in the country and region.
- To promote and coordinate practices on hydrology and water resources.
- To promote and coordinate programmes on education, training and public information on hydrology and water resources.

The MIHP comprises eight EXCO members to serve for two years and its activities through its Executive Committee are carried out by the three standing committees namely:

1. The Committee on Research
2. The Committee on Education, Training and Public Information
3. The Committee on Standardization of Hydrological Practices

UNESCO-IHP MALAYSIA PROGRAMME SECRETARIAT

Chairman UNESCO-IHP Malaysia

Dato' Ir Ahmad Husaini Sulaiman

Director General

Department of Irrigation and Drainage Malaysia.



Secretary UNESCO-IHP Malaysia

Dato' Ir Lim Chow Hock

Director Water Resources and Hydrology Division,

Department of Irrigation and Drainage Malaysia.



SECRETARIAT OFFICE

UNESCO-IHP Malaysia

Water Resources & Hydrology Division,

Department of Irrigation and Drainage Malaysia,

Jalan Ampang,

68000 Ampang, Kuala Lumpur, Malaysia.

Tel : +603 4253 1690 Fax: +603 4256 2645



A - COURSES ATTENDED BY MEMBERS:

- 1 Workshop on Developing the "ASEAN IWRM Country Strategy Guideline"
16-18 March 2009 | Kuala Lumpur, Malaysia
Mohd Nazim Keling – Deputy Secretary MIHP
- 2 5th World Water Forum "Bridging Divides for Water"
16 – 22 March 2009 | Istanbul, Turki
Dato' Ir Hj Ahmad Husaini Sulaiman – Chairman MIHP
Dato' Ir Lim Chow Hock – Secretary MIHP
- 3 International Conference on Water Resources 2009
26 – 27 May 2009 | Langkawi Kedah Malaysia
Dato' Ir Hj Ahmad Husaini Sulaiman – Chairman MIHP
Dato' Ir Lim Chow Hock – Secretary MIHP
- 4 International Kinabalu Expedition 2009, National Commission UNESCO Malaysia,
23 – 29 July 2009 | Kinabalu Park, Sabah Malaysia.
Mohd Nazim Keling – Deputy Secretary MIHP
- 5 3rd On the Job Training on Flood Forecasting
July 21 – 23 August 2009 | Kuala Lumpur Malaysia
Mohd Nazim Keling – Deputy Secretary MIHP
- 6 RCUWM and UNESCO-IHP Tehran Committee Meeting
27 – 28 July 2009 | Tehran Iran
Dato' Ir Hj Ahmad Husaini Sulaiman – Chairman
- 7 International Training Workshop on Risk Assessment and Flash Flood Mitigation Strategies
10 – 13 August 2009 | Kuala Lumpur Malaysia
Mohd Nazim Keling – Deputy Secretary MIHP
- 8 National Colloquium on Water Demand Management
19 – 21 November | Kuala Lumpur
Dato' Ir. Lim Chow Hock – Secretary MIHP
Mohd Nazim Keling – Deputy Secretary MIHP

B - NATIONAL CELEBRATION

World Water Day 2009 celebration was launched by The Honourable YAB Pehin Sri Haji Abdul Taib Mahmud Chief Minister of Sarawak on 11 April 2009.

World Water Day is held annually on 22 March focusing on the importance of freshwater and advocating for the sustainable management of freshwater resources. The theme for World Water Day is "Shared Water - Shared Opportunities". Special focus will be placed on "trans-boundary waters".



C - INSTITUTIONAL COOPERATION PROGRAMME

A programme was organized by **UNESCO-IHP Malaysia** which involved the participation of their members. The Programme was developed through the SMART (Start Managing All Resources Today) which covered on how to manage our resources, both natural and man-made. The programme aim at educating the public with hands-on training on the importance of water resources management and environment as listed:

- 1 The National Sustainable Water Awareness Camp, Lambir Hills Forest Reserve , 6 - 9 April 2009, Capacity Building For Young Leader, Miri, Sarawak in conjunction with World Water Day 2009.
- 2 Best Thesis Award 2009, World Water Day 2009, Miri, Sarawak. MIHP is creating awareness on the importance of researches in hydrology among university students by encouraging them to participate in the award for best thesis related to hydrology and water resources.
- 3 Sustainable Water Awareness Camp - Southern Zone, Ledang Forest Reserve, Malacca, 29 May - 1 June 2009, Capacity Building For Young Leader, Education Department Malacca.

- 4 University Sains Malaysia Community Programme : 'Rivers Is Life The Sg. Sedim – Sg. Pinang Expedition 2009 : Capacity Building For Early Youngsters,USM Penang, 21 - 24 June 2009.
- 5 Sustainable Water Awareness Camp -Northern Zone, Kuala Woh Tapah Perak, "Rivers Is Life" The Kuala Woh Expedition 2009 : Capacity Building For Early Youngsters, USM Penang-IHP Malaysia, 10 - 12 July 2009.



D - TRAININGS CONDUCTED

1. International Conference on Water Resources (ICWR 2009), 26 - 27 May 2009, Langkawi, Kedah, Malaysia.
2. 3rd On-the-Job Training on Flood Forecasting, 21 July - 23 August 2009 Kuala Lumpur. Organised by the Department of Irrigation and Drainage Malaysia for five local participants and three foreign participants from the Typhoon Committee member countries.
3. International Training Workshop on Risk Assessment and Flash Flood mitigation Strategies, Kuala Lumpur on 10 - 13 August 2009. Organized by the Humid Tropics Centre Kuala Lumpur and supported by ICHARM Japan and RCUWM Iran.

E - RESEARCHES CONDUCTED

1. Researches (Regional)
 - a) Integrated and Multidisciplinary Research On Flood Hazard Assessment In Johor Malaysia. (HTCKL/ ICHARM-Japan).
 - b) Regional consultation on water education and training in Asia. Development of a strategic framework (education) (HTC KL/ ICHARM-Japan/AIT-Thailand/ APCE-Indonesia).

- c) Flood Forecasting and warning system for tropical regions (research)
(HTC KL/ ICHARM-Japan/ APCE-Indonesia).
 - d) Compilation of major flood events in the region (outreach)
(HTC KL/ ICHARM-Japan).
2. Research (National)
- a) Research And Development On Application Of Water Sensitive Urban Design For Integrated Stormwater Management At Local Scale In Kuala Lumpur.

F - TECHNICAL TALKS CONDUCTED

The collaboration with Institute of Engineers Malaysia (IEM), UNESCO-IHP Malaysia and Malaysian Hydrological Society (MHS) have launched a series of dedicated technical talks for 2009. Every month, a technical talk will be hosted on a specific update research and each will focus exclusively on the key aspects of the featured hydrological researches and practices, identifying and challenges that lie ahead as per listed:

NO.	TOPIC	SPEAKER	DATE
1/2008	Greenhouse Gas Inventory and Malaysian Scenario	Dr Abdul Rahim Bin Hj Nik (FRIM)	4 Dec 2008
2/2008	Climate Change in Malaysia	Ir. Hj Jamalluddin Bin Shaaban (NAHRIM)	9 Dec 2008
1/2009	The Findings of Study on Implementation Of Integrated Water Resources Management (IWRM) In Malaysia	Dr. Wong Wai Sam (Dr Nik & Associates Sdn Bhd)	19 Jan 2009
2/2009	Surface And Subsurface Drainage Practices for Slope Protection Works	Ir. W. Mokhtar Nawang (PMW Associates Sdn Bhd)	27 Feb 2009
3/2009	The National Groundwater Potential in Peninsular Malaysia	Dr. Afzal Hossain (UTM)	3 April 2009



NO.	TOPIC	SPEAKER	DATE
4/2009	Statistical And Physical Methods of Probable Maximum Precipitation Estimation Over Peninsular Malaysia	Prof. Ir. Dr. Hj Mohd Nor Bin Hj Mohd Desa (HTC KL)	8 May 2009
5/2009	Statistical And Hydro - Meteorological Approach in Estimation Probable Maximum Precipitation for Design Floods	Ir. Hj Jamalluddin Bin Shaaban (NAHRIM)	5 Jun 2009
6/2009	The Operational of Smart System for Flood Control	Mr. Low Koon Sing (SMART)	31 Jul 2009
7/2009	Case Study Water Sensitive Urban Design (WSUD) For Integrated Stormwater Management at Local Scale in Kuala Lumpur	Prof Madya Dr Ir Lariyah Mohd Sidek (UNITEN)	28 Aug 2009
8/2009	Hydological Attributes of Oil Palm Catchment: Important Consideration for Sustaining Water Resources	Prof Dr. Zulkifli Yusop (UTM)	15 Sep 2009
9/2009	Lakes And Reservoir Management in Malaysia	Hj Juhaimi Jusoh (NAHRIM)	16 Oct 2009
10/2009	Technologies for Flash Flood Detection and Prediction	Mr Low Koon Sing (SMART)	6 Nov 2009

G - FUTURE ACTIVITIES

Remaining programmes planned for 2009:

- 1 The awareness programme for **"Best Management Practices Implementation in IWRM"**. Organized by Department of Irrigation and Drainage Malaysia and Universiti Teknologi MARA (UiTM), Shah Alam to be held on 7-14 November 2009 .

H - PUBLICATIONS

1. MIHP (2007).Guide to Water Quality Monitoring Practices in Malaysia. Practices and Techniques of Sampling and Application of Water Quality Data by Various Government Agencies.



2. Mohd Nor Mohd Desa (2008). Final Report, Development of Temporal Pattern of Urban Areas and PMP Derivation for Peninsular Malaysia submitted to Ministry of Science, Technology and Innovation, Malaysia, PN: 02-03-08-0002-EA002.
3. M.N. Desa M. and P.R. Rakhecha (2008). On Secular Changes in The Extreme Rainfalls Over Humid Tropical Region of Peninsular Malaysia submitted to Journal of Hydrologic Environment, International Hydrologic Environmental Society, 15 April 2008.
4. Humid Tropic Centre, Kuala Lumpur (2008). Final Report, Detailed Hydrological Water Balance for Paya Indah Wetlands submitted to Ministry of Science, Technology and Innovation, Malaysia, PN PN: 02-03-08-003-EA003.

I - PARTNERS/MEMBERS

The Malaysian National Committee for IHP was established in 1975, and now comprises 30 governmental agencies and institutions of higher learning as listed below:

- | | |
|---|--|
| 1. Malaysian National Commission for UNESCO | 2. Malaysian Center for Remote Sensing |
| 3. Ministry of Science, Technology and Innovation | 4. Malaysian Meteorological Department |
| 5. Ministry of Housing and Local Government | 6. Malaysian Nuclear Agency |
| 7. Ministry of Energy, Green Technology and Water | 8. Public Works Department |
| 9. Ministry of Agriculture | 10. Universiti Kebangsaan Malaysia |
| 11. Ministry of Education | 12. University of Malaya |
| 13. Ministry of Finance | 14. Universiti Putra Malaysia |
| 15. Ministry of Health | 16. Universiti Sains Malaysia |
| 17. Economic Planning Unit | 18. Universiti Teknologi Malaysia |
| 19. Department of Irrigation and Drainage | 20. Universiti Tun Hussein Onn Malaysia |
| 21. Department of Agriculture | 22. Universiti Teknologi MARA |
| 23. Department of Environment | 24. National Hydraulics Research Institute of Malaysia |
| 25. Department of Forestry | 26. Humid Tropics Centre Kuala Lumpur |
| 27. Forest Research Institute of Malaysia | 28. Universiti Tenaga Nasional |
| 29. Department of Minerals and Geosciences | 30. Federal Land Development Authority |

**COUNTRY REPORT 2009
Of
THE MONGOLIAN NATIONAL
COMMITTEE FOR THE UNESCO-IHP**

**For Regional Steering Committee
meeting, 5-6th November 2009, Wuhan,
China**

IHP country report, Mongolia, 2009

I. Main activities and outputs in 2009:

A. In national level:

- Organized training workshop on “Integrated water resource management” supported by UNESCO-Beijing Office, 14 October 2009, Ulaanbaatar, Mongolia
- National consultant and author on development “National Human development report-2010”, section “Water and Human development” , since April 2009
- Participation and monitoring Midterm review MDG, Mongolia focusing “Water & Sanitation” /UNDP, UNICEF and WHO in Mongolia/ July 2009
- Co-organized international workshop on “Climate change impact on water resources in Kharaa River basin” with “MoMo” project “Kharaa River basin” sponsored by Germany, September 2009
- Developed report “Assessment water supply distribution lines and water loss in Darkhan city“, June 2009, Darkhan city.
- Consultation meeting on river basin management Upper Tuul River basin organized by World Bank in Mongolia. March 2009. Ulaanbaatar, Mongolia
- Trained 2 participants from different water related institutions Mongolia ,to International Training Workshop on IRBM, IRTCES in Beijing, July 2009.
- Consultative meeting with UNDP, UNICEF and WHO on case study assessment institutional capacity water sector of Mongolia, UNDP office in Mongolia, Ulaanbaatar, February 2009.
- Trained and provided certificate for 50 senior engineers in water sector, January 2009, in Research and Training Center in IWRM.
- Since January 2009 Involvement and Development “National Water policy and program”, National Water Committee and Ministry of Environment and Tourism
- Case study remove iron from drinking water sources in Selenge province, north of Mongolia, May 2009.
- On occasion of World Water Day 2009 by the lead of UNESCO with close cooperation with Ministry of Environment and Tourism of Mongolia and UN agencies in Mongolia such as UNDP, UNICEF, UNFPA, WHO we organized National Consultative

Meeting under the theme of “Sharing water, Sharing opportunity”. In this meeting participated more than 80 representatives of Government, Non-government, international donor organizations and media. And provided 2 main activity among school children and journalists, one is competition for journalists about main water related problems in Mongolia, another for schools children-how they can save and efficiently use of water sources. Therefore for the dissemination of the result of the Consultative meeting we broadcasted international and national documentary films “Water” and TV spots by the National TV channels during the week. The main activity report of celebration World Water day in Mongolia have been sent to UNESCO.

- Process development project proposal to UNESCO “Improvement water education in schools and communities in Mongolia”, since April 2009.
- Organized local training course ‘Household water treatment and storages, hand washing and improvement sanitation technology in GER area’ for ‘ToT’, in Eastern and Western Mongolian provinces, trained 150 trainers from April –October 2009
- Involvement case study and review meeting on “Design improved water supply and sanitation service” in 8 small town or soum in Khovd and Gobi-Altai province. September 2009. UNDP office, UB.
- Development guidelines manage shallow water in northern area in Ulaanbaatar city, like additional water source for domestic use. Cooperation with UNESCAP, since July 2009.
- Case study “nanotechnology” for treatment wastewater after Central wastewater treatment plant in Ulaanbaatar city, since October 2009, cooperation Keosan Hi Tech, RoK

B. Regional and International activities:

- 2 lady from Mongolia were participated in International Training Workshop “Monitoring land cover, land use, fire in agricultural and semi-arid regions of Northern Eurasia” and Training on “Geospatial methods, technologies, and applications in semi-arid regions Central Asia” from 18-21 September 2009 in Almaty, Kazakhstan
- Organized and hosted International Symposium, 16th SEAP, RSC Meeting, Ulaanbaatar, Mongolia, in 2008.

- Development guidelines and Strategy on Eco efficient water infrastructure in Mongolia, cooperation with UNESCAP, since March 2009.
- Consultation UNDP GoAL-WaSH Programme: Governance, Advocacy and Leadership for Water, Sanitation and Hygiene, country sector assessment, UNDP, Mongolia, May 2009, UB, Mongolia
- The Second Regional Workshop on Eco-efficient Water infrastructure in Asia, Aug 19 – 21. 2009, Incheon, RoK
- International workshop on capacity development for Farm management strategies to improve Crop-Water productivity using Aqua-Crop, FAO, UNW-DPC. China Agriculture University, Beijing 14-18 September 2009.
- Participation International Conference on “Hydrology and Disaster Management” and 17th Regional Steering Committee Meeting for UNESCO - IHP Southeast Asia and The Pacific, 2-6th November 2009, Wuhan, China
- Sent Letter of intent to Korean Minister of Environment, sharing experience and introduction advanced technology drinking and wastewater treatment, will trained and practiced 20 water experts from Mongolia
- Applied one lady to The Nineteenth IHP Training Course “Water Resources and Water-Related Disasters under Climate Change Prediction, Impact Assessment and Adaptation ” Kyoto, Japan, 29 November - 12 December 2009
- To participate Preparatory Meeting to study possibilities for the establishment of the Council of Ministers on water security of Asia-Pacific is scheduled UNCC, Bangkok, from 11-13th November 2009.

C. Presented and prepared papers:

1. “Water sector management and challenges in Mongolia”, International Training Workshop on IRBM, IRTCES in Beijing, July 2009
2. “Status and development eco efficient water infrastructure in Mongolia”, Aug 19 – 21. 2009, Incheon, RoK
3. “Pollution risk and need to develop master plans for wastewater treatment plants”, Singapore Water week, June, 2009

D. General Conclusions and suggestions

- Last recent years Mongolian Government taking more and more attention to water policy, strengthening IWRM in Mongolia, but economic condition giving us less investment for water sector, implementation IHP phases not so strong in Mongolia, therefore MNC for IHP suggest to help us improve “water education” for school children’s and communities. We working under development project proposal, MNC for the IHP, really would like more input implementation phase VII of the IHP, educated people will save water and manage water for all level.
- Improve cooperation in regional and international level, especially for implementation IHP phases, actively participate regional activity;

National Committee for IHP, Mongolia

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NATIONAL REPORT ON IHP RELATED ACTIVITIES

MYANMAR

1. ACTIVITIES UNDERTAKEN IN THE PERIOD November 2008 - October 2009

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-VII Activities

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 2009

2.2 Activities foreseen for 2010-2011

NATIONAL REPORT ON IHP RELATED ACTIVITIES

MYANMAR

1. ACTIVITIES UNDERTAKEN IN THE PERIOD November 2008 - October 2009

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 Transport
Vice Chairman: Colonel Nyan Htun Aung, Deputy Minister for Transport
Secretary: Dr. Thein Tun, Acting Director General of the 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 the Directorate of Water Resources and Improvement of River System
4. Professor of Civil Engineering Department, Yangon Institute of Technology
5. Professor of Civil Engineering Department, Mandalay Institute of Technology
6. Director General of the Irrigation Department
7. Director General of the Water Resources Utilization Department
8. Director General of the Department of Forestry
9. Secretary of National Commission for Environmental Affairs
10. Director General of the Department of Progress of Border Areas and National Races
11. Director General of the Department of Hydroelectric Power
12. Director General of the Department of Health
13. Professor of Department of Mathematics, Yangon University

14. 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. Activities related to the themes of IHP-VI are implemented by the members of the working committees. The WCs prepared the (27) research papers and shared the knowledge and experiences to the other national committee members during 2003-2005. The session could not be hold during 2006 to 2009. But the MNC-IHP will try to implement the water related activities in line with the themes of IHP.

1.1.2 Status of IHP-VII Activities

- Monitoring Water Quality of Rivers in Myanmar
- Monitoring the changes of Water resources in Myanmar
- Hydrological Disaster risk management in Myanmar by using GIS and Remote Sensing Technologies

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

Participants from DMH attended the UNESCO-IHP 13th, 14th and 15th Regional Steering Committee Meetings for Southeast Asia and Pacific during 2005 to 2007

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

-

1.3.2 Organization of specific courses

-

Participation in IHP courses

One participant attended the 18th IHP Training Course on Satellite Remote Sensing of Atmospheric Constituents, Nagoya University, Japan, 3 to 15 November 2008.

1.4 Publication

-

1.5 Participation in International Scientific Meeting

1.5.1 Meetings hosted by the country

Fourth Monsoon Forum (Myanmar) was held on 16-17 December 2008 at Nay Pyi Taw, Myanmar. This forum was organized by ADPC (Asian Disaster Preparedness Centre) and DMH of Myanmar. Director General of the Department of Meteorology and Hydrology, Secretary of MNC-IHP carried out as the Chairman for this forum. The representatives of MNC-IHP attended to this forum. In this Forum, the participants delegated and discussed about the weather and flood conditions in Myanmar during 2008, Verifications of Long Range weather and flood forecasts in 2008 and the effectiveness of the forecasts and the needs for the relevant departments and organizations and also issued the weather and low flow Forecast for winter season during 2008 -2009.

Fifth Monsoon Forum (Myanmar) was also held on 28-29 May 2009 at Nay Pyi Taw, Myanmar. Director General of the Department of Meteorology and Hydrology, Secretary of MNC-IHP carried out as the Chairman for this forum. The representatives of MNC-IHP attended to this forum. In this Forum, the participants delegated and discussed about the Verifications of weather and low flow forecasts in winter season during 2008-2009 and the effectiveness of the forecasts and the needs for the relevant departments and organizations and also issued the Long Range weather and flood Forecast during monsoon season 2009.

1.5.2 Participation in meetings abroad

The Secretary of MNC-IHP is a Permanent Representative of WMO and so he has contact and coordinate with WMO's activities.

The representatives of MNC-IHP participated in

- The 3rd AWCI meeting and 4th APHW Conference, China, 3-6 November 2008
- The 14th Session of Regional Association II (Asia) of the WMO, Uzbekistan, 5-11 December 2008
- Workshop on Application of Satellite rainfall estimates in the HKH Region, Nepal, 15-19 December 2008
- Meeting of the GEOSS and AWCI and 3rd GEOSS Asia Pacific Symposium, Japan, 4-7 February 2009
- The 9th Workshop on Public Awareness for Acid Deposition Problems, Japan, 12-13 February 2009
- PRECIS Climate Scenarios Training Workshop, Thailand, 19-23 March 2009
- International Conference on Indian Ocean Tropical Cyclones and Climate Change and the 36th Session of the WMO/ ESCAP Panel on Tropical Cyclone, Oman, 2-11 March 2009
- 30th meeting Intergovernmental Panel on Climate Change, Turkey, 21-23 April, 2009
- World Ocean Conference 2009, Indonesia, 11-15 May 2009
- The Asian Forum on Disaster Management and Climate Change Adaptation, Japan, 22-25 April 2009
- Sentinel Asia Joint Project Team meeting, Indonesia, 15-17 July 2009
- Expert Group Meeting on innovative Strategies for Urban Flood Management Considering Climate Change in Asian Region, Thailand, 21-23 July 2009
- International Advanced Training Workshop on Integrated River Basin Management, China, 27th July to 3rd August 2009
- Regional Training workshop on Mapping and Inventory of Glacier using Remote Sensing and Techniques in HKH Region, 3-7 August 2009
- Regional Training workshop on snow and glacier melt runoff modeling in

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 2009

-

2.2 Activities foreseen for 2010-2011

- The MNC-IHP will try to implement the water related activities in line with the themes of IHP
- The members of MNC-IHP will attend the 18th Regional Steering Committee for Southeast Asia and the Pacific.
- The members of MNC-IHP will participate in the international and national activities of IHP.

**17th IHP REGIONAL STEERING COMMITTEE MEETING FOR
SOUTH EAST ASIA AND THE PACIFIC
WUHAN, CHINA
(2 November 2008 – 6 November 2009)**

NATIONAL REPORT OF NEW ZEALAND

1. Activities undertaken in the period October 2008– October 2009

1.1 Meetings of the IHP National Committee

1.1.1 Composition of the IHP National Committee

Dr Richard P Ibbitt and Mr. Dennis D Jamieson continued as Chairman and Secretary respectively of the IHP National Committee during the reporting period.

1.1.2 Status of IHP-VI 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);

WG 2.8 (Reducing the Impacts of Weather Related Hazards) – funding reconfirmed, see section 1.6.2.

(Refer IHP-V Technical Documents in Hydrology No.2 UNESCO Jakarta Office 1999 for details).

WG 1.1 – “Information on New Zealand’s Freshwaters: Climate and Water Resources Archives” is a national programme of climate and hydrometric data collection. The data produced from this programme are of increasing importance to guide decision-making on development (especially proposed hydropower and expanded irrigation) and to contribute to the assessment of effects of human related activities on rivers and lakes. In addition there is wide interest in the effects of climate change on water resources and consequent effects on hydropower and agriculture.

As reported in previous years, the implementing agency (National Institute of Water and Atmospheric Research - NIWA) implemented a policy of “free” data access for most users from 1 July 2007. This policy has been in place for a two years and the increase in data requests is summarized in Table 1.

Table 1: Comparison of data requests from Climate and Water Resources databases in years ending 30 June 2007, 2008, 2009.

	Climate	Water Resources	Total
2006/7	118,000	68,000	186,000
2007/8	360,000	88,000	448,000
2008/9	999,000	84,500	1,083,500

This free data provision was facilitated by a previous one-off grant from the Foundation for Research Science and Technology (FRST) to upgrade web access systems. Usage has increased steadily since inception. For example, in the twelve months since 1 July 2008, registered users of the climate database (CLIDB) have increased from 4,300 to over 8,600, at an average rate of nearly 80 new users per week. Some 80% of users download data from CLIDB, while others use the web site to search for station information. The most popular query by transactions is wind followed by daily rain.

Overseas users from 53 countries now make up 10% of data rows (where a data row represents a row of data in a database table, which vary in composition depending on the data type) and transactions, with a significant number from Australia (5% of all data rows). The total number of rows downloaded in the year has increased by 35% to 257,000,000, up from last year's 191,000,000, and data transactions have increased by 180% to 999,000. The distribution of users remains similar with 50% business, 20% education, 20% personal and 10% government.

An additional relevant project has been started by NIWA to develop a "Urban Impact of Climate Change Toolkit". This project will produce methods to allow planners in government to understand the issues, assess the likely impacts, identify the risks, evaluate the options & their costs / benefits and then implement a climate change adaptation plan.

1.1.3 Decisions regarding contribution to participation in IHP-VI and IHP-VII

Components of the New Zealand hydrological research programme have had good alignment with IHP-VI themes in eco-hydrology and sustainable water management. It is therefore apparent that the UNESCO plan for transition to IHP-VII ("Continuity with change") will ensure a productive link to future hydrology related work in New Zealand. As noted in previous years, 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. To be successful 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 to brief groups established to guide government decisions on future land and water use).

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 Jamieson attended the 16th RSC meeting held in Ulaan Bataar, Mongolia and attended the 14th Technical Sub-Committee meeting associated with the 16th RSC meeting.

1.2.3 Research/applied projects supported or sponsored

None directly sponsored by IHP.

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

New Start for Freshwater

Following a change of elected government a new set of actions, coordinated through the Ministry for the Environment and Ministry of Agriculture and Forestry was launched in June 2009 to:

Ensure that water contributes to New Zealand's economic growth and environmental integrity

- provide stronger central government direction and leadership
- set some resource limits to shape the actions taken on managing water quality and allocation
- develop an allocation regime that provides for ecological and public purposes (including Treaty of Waitangi considerations), and then maximises the return from the remaining water available for consumptive use
- identify the contribution water infrastructure (including storage) could make to improve water use, and address the barriers to achieving this

- address some of the scientific, technical, information and capability gaps that hold back improved management
- establish supplementary measures to address the impacts of land use intensification on water quality, and manage urban and rural demand
- maintain Treaty-based engagement with Māori on water management options.

IHP activities under IHP-VI (and IHP-VII) and capabilities related to these activities are already being used to inform this new process. This includes science briefings for a stakeholder-led collaborative process under the Land and Water Forum (previously known as the Sustainable Land Use Forum) which is being used to develop a shared understanding of the issues and strategic outcomes wanted for New Zealand, and options for achieving those outcomes.

Some initiatives carried forward from the previous governments *Sustainable Water Programme of Action (SWPOA)* which ran from 2006 to 2009 include the development and adoption of National Environmental standards for Water Measuring Devices, Ecological Flows and Water Levels, and National Policy statements for Flood Risk Management and Freshwater Management..

Primary sector water partnership: Plan of action

Major organizations involved in the primary industries (e.g. Agriculture, Forestry) have formed a grouping to target the key industry issues of nutrient management, water use and sediment and microbial management. Their aim is to have industry “anticipate and engage proactively on environmental issues”. This can be seen as an example of industry responding to meet the objectives of central government agency programmes and, as with the original government programme, IHP activities under IHP-VI (& VII) and capabilities resulting from these activities are being used to inform the process.

Republic of Korea Water Resources Association (KWRA) – collaborative research strategy with NZ Hydrological Society (NZHS)

The KWRA and NZHS have had a Memorandum Of Understanding (MOU) in place since 2007. There have been regular exchanges between the organisations. In 2009 it was decided to draft a written strategy for future collaboration between the societies, identifying a clear direction and/or research programme that can be worked on jointly by scientists in the respective countries. This strategy was drafted during a visit by an NZ delegation which also involved presentations at the KWRA Annual conference (19-23 May 2009). It is extremely pleasing to note that the themes incorporated in the strategy were based on IHP priorities for the Republic of Korea which match priorities in New Zealand as follows:

- Climate change impacts
- Good governance, capacity development and stakeholder participation at regional level

- Eco-hydrological processes
- Methodologies for safeguards against water borne and abiotic components.

This strategy is to be submitted to both the NZHS executive and the KWRA council for consideration of future funding.

NZ delegation members were:

Mike Ede: Hydrologist with Marlborough District Council and NZHS Executive Member/Chair technical Hydrology.

Dennis Jamieson: National Institute of Water and Atmosphere (NIWA).

Murray Close: Institute of Environmental and Scientific Research (ESR).

Paul White: Geological and Nuclear Sciences (GNS), Past President NZHS.

Timothy Hong: Geological and Nuclear Sciences (GNS).

Dennis Jamieson presented a paper entitled “An overview and update on Rainfall Intensity Duration Frequency (IDF) and Flood Estimation work in the Asia Pacific Region”. This paper concisely presented work to May 2009 and made observations made about lessons learnt on how to successfully integrate work from nine diverse countries with differing approaches to both hydrology and water resource management structures.

Links with other International and Regional organisations

The Chairman and Secretary of the National Committee are in regular contact with Charles Pearson, the Regional Hydrological Advisor to the President of the WMO Region V (Asia Pacific). 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.

Motueka River Integrated catchment Management Project

This long term programme began in 2000 (<http://icm.landcareresearch.co.nz>). It is recognized as one of the inaugural operational pilot basins in the UNESCO/WMO global HELP project (Hydrology for the Environment, Life and Policy). The programme has developed and demonstrated a toolbox to guide sustainable management of land and water resources at small to medium catchment scales, including the adjacent coast. It involves a collaboration comprising a committed and continuous partnership among researchers, policy makers, resource users, and community members, including iwi (Māori tribes).

Lessons from the Motueka ICM research programme are being drawn together in its last year, with programme leader Andrew Fenemor leading a Tasman District Council presentation in July 2009. (http://icm.landcareresearch.co.nz/knowledgebase/publications/public/Motueka_ICM_Research_Summary_for_TDC2.pdf).

Andrew Fenemor Chaired the Australian HELP basins session at the UNESCO-HELP workshop hosted by CSIRO on 24 July in Brisbane (UNESCO funded attendance) and also led a discussion on Whole of Basin & Inter-Sectoral Approach vs. Sectoral Approaches to Integrated Water Resource Management with an associated report in the workshop proceedings.

A wrap-up workshop is being planned for the last week of April 2010 in Nelson. The social research component of the ICM programme has just published a book on processes for building community resilience which is useful for designing interactions for achieving grass-roots integrated catchment management. It is available for NZ\$20 plus postage from Manaaki Whenua Press (click <http://www.mwpress.co.nz/store/viewItem.asp?idProduct=862>): Atkinson, M; Kilvington, M; Fenemor, A. 2009. Watershed Talk - the cultivation of ideas and action. Manaaki Whenua Press. 45pp.

.SOPAC – Pacific HYCOS project

The Chair and Secretary maintain interest in this project. A key objective is to ensure that interaction between NZ and Pacific Island based hydrologists is productive and opportunities for productive joint work are identified. The most important issue for all hydrologists in the Pacific (including New Zealand) is the need for ongoing operational funding. Often resources are available for equipment and training, but ongoing network operation is inadequately supported. Advanced training in hydrological data processing was provided to representatives from PNG and Samoa in New Zealand with SOPAC support. In addition NZ hydrologists worked with colleagues in the Federated States of Micronesia (FSM) and Palau with SOPAC support.

1.2.5 Other initiatives

Diatom invasion - Didymosphenia geminata

The diatom *Didymosphenia geminate* forms massive slimes over riverbeds. It is classified as an Unwanted Organism (under the Biosecurity Act 1993). It is an offence to knowingly spread an unwanted organism with penalties of up to 5 years imprisonment, and/or a fine of up to NZ\$100,000. This organism continues to be investigated because of its effect on waterways and water users. Methods have been developed to adapt to problems caused by the organism, but ongoing research continues with the objectives of better future control methods.

EcoConnect

EcoConnect is a system that makes accurate weather forecasts for environmental forecasting. NIWA is upgrading supercomputer facilities to further improve operational performance. The system represents a significant advance in national-scale technical capability. In addition to its technical significance, the application of the system to water resources represents a practical and tangible outcome of greater collaboration between hydrologists and meteorologists.

A number of industries (including hydropower, mining and port companies) use EcoConnect forecasts for operational purposes. Application of the technology to national scale forecasting will require reorganization of current arrangements. This indicates the challenges of adapting existing institutional arrangements to significant new technologies.

1.3 Educational and training courses

1.3.1 Contribution to IHP courses

None.

1.3.2 Organisation of specific courses

Courses and workshops run in New Zealand generally 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.

National Institute of Water and Atmospheric Research (NIWA) Courses / workshops

Over the course of a year NIWA provides many courses for regional government agencies and their own staff. These cover many topics from general hydrological training to courses on specific topics of wide interest.

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:

The “Climate Update” monthly bulletin

The National Climate Centre (NCC) has published a further 13 issues (112 to 124) 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 the previous month’s forecast was. Publication is now made electronically only..

The “Island Climate Update” monthly bulletin

The National Climate Centre (NCC) has published a further 12 issues (97 to 108) 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/our-science/climate/publications/all/icu>).

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.

“Water Resources Update” bulletin

The National Centre for Water Resources (NCWR) has changed publication of the bulletin entitled “Water Resources Update” to a quarterly basis (<http://www.niwa.co.nz/our-science/freshwater/publications>). 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 and water management.

Access to climate and water resources information

The NIWA real time environmental data site EDENZ (**E**nvironmental **D**ata **E**xplorer **N**ew **Z**ealand) is available to the public on the web (<http://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 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.

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 18-20 November 2008 in Greymouth, New Zealand with the theme “Extremes”. A delegation of four Korean Hydrologists attended this conference:

Yoon, Sei Eui: Vice President KWRA; Professor, Dept of Civil and Environmental Engineering, College of Engineering, Kyonggi University

Lee, Sang Il: Chair, Committee on Cooperation with International Organisations; Professor, Dept of Civil & Environmental Engineering, Dongguk University

Jai-Woo Song: President , Korea Federation of Water Science & Engineering Societies

Joo-Heon Lee: Associate Professor/Ph.D. Department of Civil Engineering, Joongbu University

1.5.2 Participation in meetings abroad

Dr Ibbitt and Mr Jamieson represented New Zealand at the 16th RSC meeting held in Ulaan Bataar , Mongolia and attended the 14th Technical Sub-Committee meeting associated with the 15th RSC meeting.

Mr Jamieson participated in the APFRIEND Workshop held in Ho Chi Minh City on 9-10 March 2009. This workshop was a precursor to the APFRIEND meeting associated with the current RSC meeting.

Charles Pearson attended the WMO's Commission for Hydrology meeting in Geneva (November 2008). He is the WMO's Hydrological Adviser to Region V (Southeast Asia - West Pacific). He

presented a talk at the Commission meeting on New Zealand's experiences with using seasonal climate outlooks for seasonal hydrological predictions

Dr Ross Woods attended the 8th IAHS Scientific Assembly and 37th IAHS Congress in Hyderabad, India in September 2009. Dr Woods was co-convener of a workshop to contribute to the production of a “Benchmark” report over the next two years that will assess, on a comprehensive, objective, open and transparent basis, the state of hydrological predictions in the absence of data and identify prediction challenges for the future. This is the next step of the Predictions in Ungauged Basins (PUB) initiative which has now entered its third Biennium. While the first two Biennia have focused on creating intellectual momentum and building up the movement, the third Biennium will take stock of what has been achieved and at the same time look ahead.

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 arrangements and Pacific HYCOS.

1.6.2 Completed and ongoing scientific projects

The Reducing Impacts of Weather Related Hazards programme (WG2.8) was reviewed and additional support gained for its ongoing operations. The programme concentrates on forecasting of extreme weather, floods and landslides.

A new programme on “Reducing impacts of climate change on the urban and built environment” commenced on 1 October 2008.

NIWA has expanded hydrology staffing to the point where four groups (Hydrological Processes, Applied Hydrology, Freshwater Ecology and Sediment) have been formed in Christchurch. In addition, groups such as Hydrodynamics and Instrument Systems also have key roles in hydrological projects, as do science groups based elsewhere. NIWA has applied government funding supplied to expand science organization capability to address emerging national scale hydrology issues including surface/groundwater interaction, water allocation and water quality and efficient use of hydropower resources.

2. Future Activities

2.1 Activities foreseen until December 2009

NZ Hydrological Society Annual Symposium

The annual conference of the New Zealand Hydrological Society will be held in Whangarei, New Zealand from the 23-27 November 2009. This will be a joint conference with the NZ Freshwater Science Society. The theme for this year's conference is "Waters for the Future: Balancing its values".

17th Regional Steering Committee Meeting

Attendance at the 17th RSC meeting in Wuhan from 2-5 November 2009 and associated meetings.

2.2 Activities planned for 2010

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 are 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

A range of training courses will be offered by NIWA. For a full list of courses refer to <http://www.niwa.co.nz/education-and-training>. These courses are also open to overseas participants.

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" and "Climate Outlook" (web) publications.
- Quarterly "Water Resources Update" (web) publication.

NATIONAL REPORT ON IHP RELATED ACTIVITIES

PHILIPPINES

NOVEMBER 2009

**Philippine National Committee
for the
UNESCO International Hydrological Programme
Republic of the Philippines**

1. ACTIVITIES UNDERTAKEN IN THE PERIOD OCTOBER 2008 – OCTOBER 2009

1.1 Meetings of the IHP National Committee

1.1.1 Decisions regarding the composition of the IHP National Committee

The institutional members of the Philippine National Committee for the UNESCO-IHP are agencies and organizations (public and private) which are mandated with, and are 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 (NPC)
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)
Philippine Water Partnership (PWP)
Mapua Institute of Technology, School of Civil Engineering, Manila
University of Santo Tomas (UST), Department of Civil Engineering (UST), Manila
University of the Philippines at Los Baños (UPLB), College of Engineering and Agro-Industrial Technology (UPLB-CEAT), Los Baños, Laguna
Ateneo De Manila University (ADMU) - Manila Observatory, Quezon City
Central Luzon State University (CLSU), Muñoz, Nueva Ecija
De La Salle University (DLSU), Department of Civil Engineering (DLSU), Manila
University of San Carlos (USC), Department of Civil Engineering & Water Resources Research Center (USC), Cebu City

Officers of the Philippine National Committee for UNESCO-IHP:

Chairman: Leonardo Q. Liongson (UP Diliman)
Treasurer: Lino P. Aldovino (LPA & Associates)
Secretariat: NHRC and PWP staff (on secondment)

Agency Lead Representatives:

Ramon B. Alikpala, NWRB & PWP(2007-2008)
Francisco Arellano, MWSI
Virgilio Basa, NAMRIA
Macra A. Cruz, MWSS
Antonio Morano, DPWH-BRS
Resito David, DPWH-FCSEC
Prisco Nilo, PAGASA
Virgilio Rivera, MWCI & PWP(2008-2009)
Lennie Santos-Borja, LLDA

Finance Sub-Committee members:

Leonor Cleofas, MWSS
Dolores Hipolito, DPWH-FCSEC
Ms. Lyn Almario, MWCI
Francisco Arellano, MWSI
Romualdo Beltran, NPC
Lino P. Aldovino, PNC-UNESCO-IHP Treasurer

Technical Sub-Committee members::

Guillermo Q. Tabios III, UP-NHRC & C.E. Dept.
Romualdo Beltran, NPC
Samuel Contreras, BSWM
Emiterio Hernandez, LLDA
Milo Landicho, NIA
Peter Lim, University of Sto. Tomas, C.E. Dept.
Rosa Perez, PAGASA
Roberto Soriano, Mapua I.T.- School of C.E.

Program Sub-Committee members::

Peter Paul Castro, UP- NHRC & C.E. Dept.
Genandrialine Peralta, UP- En.E. Program
Susan Abano, NWRB
Joylynn Accad, NEDA
Margarette Bautista, PAGASA
Isidora Camaya, NIA
Efren Carandang, NAMRIA
Robert Domingo, NEDA
Maristel Espiritu, LLDA
George Estioko, NWRB
Myrna Lansangam, LWUA
Nicanor Mendoza, DENR-EMB
Jesusa Roque, NWRB
Teresita Sandoval, BSWM
Beverly Sarausad, Univ. of Sto, Tomas

1.1.2 Status of IHP-VII activities

In response to the questionnaire from the UNESCO-IHP Paris office, the following has been indicated in 2008 as the Philippines Country Priorities for IHP-VII Themes:

Theme 1: ADAPTING TO THE IMPACTS OF GLOBAL CHANGES ON RIVER BASINS AND AQUIFER SYSTEMS (General priority of the Philippines in all focal areas)

Focal area 1.1 - Global changes and feedback mechanisms of hydrological processes in stressed systems

Focal area 1.2 - Climate change impacts on the hydrological cycle and consequent impact on water resources

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

Focal area 1.4 - Managing groundwater systems' response to global changes

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

Theme 2: STRENGTHENING WATER GOVERNANCE FOR SUSTAINABILITY (General priority of the Philippines in all focal areas)

Focal area 2.1 - Cultural, societal and scientific responses to the crises in water governance

Focal area 2.2 - Capacity development for improved governance; enhanced legislation for wise stewardship of water resources

Focal area 2.3 - Governance strategies that enhance affordability and assure financing

Focal area 2.4 - Managing water as a shared responsibility across geographical & social boundaries

Focal area 2.5 - Addressing the water-energy nexus in basin-wide water resources

Theme 3: ECOHYDROLOGY FOR SUSTAINABILITY (priority of the Philippines for focal area 3.1)

Focal area 3.1 - Ecological measures to protect and remediate catchments process

Focal area 3.2 - Improving ecosystem quality and services by combining structural solutions with ecological biotechnologies

Focal area 3.3 - Risk-based environmental management and accounting

Focal area 3.4 - Groundwater-dependent ecosystems identification, inventory and assessment

Theme 4: WATER AND LIFE SUPPORT SYSTEMS

(General priority of the Philippines in all focal areas)

Focal area 4.1 - Protecting water quality for sustainable livelihoods and poverty alleviation

Focal area 4.2 - Augmenting scarce water resources especially in SIDS

Focal area 4.3 - Achieving sustainable urban water management

Focal area 4.4 - Achieving sustainable rural water management

Theme 5: WATER EDUCATION FOR SUSTAINABLE DEVELOPMENT

(General priority of the Philippines in all focal areas)

Focal area 5.1: Tertiary water education and professional development

Focal area 5.2: Vocational education and training of water technicians

Focal area 5.3: Water education in schools

Focal area 5.4: Water education for communities, stakeholders and mass-media professionals

Cross-cutting programmes: FRIEND (Asia Pacific FRIEND - priority of the Philippines)

1.2 Activities at national level in the framework of the IHP

1.2.1 National/local scientific and technical meetings

Consultative Forum on the National Integrated Basic Research Agenda (NIBRA),

organized by the National Research Council of the Philippines (NRCP).

The water-related research agenda are covered by Cluster II (Mathematical Sciences, Engineering and Industrial Research, Physics, and Earth and Space Sciences) – such as in the earth and environmental sciences, and multi-disciplinary research on environment and climate.

7 November 2008, Traders Hotel, Pasay City, Philippines.

National Consultative Meeting on the Review of the Philippines Water Code (2007-2008),

organized by the National Academy of Science and Technology (NAST) and the National Water Resources Board (NWRB). In a series of four (4) Round Table Meetings and one National Consultative Meeting held in 2008, a Technical Working Group (TWG) and 58 water agencies and stakeholders reviewed, discussed and made comments (by agency) on the proposed amendments of the Philippines Water Code.

2008 National Meeting of the Philippine National Committee for UNESCO-IHP,

4 December 2008, National Hydraulic Research Center, Melchor Hall, College of Engineering, University of the Philippines, Diliman, Quezon City, Philippines.

2nd National Conference of Small Water Service Providers:

"Building Partnerships for Sustainable Water for All",

organized by the Philippine Water Partnership (PWP).

16-17 October 2008, Cebu, Philippines.

PWP Strategic Plan (2009-2013) Planning Workshop,

organized by the Philippine Water Partnership (PWP).

20-21 November 2008, Balaw Kalinaw, University of the Philippines, Diliman, Quezon City, Philippines.

Facilitators Training on Outcome Mapping Plan for PWP/CWPs back-to-back with Rainwater Harvesting Seminar - Supporting Water Supply and Sanitation (WSS): Government Agencies and Foreign Funding Institutions,

organized by the Philippine Water Partnership (PWP).

Water supply and sanitation (WSS) services are major concerns of the government. Population growth, urban development, economic crisis, poverty, lack of knowledge, global competition are some factors that contribute to problems in water supply and sanitation.

24-25 November 2008, Davao City, Philippines.

Conference on Legislating Water Economic Regulation to Expand Water Access for the Poor,

organized by the Philippine Water Partnership together with the Office of Senator Jinggoy E. Estrada .

10 March 2009, Pecson Room, Senate Building, Pasay City, Philippines.

Conference on Climate Change Adaptation for Urban and Rural Development Planners,

organized by the Philippine Water Partnership together with

Co-convenors: Office of Senator Juan Miguel Zubiri and Office of Representative Ignacio Arroyo.

March 2009, Philippines.

3rd National Conference on Small-scale Water Service Providers

organized by the Philippine Water Partnership.

19-20 August 2009, The Royal Mandaya Hotel, Davao City, Philippines.

“Water is Life” National Photo Contest 2009,

organized by the Philippine Water Partnership together with the National Water Resources Board (NWRB) and German Agency for Technical Cooperation (GTZ) Sanitation Program, recently conducted to raise awareness among Filipino citizens by capturing the various water and sanitation issues facing the country today and move our people into action to address these issues. The theme Water for Life is based on the fundamental truth of water as a core element of life. The contest is open to all amateur and professional photographers who are Philippine residents.

Prizes for this contest are: 1st Prize - P25,000, 2nd Prize - P20,000, 3rd prize - P15,000. There will be special prizes on Water for Food and Agriculture - P10,000, Water for People - P10,000, and Water for Health and Sanitation - P10,000.

Forum on Climate Change and Water Resources:

Understanding the Climate Vulnerability of the Water Resources,

organized by the Philippine Water Partnership and the National Water Resources Board (NWRB), with support by GTZ and the PAGCOR.

25 September 2009, Mandarin Suites, Araneta Center, Cubao, Quezon City, Philippines.

Disaster Mitigation and Preparedness Strategies Project (DMAPS) Forum on Flood Risk Management:

“Learning Lessons, Moving On in the Wake of Storm Ondoy (Ketsana)”,

organized by the University of the Philippines, College of Engineering, Institute of Civil Engineering (UP ICE) and Philippine Institute of Civil Engineers (PICE).

13 October 2009, Melchor Hall, College of Engineering, University of the Philippines, Diliman, Quezon City, Philippines.

Learning from the Ondoy Flood: A Dialogue with Experts,

a seminar organized by the Asian Development Bank (ADB),

14 October 2009, khub Main Library, ADB, Pasig City, Philippines.

2nd National Conference on Climate Change Adaptation (Albay+2):

Moving Forward on the 2007 Albay Declaration,

organized by the Center for Initiatives and Research on Climate Change Adaptation (CIRCA) of the Provincial Government of Albay, in partnership with the Department of Environment and Natural Resources (DENR) and the GTZ ACCBio Project.

26-27 October 2009, Diamond Hotel, Roxas Boulevard, Manila, Philippines.

A National Forum on Climate Change and Vulnerability:

Mainstreaming Climate Change Mitigation and Adaptation in Philippine Development Agenda.

Organized by the Task Force on Climate Change (TFCC) of the National Academy of Science and Technology (NAST).

16 November 2009, Manila Hotel, Manila, Philippines.

1.2.2 Participation in IHP Steering Committees/Working Groups

Leonardo Q. Liongson (UP Diliman) – Philippine national representative to the RSC (2002-2009); and elected as Chairman of RSC (two-year term: 2008 and 2009) during the 15th RSC Meeting held in Manila, Philippines on 22-23 October 2007, attending to chair both the 16th RSC Meeting in 2008 at Ulan Bataar, Mongolia and the 17th RSC Meeting in 2009 at Wuhan, China.

Guillermo Q. Tabios III (UP Diliman), RSC member - has served as co-coordinator with RSC member Prof. Trevor Daniels of Adelaide University in the RSC-assigned task group for APFRIEND (2005-2009) on the development of Rainfall Intensity Duration Frequency (IDF) and Flood Frequency (FF) relations in the SEAP region.

Guillermo Q. Tabios III (UP Diliman), RSC member – has served as Philippine focal person in the Assessment of Flood Forecasting and Warning System (FFWS) for Tropical Regions, organized by the the UNESCO-IHP Humid Tropics Center, Malaysia.

First Meeting of the “Assessment of Flood Forecasting and Warning System (FFWS) for Tropical Regions” held at Kuala Lumpur, Malaysia, April 20-24, 2009.

Second Meeting of the “Assessment of Flood Forecasting and Warning System (FFWS) for Tropical Regions” held at Bogor, Indonesia, July 15-18, 2009.

Third Meeting of the “Assessment of Flood Forecasting and Warning System (FFWS) for Tropical Regions” held at Danang, Vietnam, October 9-11, 2009.

1.2.3 Research/applied projects supported or sponsored

National Hydraulic Research Center (NHRC)

Enhancement, Incorporation of Optimization Module and Calibration of MWSI Water Distribution Network Model, 2008-2009, UPERDFI-NHRC project for Maynilad Water Services, Inc. (MWSI), University of the Philippines, Diliman, Quezon City, Philippines.

Ambuklao and Binga Rehabilitation Project, Sedimentation and Reservoir Operation Studies, 2009, UPERDFI-NHRC project for NORCONSULT Management Services (Phil.) Inc., University of the Philippines, Diliman, Quezon City, Philippines.

National Academy of Science and Technology (NAST)

NAST Research Fellowship on the Metro-Manila Floods caused by Tropical Storm Ketsana (Ondoy) and other Flood Events of 2009.

National Research Council of the Philippines (NRCP)

Publication/Updating of the Philippine Compendium of Science and Technology (Chapters on Hydrology, Hydraulics and Water Resources Management)

National Water Resources Board (NWRB)

NWRB-JICA Study on Integrated Water Resources Management for Poverty Alleviation and Economic Development in Pampanga River Basin,

Phase I (the phase for the basic study to assess the present conditions of the study area);

Phase II (the phase for formulation of the IWRM Plan).

January 2009 – February 2011.

Other Projects (2007-2008):

- *Price Policy for Public Goods, Philippines (Study on Raw Water Pricing)* (GTZ: 2005-2008)

- *Economic Valuation of Groundwater in Metro Manila*.

- *Development of Water Supply Sector Roadmap* (GTZ-Water and Sanitation Program)

Department of Environment and Natural Resources (DENR) and National Water Resources Board

ADB-assisted project - Philippines: Master Plan for the Agusan River Basin.

Philippine Atmospheric, Geophysical and Astronomical Services Administration (PAGASA),

Continuing Priority Programs of the Flood Forecasting Branch

- *Upgrading of Flood Forecasting Operations*.

- Establishment of *Communication Network Thru SMS Link* Between PAGASA Weather and Flood Forecasting Center (WFFC) Bldg. (Quezon City) and Magat Dam in Isabela.
 - Calibration of the following hydrologic models, to be applied operationally to the various flood forecasting points of the Pampanga, Agno, Bicol and Cagayan River Basins: MLRegression, Storage Function and Sacramento Model.
- Establishment/Enhancement of *Community-based Early Warning System (CBEWS)* under the READY Project (UNDP), covering the following Provinces: Laguna, Ilocos Sur, Zambales, Cavite, Bohol
- Conduct of *flood hazard mapping* (READY Project) in the following provinces: Ilocos Sur, Laguna, Cavite, Pampanga, Iloilo.
- Improvement of the *Flood Forecasting and Warning System (FFWS)* of the Pampanga and Agno River Basins, to include the ff. activities:
- Construction of the Pampanga River Flood Forecasting Center.
 - Implementation of JICA project in the Pampanga and Agno river basins
- Strengthening of the *FFWS for Dam Operation*, including Magat Dam through the improvement of dam facilities and conduct of training.
- Establishment of *Early Warning System for disaster mitigation* in the south (Iloilo) under the Korean Government - project began March 2008.

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

Philippine Water Partnership (PWP)

15th Global Water Partnership (GWP) - SouthEast Asia Steering Committee Meeting, The Meeting discussed the GWP-SEA Strategy 2009-2013 during the Planning Session. 17-20 September 2008, Jakarta, Indonesia.

1.2.5 Other Initiatives

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*.

1.3 Educational and training courses

1.3.1 Contribution to IHP Courses

Tabios, G.Q. III, 2009, Workshop Presenter, UNESCO-IHP Asia Pacific FRIEND Workshop on Design Rainfall and Flood Frequency, Ho Chi Minh City, Vietnam, March 9-10, 2009.

1.3.2 Organization of specific courses

Tabios, G.Q.III, 2008, Lecturer, National Engineering Center, Hydrology and Hydropower Development for First Gen Corporation, August 13-15, 2008.

Tabios, G.Q. III, 2008, Lecturer, Metro Cebu Water District, Groundwater Flow and Solute Transport Modeling with FEMWATER Model, October 27-28, 2008.

1.3.3 Participation in IHP courses

18th IHP Training Course on Satellite Remote Sensing of Atmospheric Constituents, 3-15 November 2008. Nagoya, Japan –

Philippine participant: Rhodora Gonzales, Dept. of Geodetic Engineering and Training Center for Applied Geodesy and Photogrammetry (TCAGP), College of Engineering, UP Diliman.

19th IHP Training Course on Water Resources and Water-Related Disasters under Climate Change: Prediction, Impact Assessment and Adaptation, 9-12 December 2009. Disaster Prevention Research Institute (DPRI), Kyoto University – Philippine participant to be nominated in November 2009.

1.4 Papers and Publications

Liongson, L. Q. (2008), *Groundwater Assessment by Distributed Basin and Aquifer Modeling*, Proceedings of the 29th Philippine Association of Water Districts (PAWD) National Convention, 5-9 February 2008, The Pryce Plaza, Cagayan de Oro.

Sioudom, K., L. Q. Liongson and S. Ikeda (2008), *Modeling of Nitrogen and Sediment Transport in Nagura River, Ishigaki City and That Luang Wetlands, Vientiane City*, Proceedings of The Regional Conference in Environmental Engineering: Environmental Challenges Facing the ASEAN Region, 8-9 September 2008, Manila, ASEAN University Network Southeast Asia Engineering Education Development Network (AUN/SEED-Net).

Liongson, L. Q. (2008), *Horizontal Wells in Heterogeneous Media*, Proceedings of the International Conference on Uncertainties in Water Resources Management: causes, technologies and consequence (WRM-Mon2008) & 16th RSC Meeting for UNESCO-IHP for Southeast Asia and the Pacific, UNESCO-IHP Phase VII Technical Document No. 1, Ulaan Baatar, Mongolia, 29 September to 3 October 2008.

Liongson, L. Q. (2009), *Seepage Rates into Horizontal Wells in Heterogeneous Media*, Paper presented in the Environment and Infrastructure Track, 2nd Engineering Research and Development for Technology (ERDT) Conference, Diamond Hotel, Manila, Philippines, 20 February 2009.

Liongson, L. Q. (2009), *Data, Models, Designs and Decisions: Meeting the Challenges of Water Resources Management*, Kho Science Awards Lectures, 29th Annual Philippine-American Academy of Science and Engineering (PAASE) Meeting and Symposium (29APAMS), Ateneo de Manila University, Loyola Heights, Quezon City, Philippines, 13-15 July 2009,

Other water-related papers presented in the 29th Annual Philippine-American Academy of Science and Engineering (PAASE) Meeting and Symposium (29APAMS), Ateneo de Manila University, Loyola Heights, Quezon City, Philippines, 13-15 July 2009:

Climate Change: a Philippine Scenario

Daniel McNamara, S.J., Emmanuel Anglo, Gemma Narisma

The Value of Scientific Collaboration in Disaster Risk Reduction:

Lessons Learned from Recent Philippine Disasters

Antonia Yulo Loyzaga

Responding to Extreme Events in a Changing Climate in the Philippines

Felino P. Lansigan

Climate Change Signals and Associated Disasters as Observed from Space

Josefino C. Comiso

The Agusan Marsh: The Need For Collaborative, Multidisciplinary Research

J.H. Primavera

Liongson, L. Q. (2009), *Extreme Hydrologic Events in the last 20 Years: Perspective for Water Research and Management*. Special Seminar at the School of Environmental Science and Management (SESAM), University of the Philippines, Los Baños, College, Laguna, Philippines, 7 September 2009.

Liongson, L. Q. (2009), *Limiting Factors in the Design of Horizontal Wells*, Paper presented in the Environment and Infrastructure Track, 3rd Engineering Research and Development for Technology (ERDT) Conference, Manila Hotel, Manila, Philippines, 11 September 2009.

Liongson, L. Q. (2009), *Limitations on Yields of Horizontal Wells with Filter Beds*, Proceedings of the International Conference on Hydrology and Disaster Management (H&DM 2009) & 17th RSC Meeting for UNESCO-IHP Southeast Asia and the Pacific, UNESCO-IHP Phase VII Technical Document No. 2, Wuhan, China, 2-6 November 2009.

Tabios, G.Q. III (2007), *Influence of Storm Rainfall Movement on Watershed Sediment Yield*, Journal of Hydrologic Environment, IHES, Vol. 3, no.1, December, pp. 31-40.

Tabios, G.Q. III (2007), *Reservoir Sedimentation and Operations Study Using A Two-Dimensional Hydraulic Model*, Journal of Hydrologic Environment, IHES, Vol. 3, no.1, December, pp. 41-50.

Tabios, G.Q. III (2008), *Two-Dimensional Hydraulic Model with Mobile Bed for Dam-Break Problems*, Journal of Hydrologic Environment, IHES, Vol. 4, no.1, December, pp. 17-25.

Tabios, G.Q. III (2008), *Hydrology and Related Ecology-Based Aspects of Managing the Agusan Marsh*, Proceedings of the First Agusan Marsh Scientific Conference, Butuan City, Agusan.

Daniell, T.M. and G.Q. Tabios III (2008), *Rainfall Intensity Duration Frequency (IDF) Analysis for the Asia Pacific Region*, Asian Pacific FRIEND, IHP-VII Technical Documents in Hydrology, No. 2, UNESCO Office, Jakarta, Indonesia, November.

Tabios, G.Q. III (2008), *Recent Water-Related Disaster in the Philippines*, Proceedings of 2008 International Symposium on Hydrological Environment, International Hydrologic Environment Society, Daegu, Korea, December 14-15.

Tabios, G.Q. III, A.A. Oposa Jr., and C.A. Cabrido Jr (2008), *Water-Related Disaster Management in the Philippines: Issues and Policies, Policy*, paper presented at Center for Integrative and Development Studies, University of the Philippines (UP-CIDS) as part of the UP-CIDS lecture offerings for the UP Centennial Celebration, December 12, 2008. [This policy research was supported by Senator Edgardo Angara through the DBM Special Allotment Release Order (SARO), Priority Development Assistance Fund (PDAF), FY 2007 Budget, RA No. 9401 to UP-CIDS.]

Tabios, G.Q. III (2009), *Need for Ecology-Based Engineering Studies for Water Resources Development around Agusan Marsh, Philippines*, Sixth Regional Symposium on Infrastructure Development (RSID6), Bangkok, Thailand, January 12-13.

1.5 Participation in international scientific meeting

Tabios, G.Q. III, presented paper at Sixth Regional Symposium on Infrastructure Development (RSID6), Bangkok, Thailand, January 12-13, 2009.

Tabios, G.Q. III, UNU and IR3S Consultation Conference on “Role of higher education in adapting to climate change for establishing a regional network to develop postgraduate educational program on climate change adaptation” held at U Thant International Conference Hall, UNU Headquarters, Tokyo, June 10-12, 2009.

Tabios, G.Q. III, International Workshop on “Role of Higher Education in adapting to climate and ecosystems change” held at Halong Bay, Vietnam, August 23-24, 2009.

1.5.1 Meetings hosted by the country

The Regional Conference in Environmental Engineering: Environmental Challenges Facing the ASEAN Region, 8-9 September 2008, Manila, ASEAN University Network Southeast Asia Engineering Education Development Network (AUN/SEED-Net).

29th Annual Philippine-American Academy of Science and Engineering (PAASE) Meeting and Symposium (29APAMS), Ateneo de Manila University, Loyola Heights, Quezon City, Philippines, 13-15 July 2009.

1.5.2 Participation in meetings abroad

No additional information is available.

1.6 Other activities at regional level

1.6.1 Institutional relations /co-operation

No complete information is available.

1.6.2 Completed and ongoing scientific projects

No additional information is available.

2.0 Future Activities

2.1 Activities planned for 2008-2009

Participation in the 17th RSC Meeting and H&DM International Conference, 2-6 Novemebr 2009, Wuhan, China.

Participation in future RSC-supported programs and activities such as APFRIEND and the IHP training courses conducted by the University of Nagoya.

2.2 Activities in the long term

Concerted efforts and initiatives for research and extension activities in flood management, water-related multi-hazard risk assessment and mitigation, climate change mitigation and adaptation, and sustainable development in the context of integrated water resources management (IWRM).

Continued support of, and participation in the UNESCO-IHP in general and the RSC in particular, in all present and future: activities: APFRIEND (rainfall IDF and flood frequency studies), Catalogue of Rivers for SEAP, IHP training courses conducted by host countries, and joint hydrologic training courses and researches among member countries.

Seventeenth Meeting of IHP Regional Steering
Committee for the Southeast Asia and the Pacific
05-06 November, 2009
Wuhan, China PR

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**Country Report on Papua New Guinea
International Hydrological Program Activities:
2008-2009**

Prepared & presented by:
Maino Virobo
Acting Chairman
Papua New Guinea IHP National Committee

1. Introduction

The Department of Environment and Conservation participated in the activities of the International Hydrological Program Decade through then Bureau of Water Resources 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 current membership of the PNG IHP National Committee is eight (8), and drawn from various government agencies and institutions of higher learning. Over the period 2008-2009, PNG experienced significant decline in UNESCO participation, particularly the short term IHP training programs, and at the national scale the impact of global recession could be felt at household levels.

A major Department of Environment and Conservation reorganization restructure at the end of 2008 resulted from a significant shift in government's priority, particularly promoting environment sustainability and economic growth, climate change and carbon trade. As a result water component at monitoring, development and policy levels were greatly affected. However, various water sectors have maintained their activities and programs to ensure their mandates remain functional.

As always, the PNG IHP National Committee performs its roles, formulated by the following key agencies;

- (a) Department of Environment and Conservation (DEC),
- (b) University of Papua New Guinea (UPNG),
- (c) Geological Survey of Mineral Resources Authority (MRA)
- (d) National Weather Service (NWS) of Department of Transport and Civil Aviation.

2. Activities Organized by the National Committee

Significant water events organized at national levels were;

- (a) DEC Organizational Restructure December 2008
- (b) World Water Day commemoration in March 2009
- (c) World Environment Day commemoration in June 2009

No committee meetings were held.

3. Other Hydrological and Water Related Activities Conducted by Individual Water Agencies

3.1 Flooding and Integrated Natural Disaster Monitoring

In conjunction with PNG National Disaster Management Center, project assistance was sought from South Pacific Applied Geoscience Commission (SOPAC) through European Union's B-envelope project funding, to develop and establish an integrated natural disaster warning system. It is in its infancy stage and discussions are still being held on what disaster components should be integrated.

3.2 PNG Liquefied Natural Gas Project

PNG LNG Project funded by oil giant EXXON Mobil is undertaking massive development exercise in terms of exploring and developing sustainable energy. Integrated activities include identifying suitable sources for water abstraction, waste disposal and hydrological monitoring.

3.3 Millennium Development Goals

PNG is working towards completing the second progress report on MDGs, which is expected to be complete in December 2009. MDG-7 refers to ensuring environmental sustainability, which integrates water in the components of sustainable supply, sanitation and renewable energy.

3.4 Developing Reducing Emission through Deforestation and Degradation

PNG is a major partner in the coalition of Rainforest Nations. As such it is spear heading the global initiative on developing strategies in reducing green house gas emission, where water has been identified as a key resource in providing clean and greener energy, through hydropower generation. Thus, regular hydrological monitoring and data application is essential to ensuring this initiative is fully realized.

3.5 Sub Regional Programs

Continuous monitoring of SOPAC initiated Ramu Hydrological Monitoring Stations Rehabilitation project. The 2009 preliminary report shows good recovery results.

Another SOPAC administered project also funded by European Union through Pacific HyCOS program commenced at the end of 2007, however has not progressed well. This resulted from major DEC reorganization restructure, which resulted in technical officers been displaced and the only hydrologist promoted to higher management levels leaving a professional vacuum.

3.6 General Assistance

The natural resources development boom in PNG has resulting in the involvement of DEC technical officers conducting water resources assessments surveys and

hydrological measurements, which are major components of the integrated environment base line data and information collection.

4. Participation in Regional Programs

4.1 Research and publications

We did not participate in the above programs and activities during this period.

4.2 Meetings and short term training

- **Maino Virobo** attended the 16th International Hydrological Program Regional Steering Committee Meeting and International Conference on Uncertainties in Water Resources Management Hydrology and Water Resources Management, Ulaanbaatar, Mongolia from 29 September - 03 October 2008.
- **Walimu Apaka** attended the training on TIDEDA data management system in Christchurch New Zealand in June 2009. The training was funded by EU through Pacific HyCOS project and organized by NIWA.
- **Tony Kuman**, the newly appointed Pacific HyCOS Project coordinator attended the joint Pacific HyCOS steering committee and Integrated Water Resources Meeting in Nadi, Fiji, September 2009.

5. Future Tasks

- Attend the 17th IHP RSC Meeting in Wuhan, China from 02-06/11/2009.
- Attend the final Pacific HyCOS Steering Committee meeting
- Attend the 6th IWRM meeting in Suva, 2010.
- Participate in the upcoming UNESCO IHP training courses.
- Complete Pacific HyCOS installation and commence data collection, processing and management programs.
- Contribute to regional activities as and when required.

6. Concluding Remarks

Finally, I would like to thank UNESCO Jakarta office once again for meeting all the costs to enable me to participate in the RSC meeting and most significantly to attend the international conference.

NATIONAL REPORT ON IHP RELATED ACTIVITIES
IN
REPUBLIC OF KOREA

November, 2009

Korean National Committee
for
The International Hydrological Programme
Republic of Korea

1. ACTIVITIES UNDERTAKEN IN THE PERIOD NOVEMBER 2007-OCTOBER 2009

1.1 Meetings of the IHP National Committee

1.1.1 Decisions regarding the composition of the IHP National Committee

For the solution of water problems and the protection of mans welfare and the quality of human life, a UNESCO Resolution in 1964 created the International Hydrological Decade(IHD). Korea as a participant in the program, then appointed within its Ministry of Construction a IHD National Committee(later, IHP National committee), which undertook pioneer hydrologic surveys of selected representative basins in three major river systems during the program period, and embarked in 1975 on a 6-year International Hydrological Programme (IHP) project as the first step toward an extension of surveys of domestic river basins in order to fulfill its responsibilities in the world's consolidated efforts to cope with the water problem. After the completion of the first phase of IHP in 1980, the second phase of IHP project(1981~1983), the third phase of IHP project(1984~1989), the fourth phase of IHP project(1990~1995), the fifth phase of IHP project(1996~2001), the sixth phase of IHP project(2002~2007) and the seventh phase of IHP project(2008-2013) followed for the continuation of representative basin studies, the adoption of new techniques of water resources development and water quality control, the hydrological evaluation of urbanization and variations of watershed including sustainable development in a changing environment, hydrology and water resources development in a vulnerable environment, water interactions of systems at risk and social challenges and water dependencies of systems under stress and societal responses, and education and training in hydrology and water resources.

From the beginning of the New Millennium through this year(2009), Korean National Committee for the IHP was reorganized and strengthened to fulfill the IHP activities more effectively and actively. All members of the Committee were from every part of water related organizations in the country and executive functions are carried out within the Water Resources Bureau, Ministry of Land, Transport and Maritime Affairs.

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

1.1.2 Status of IHP-VII activities

In the beginning of the seventh phase of IHP(2008-2013) the Korean National Committee for the IHP has prepared the implementation plan of IHP-VII during the period(2008-2013) as listed in Table-1 and the potential activities to be undertaken by the Korean National Committee for the IHP as listed in Table-2 both according to the core programme Themes and Focal Areas, overviews of which are shown as follows;

WATER DEPENDENCIES: SYSTEMS UNDER STRESS AND SOCIETAL RESPONSES

Theme 1: ADAPTING TO THE IMPACTS OF GLOBAL CHANGES ON RIVER BASINS AND AQUIFER SYSTEMS

- Focal area 1.1 - Global changes and feedback mechanisms of hydrological processes in stressed systems
- Focal area 1.2 - Climate change impacts on the hydrological cycle and consequent impact on water resources
- Focal area 1.3 - Hydro-hazards, hydrological extremes and water-related disasters
- Focal area 1.4 - Managing groundwater systems' response to global changes
- Focal area 1.5 - Global change and climate variability in arid and semi-arid regions

Theme 2: STRENGTHENING WATER GOVERNANCE FOR SUSTAINABILITY

- Focal area 2.1 - Cultural, societal and scientific responses to the crises in water governance
- Focal area 2.2 - Capacity development for improved governance; enhanced legislation for wise stewardship of water resources
- Focal area 2.3 - Governance strategies that enhance affordability and assure financing
- Focal area 2.4 - Managing water as a shared responsibility across geographical & social boundaries
- Focal area 2.5 - Addressing the water-energy nexus in basin-wide water resources

Theme 3: ECOHYDROLOGY FOR SUSTAINABILITY

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

Theme 4: WATER AND LIFE SUPPORT SYSTEMS

- Focal area 4.1 - Protecting water quality for sustainable livelihoods and poverty alleviation
- Focal area 4.2 - Augmenting scarce water resources especially in SIDS
- Focal area 4.3 - Achieving sustainable urban water management
- Focal area 4.4 - Achieving sustainable rural water management

Theme 5: WATER EDUCATION FOR SUSTAINABLE DEVELOPMENT

- Focal area 5.1: Tertiary water education and professional development
- Focal area 5.2: Vocational education and training of water technicians
- Focal area 5.3: Water education in schools
- Focal area 5.4: Water education for communities, stakeholders and mass-media professionals

Cross-cutting programmes: HELP, FRIEND

Associated programmes: International Flood Initiative (IFI)

International Sediment Initiative (ISI)

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

Joint International Isotope Hydrology Programme (JIIHP)

Internationally Shared Aquifer Resources Management (ISARM)

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

Urban Water Management Programme (UWMP)

World Hydrogeological Map (WHYMAP)

Education, Training and Capacity Building across all the themes

Table-1 Implementation Plan of IHP-VII Phase

Name of the IHP National Committee	Country Priorities 2008-2009	Country Participation in Theme and Focal area 2008-2013	Events organized in the Country	Activity lead/Coordinated by the Country
<u>REPUBLIC OF KOREA IHP-NC</u>				
IHP VII Themes and Focal areas				
Theme 1:				MLTM/KWRA*
Focal area 1.1	●	2008-2009		MLTM/KWRA
Focal area 1.2	●	2009-2010		MLTM/KWRA
Focal area 1.3		●2011-2013		MLTM/KWRA
Focal area 1.4	●	2008-2009		MLTM/KWRA
Focal area 1.5				
Theme 2:				MLTM/KWRA
Focal area 2.1		●2010		MLTM/KWRA
Focal area 2.2	●	2008-2009		MLTM/KWRA
Focal area 2.3		●2010-2011		MLTM/KWRA
Focal area 2.4		●2011-2013		MLTM/KWRA
Focal area 2.5				
Theme 3:				
Focal area 3.1	●	2008-2009		MLTM/KWRA/IHES*
Focal area 3.2	●	2008-2009		MLTM/KWRA/IHES
Focal area 3.3		●2010-2011		MLTM/KWRA/IHES
Focal area 3.4		●2011-2012		MLTM/KWRA/IHES
Theme 4:				
Focal area 4.1	●	2008-2009		MLTM/KWRA
Focal area 4.2				MLTM/KWRA
Focal area 4.3		●2010-2011		MLTM/KWRA
Focal area 4.4		●2011-2013		MLTM/KWRA
Theme 5:				
Cross-cutting programmes				
HELP	●	2008-2013		MLTM/IHES
FRIEND	●	2008-2013		MLTM/IHES
Associated programmes :				
International Flood Initiative(IFI)	●	2008-2013		MLTM/IHES
International Sediment Initiative(ISI)				
Water for Peace(PCCP)				
UNESCO-IAEA Isotope(JIHP)				
Shared Aquifer(ISARM)				
Global Network Arid Lands(G-WADI)				
Unban Water Management(UWMP)	●	2008-2013		MLTM/KWRA
World Hydrogeological Map(WHYMAP)				

* MLTM : Ministry of Land, Transport and Maritime Affairs

KWRA : Korea Water Resources Association

IHES : International Hydrologic Environmental Society

* NOTE : Education, Training and Capacity Building activities are to be undertaken across all the themes

Table-2 Activities to be undertaken by the Korean National Committee

Name of the IHP National Committee <u>REPUBLIC OF KOREA IHP-NC</u>	Activities suggested by the IHP National Committee and their method of implementation
IHP VII Themes and Focal areas	
Theme 1:	
Focal area 1.1	Case studies on facility management techniques for abnormal climate
Focal area 1.2	Case studies of climate change impact on hydrological cycle Case studies of effect on water resources by climate change and development of evaluation system
Focal area 1.3	Case studies on regional hydrological extremes and water-related disasters
Focal area 1.4	Case studies of large scale groundwater dependencies related global change
Focal area 1.5	
Theme 2:	
Focal area 2.1	
Focal area 2.2	Best practices of good governance, capacity development and stakeholder participation at regional level
Focal area 2.3	
Focal area 2.4	
Focal area 2.5	
Theme 3:	
Focal area 3.1	Case studies of ecohydrological measures to protect and remediate catchment process
Focal area 3.2	Case studies on complementing engineering solutions with ecological measures resulting in sustainable carrying capacity of ecosystems Case studies on gravel contact oxidation process technology applied to improvement of stream quality
Focal area 3.3	
Focal area 3.4	
Theme 4:	
Focal area 4.1	Methodologies for safeguards against water borne biotic and abiotic pollutants
Focal area 4.2	
Focal area 4.3	
Focal area 4.4	
Theme 5:	
Cross-cutting programmes	
HELP	Regional case studies in HELP experimental river basins
FRIEND	Regional comparative case studies in Asia-Pacific river basins
Associated programmes :	
International Flood Initiative (IFI)	Regional case studies on flood and water-related disasters
International Sediment Initiative (ISI)	
Water for Peace (PCCP)	
UNESCO-IAEA Isotope (JIIHP)	
Shared Aquifer (ISARM)	
Global Network Arid Lands (G-WADI)	
Urban Water Management (UWMP)	Development of urban water management strategies and technologies
World Hydrogeological Map (WHYMAP)	

* NOTE : Education, Training and Capacity Building activities are to be undertaken across all the themes

During the first and second year(2008-2009) of the seventh phase of IHP, the Korean National Committee for the IHP has been paying its efforts to achieve the objectives set by UNESCO for this phase of IHP and the following projects have been and being executed in Korean river basins and in the field of hydrology and water resources in Korea;

- (1) Global changes and feedback mechanism of hydrological processes
- (2) Climate change impacts on the hydrological cycle and consequent impact on water resources
- (3) Managing groundwater systems' response to global changes
- (4) Strengthening water governance for sustainability
- (5) Ecological measures to protect and remediate catchment process
- (6) Improving ecosystem quality and services by combining structural solutions with ecological biotechnologies
- (7) FRIEND basin studies

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, Workshop and Working Group meetings held in the period of 2007~2009.

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 2007~2009 have been executed according to the above listed projects in 1.1.2. Some other research or applied projects were also supported or sponsored by the Government and other water-related organizations such as Korea Water Resources Corporation during this period.

The following projects have been and are being implemented for the Asian Pacific FRIEND in the three representative river basins chosen as the Korean Asian Pacific FRIEND, and a new HELP basin(Kumho river) proposal was accepted by UNESCO.

- Basic hydrologic analyses and data collection
- Comparative regional flow regimes analyses
 - Rainfall models and design storm
 - Flood models and design flood
- FRIEND river basins studies
- New HELP river basin proposal and research programmes

1.2.4 Collaboration with other national and international organizations / or programmes

The Korean National Committee for the IHP is functioning in the execution of IHP activities in collaboration with the following national and international organizations/or programmes; Korea Water Resources Corporation(The K-Water); Korea Water Resources Association(KWRA); Korean Society of Civil Engineers(KSCE); Korean Society of Agricultural Engineers(KSAE); Korean Meteorological Society(KMS); ICOLD Korean National Committee(KNCOLD); IWRA Korean Geographic Committee; International Hydrologic Environmental Society(IHES); Korea Federation of Water Science and Engineering Societies(KFWSES); Korea Institute of Construction Technology(KICT); Korean Universities Hydrology and Water Resources Programmes.

1.3 Educational and training courses

1.3.1 Contribution to IHP courses

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

1.3.2 Organization of specific courses

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

1.3.3 Participation in IHP courses

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

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

The Korean National Committee for the IHP had particularly close cooperation with International Center

for Water Hazard and Risk Management(ICHARM) under the auspices of UNESCO in its preparatory activities for the establishment during last two years through the participation in workshops and strong support at the UNESCO Council and regional meetings. Furthermore, Korea Water Resources Corporation(The K-Water) which is a member of the Korean National Committee for the IHP established a special cooperation program with the UNESCO-IHE since 2007.

1.5 Publications

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

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

1.6 Participation in international scientific meetings

1.6.1 Meetings hosted by the country

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

- 2007 International Symposium on Hydrological Environment
- 2008 International Seminar on Climate Change and Water

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 2010, foreseen for 2011-2012 and envisaged in the long term

From the beginning of 2008, IHP-KNC prepared concrete national plan for the seventh phase of IHP and began to implement this plan in Korean river basins. IHP-KNC will also actively continue and participate in the Asian Pacific FRIEND project to complete with successful results for the Southeast Asia and the Pacific, and also will execute a new HELP river basin project in collaboration with other Asia Pacific HELP projects.

The following international symposiums and workshops will be organized until December 2009 and during 2010-2011 as the IHP-VII activities of IHP-KNC.

- 2010 HELP Inauguration International Symposium
- 2009 International Symposium on Hydrological Environment
- 2010 International Symposium of Hydrologic Environment
- Korean Workshops of FRIEND, HELP and PUB during 2010-2011

NATIONAL REPORT ON IHP RELATED ACTIVITIES

THAILAND

1. ACTIVITIES UNDERTAKEN IN THE PERIOD November 2008 – September 2009

- 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 2009
- 2.2 Activities foreseen for 2009-2010
- 2.3 Activities envisaged in the long term

National Report on IHP Related Activities
Thailand

1. Activities undertaken in the period of November 2008- September 2009

1.1 Meeting of the IHP National Committee

1.1.1 Decision regarding the composition of the IHP National Committee

The present composition of THC-IHP consists of 18 members as follow:

- Chairman : Dr.Siripong Hungspreug, Director-General of Department of Water Resources
- Vice Chairmans : Deputy Director-General of Department of Water Resources
Deputy Director-General of Royal Irrigation Department
- Secretary : Director of Bureau of Research -Development and Hydrology, Department of Water Resources
- Members : Representatives from concerning agencies and individuals are as follows :
1. National Park, Wildlife and Plant Conservation Department
 2. Department of Ground Water Resources
 3. Royal Irrigation Department
 4. Meteorological Department
 5. Marine Department
 6. Hydrographic Department
 7. National Research Council of Thailand
 8. Bureau of Royal Rainmaking and Agricultural Aviation
 9. Secretarial of the Thai National Commission for UNESCO
 10. Electricity Generating Authority of Thailand
 11. The Thailand Research Fund
 12. Thai Hydrologist Assembly
 13. Mr.Veeraphol Taesombat
 14. Director of Research and Hydrology Development Division, Department of Water Resources

The mailing address are as follow :

Thailand National Committee for the IHP
Department of Water Resources
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Phayathai Bangkok, 10400, Thailand
Tel : +66-22986604 Fax: +66-22986604
Email : sukonth.a@dwr.mail.go.th

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 Chao Phraya 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.
- f) Increasing and enhancement the rainfall observations density in the TMD's surface observation network, and improve the data transmission automatically, 820 automatic rain gauges have been completely installed in the major river basins across the country (in Northern, Northeastern, Central and Eastern Thailand), increasing the total amount of automatic rain gauges to 930.
- g) Supporting and strengthening severe weather observation and monitoring networks of the country, two C-band Doppler Radars have been being installed in the North of Thailand as follows:
 1. C -band Doppler Radar at Lumphun,
 2. C- band Doppler Radar at Petchaboon,

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
- 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

- Seminar on Wisdom Application for Water Resources Management, 10 March 2009, Bangkok, Thailand.
- 3rd Engineering Water Resources Meeting on "Water Resources Management under Uncertainties, 6-7 August 2009, Nakhon-Nayok, Thailand.
- Result of Sensitivity Analysis using 2006 historical rainfall data for Mun-Chi basin for new Flood Forecasting System (FFS), 28 Sep 2009, Bangkok, Thailand.
- Meeting on "Assessment of Flash Flood and Landslide Early Warning System" 11-12 Sep 2009, Chiang Mai, Thailand.

1.2.2 Participation in IHP Steering Committees/Working Groups

The representatives from TNC-IHP attended the 16th Regional Steering Committee Meeting for the IHP in Southeast Asia and Pacific on the International Conference on "Uncertainties in Water Resource Management: causes, technologies and consequences/WRM-Mon 2008" 29 September – 3 October 2008, Ulaanbaatar City, Mongolia

- 1.2.3 Research/applied projects supported or sponsored
- 1 API Application in Flash Flood and Landslide.
 - 2 Probability and Return Period of Monthly Rainfall Amount for Thailand.
 - 3 The assessment of Rainfall Impact on Crops During northeast monsoon by Generalized Monsoon Index
 - 4 Application of Artificial Neural Network(ANN) for Flood Forecasting in PASAK BASIN
 - 5 Numerical Weather Prediction Output Integration by GIS Technique for Forecasting and Early Warning in the Risk Area

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, Environment Program, Flood Mitigation Management Program and Drought management program, Mekong HYCOS and Integrated Knowledge Management Program.
- b) Collaboration with ESCAP/WMO Typhoon 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
- h) Collaboration with ADB on CPWF (Challenge Program on Water and Food)
- i) Collaboration with ADB on Hydro-Agronomic-Economic Model for Mekong River Basin and Local Adaptation in Thailand and Lao PDR Project

1.2.5 Other initiatives

- Integrate Sustainable Water Resources Utilization on Bapakong-Prachinburi River Basin in collaboration with ADB

1.3 Educational and training courses

1.3.1 Contribution to IHP courses

-

1.3.2 Organization of specific courses

- Trainer for Trainee Course on Principal Hydro-meteorological Equipment Management, 1-3 July 2009, Luxawan Hotel, Chiang Rai, Thailand.
- Training of Trainers Course on IWRM for River Basin Organizations (RBO): Improve efficiency and effectiveness for water security, Bangkok, Thailand during 27-31 July 2009

1.3.3 Participation in IHP courses

-

1.4 Publications

- Hydrological and meteorological Year Book 2007
- Flood and Drought Early Warning System

1.5 Participation in international scientific meeting

1.5.1 Meetings hosted by the country

- The 41st ESCAP/WMO Typhoon Committee, Chiang Mai, Thailand during 19-24 Jan 2009
- High-Level Ministerial Conference on Strengthening Transboundary Freshwater Governance - *the Environmental Sustainability Challenge* Bangkok, Thailand during 20 – 22 May 2009
- Third Meeting of MRC Information and Knowledge Management (IKM TACT) 23 September 2009, Landmark Hotel, Bangkok, Thailand.
- Fourth Mekong-HYCOS Project Coordination Committee Meeting, 22 September 2009, Landmark Hotel, Bangkok, Thailand.
- The Fifth IKMP Steering Committee Meeting, 24 September 2009, Landmark Hotel, Bangkok, Thailand.
- Lao-Thai Joint Meeting on Term of Reference for Implementation of the Joint-Discharge and Suspended Sediment Transport Measurements on the Mekong River, 2 June 2009, Udon Thani, Thailand.

1.5.2 Participation in meetings abroad

A representative from Thailand participated in

- The 10th Meeting of the Conference of the Parties to the Convention on wetlands (Ramsar, Iran, 1971) “Healthy wetlands, healthy people” Changwon, Republic of Korea, 28 October – 4 November 2008
- The 2nd International Conference on Water and Flood Management (ICWFM 2009) Bangladesh , 14-18 March 2009
- The 5th World Water Forum, Turkey , March 2009
- Training on “Professional Development Programme on Water Resources Management”, Australia, 13 Jul - 5 Sep 2009
- In-depth Training Course and Hands-on Operations- the MRC’s Flash Flood Guidance System (MRCFFG), Siem Reap City, Cambodia, 19-23 Oct 2009

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.
- 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

- Hydro-Agronomic-Economic Model for Mekong River Basin and Local Adaptation in Thailand and Lao PDR Project.
- MRC Climate Change and Adaptation Initiative
- Developed and improvement on the hydrological and meteorological monitoring network in Chi-Mun River Basin, Chao Phraya River Basin, Talesap Songkhla Basin and Khlong River basin for Water Resources Management including Flood forecasting and management.
- Continued to develop and set up a flood and landslide warning system in upland area.

2 FUTURE ACTIVITIES

2.1 Activities planned until December 2009

- Strengthening cooperation with other countries in Lower Mekong River Basin
- Raise public participation in Integrated Water Resources Management

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 NOVEMBER 2008 - OCTOBER 2009

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 (IMHEN) - Ministry of Natural Resources and Environment (MONRE).

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

The members of the Vietnam National Committee for the IHP have attended and participated actively in all of the annual meetings of the Regional Steering Committee.

- Organize the AP-FRIEND meeting of “Intensity Frequency Duration and Flood Frequency Determination” in Ho Chi Minh City Viet Nam from 9 to 10 March 2009

- Participated in the project “Assessment of Flood Forecasting and Warning System for Tropical Regions”; Meeting and visit the studied river basins in Malaysia, Indonesia, VietNam.
- Participated in 17th RSC meeting and H&DM conference, Wuhan, Nov 2009.

1.2.3 *Research/applied projects supported or sponsored*

- *Impact of Sea Level Rise and Adaptation Measures*, Research project funded by DANIDA.
- *Impact of Climate Change on Water Resources and Adaptation Measures*. Research project funded by DANIDA.
- *Strengthening national capacity to respond to CC, mitigation impact and control GHG emission*, funded by UNDP.
- *National target program to respond to CC*, funded by Vietnam Government.
- *Development of Climate Change Scenarios for Vietnam*, funded by Vietnam Government.
- *Assessment and adjustment for waring water levels of Vietnam rivers*, funded by Vietnam Government.
- *Development of Operation rule for reservoir system on Red river*, Research study funded by the Ministry of Natural Resources and Environment.
- *Development of Operation rule in dry season for reservoir system on Huong river*, Research study funded by the Ministry of Natural Resources and Environment.

1.2.4 *Collaboration with other national and international organizations*

- Contract with **Met Office Hadley** center (UK) to exchange and train on **Precis model** to downscaling climate data for Vietnam CC scenarios.
- Cooperate with **UNDP to organize Forum** “WORLD WIDE VIEWS ON GLOBAL WARMING IN VIETNAM”
- Cooperate with Tokyo University, Japan to develop Flood Forecasting and Early Warning System for Thao, Lo river basins.
- Members/representatives of Vietnam NC IHP participated and contributed to many national councils.
- 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,

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

Collaboration with Met Office Hadley Center (UK) on training of downscaling Climate Data for development CC scenarios by using Precis model.

1.3.3 Participation in IHP courses

1.4 Publications

- **Climate change, Sea Level Rise scenaios for VietNam**
- **National Target Program to respond to CC.**

1.5 Participation in international scientific meetings

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

II. FUTURE ACTIVITIES

2.1 Activities planned for 2009-2010

- The Fifth APHW 2010 AND 18th RSC MEETING, Nov, 2010
- Participating in regional and national activities of IHP.

2.2 Activities envisaged in the long term

Unknown at this time.

**THE REGIONAL HUMID TROPICS HYDROLOGY AND WATER RESOURCES
CENTRE FOR SOUTHEAST ASIA AND THE PACIFIC
(HTC KUALA LUMPUR)**

1. INTRODUCTION

This report highlights events and activities that had taken place since the 16th Regional Steering Committee Meeting for UNESCO-IHP South East Asia and The Pacific held in Ulaanbaatar City, Mongolia from 29th – 3rd October, 2008. This report also highlights future programmes and activities planned by the Centre.

2. ACTIVITIES IMPLEMENTED AND PARTICIPATED AT REGIONAL AND INTERNATIONAL LEVEL

International Level

2.1. Seminar/Workshop/Training

a. International Training Workshop on Flash Flood Risk Assessment and Mitigation Strategies, 10th – 13th August 2009 held in Kuala Lumpur.

Humid Tropics Centre Kuala Lumpur (HTC Kuala Lumpur) together with Regional Centre on Urban Water Management – Tehran (RCUWM-Tehran) and International Centre for Water Hazards and Risk Management (ICHARM), Japan and supported by the Department of Irrigation and Drainage (DID) Malaysia and the University of Tenaga Nasional, Malaysia (UNITEN) has successfully organized the International Training Workshop held in Kuala Lumpur on the 10-13 August 2009. Total number of 35 participants from 9 countries including Malaysia participated in the training workshop. The participants were from Iran, Japan, Bangladesh, Egypt, China, India, Pakistan, Jordan, Oman, Tajikistan and also Malaysia.

- b. Training Workshop on Assessment of Industry Needs to Help Develop a Sustainable and Productive Science and Technology Policy, Corus Hotel, Kuala Lumpur, 22nd – 26th June 2009.**

The training workshop was organized by the International Science, Technology and Innovation Centre for South-South Cooperation under auspices of UNESCO (ISTIC) in collaboration with Malaysia University of Science and Technology (MUST) and supported by UNESCO and Ministry of Science, Technology and Innovation, (MOSTI), Malaysia.

- c. International Conference on Water Resources (ICWR), the Bayview Hotel, Langkawi, Kedah, Malaysia, 26th – 27th May 2009.**

The conference was organized by University of Technology Malaysia (UTM) in collaboration with Department of Irrigation and Drainage Malaysia (DID), National Hydraulic Research Institute of Malaysia (NAHRIM), Langkawi Development Authority (LADA) and supported by United Nations Education, Scientific and Cultural Organization (UNESCO), International Association of Hydraulic Engineering Research, Humid Tropic Centre Kuala Lumpur (HTC KL), Malaysia Hydrological Society (MHS), International Hydraulic Programme, Tourism Malaysia and Langkawi Geopark.

- d. 6th General Session on World Commission on Ethics of Science and Technology- COMEST, Eastin Hotel, Kuala Lumpur, 10th – 16th June 2009.**

This 6th General Session of COMEST was organized by Ministry of Science, Technology and Innovation (MOSTI) in collaboration with United Nations Education, Scientific and Cultural Organization (UNESCO) and supported by International Science, Technology and Innovation Centre for South-South Cooperation under auspices of UNESCO (ISTIC).

- e. The 5th World Water Forum, Istanbul, Turkey, 16th – 22th March 2009.**

- f. Memorandum of Understanding (MoU) between HTC Kuala Lumpur and UNESCO's Water Centre:**

- i. HTC KL and International Centre for Water Hazard and Risk Management (ICHARM-Japan)
- ii. HTC KL and The Regional Centre on Urban Water Management (RCUWM-Tehran)

The Government of Malaysia through the Ministry of Natural Resources and Environment stated that the above-mentioned Memorandum of Understanding is not necessary because in the Memorandum of Agreement between HTC Kuala Lumpur and UNESCO clearly stated that in the Article II-Functions (b) *“to network with IHP National Committees and other similar centres for exchange of scientific and technical information on research results;”*.

2.2. Meeting

- None -

Regional level

2.3. Seminar/Workshop/Training

- a. Workshop on the Frequency Methods and Design Flood Determination by Routing Method, Ho Chi Minh City, Vietnam, 9th – 10th March 2009. The workshop was organized by Vietnam Institute of Meteorology, Hydrology and Environment and Vietnamese NATIONAL Committee for IHP.
- b. Water Education Workshop, Indonesian Institute of Science (LIPI) Jakarta, Indonesia, 10th – 13th February 2009 organized by UNESCO Jakarta

2.4. Meeting

-None -

2.5. Research

- a. Integrated and Multidisciplinary Research on Flood Hazard Assessment in Johor Malaysia (HTC KL /ICHARM Japan)

The science research is being carried out by HTC Kuala Lumpur in collaboration with ICHARM and supported by Department of Irrigation and Drainage Malaysia and as well as the universities. The expected outputs of this study are the flood hazard and risk assessments for the proposed areas based on the recurrent interval and flood hazard and flood risk map. The methodology of the research and the name of researchers have been

identified to carry out the various scopes in the studies. The researchers have to report the progress of the studies in the next meeting schedule to be held at the end of November 2009 or early December 2009.

- b. Flood Forecasting and Warning System (FFWS) for Tropical Regions (HTC KL/ ICHARM, Japan /APEC, Indonesia)

The participating agencies of the studies are HTC KL/ ICHARM, Japan and APEC, Indonesia. The main objectives of this study are to assess for the FFWS for the selected river basins in each participating countries that is Indonesia, Philippines, Vietnam and Malaysia. The draft of the report will be prepared by the experts on the proposed outline and to be discussed during the forthcoming field visit meeting.

2.6. Technical Visit

-None-

2.7. Information Technology

Development of the introductory webpage displaying corporate identity known as Consortium of Water-Related UNESCO Category II Centres in Asia Pacific has been carried out. The link to the website is www.htckl.org.my/water.

3. ACTIVITIES IMPLEMENTED AND PARTICIPATED AT NATIONAL LEVEL

3.1 Educational Activities

a. Malaysia World Water Day 2009

Malaysia World Water Day 2009 was held on the 11-12 April in Sarawak, Malaysia. The Theme was "TRANSBOUNDARY WATER" with slogan "Shared Water - Shared Opportunities" and special focus was on trans-boundary waters.

HTC Kuala Lumpur together with Malaysia International Hydrological Programme–UNESCO (MIHP-UNESCO) has conducted the MIHP-UNESCO BEST THESIS AWARD, an award to the best student's thesis at undergraduate level in the field of hydrology and water resources. The objective was to promote Hydrology and Water Resources subjects at university level.

b. Advisory to Open University (OUM) for postgraduate programme

3.2 Research Activities

Research and Development on Application of Water Sensitive Urban Drainage Design (WSUD) for Integrated Storm Water Management at Local Scale in Kuala Lumpur, Malaysia.

The concept of WSUD covers all aspect of integrated urban water cycle management, including the harvesting and treatment of storm water and wastewater to supplement non-potable water supplies. It intends to minimize the impact of urbanization of the natural water cycle.

There are six (6) components of the studies:

- Component 1: BioRetention System
- Component 2: Constructed Wetland System
- Component 3: Rainwater Harvesting System
- Component 4: Greywater Reuse System
- Component 5: Porous Pavement System
- Component 6: Green Roof System

Currently, the Construction Drawing and the Bill of Quantities are completed. The construction is expected to begin early December 2009. Some of the key outputs of the study are the Design Manual of WSUD that can be applied on regional scale, development of WSUD Decision Support Tools to support practical design and operation of WSUD.

3.3 Seminar/Courses/Training Workshop

a. National Colloquium on Water Demand Management, Putra World Trade Centre (PWTC) Kuala Lumpur, 19th – 21st October 2009.

This Colloquium is jointly organized by the Academy of Sciences Malaysia (ASM), the Malaysia Water Partnership (MyWP) and the Department of Irrigation and Drainage Malaysia and supported by the Ministry of Natural Resources and Environment, Ministry of Agriculture and Agro-based Industry Malaysia, Ministry of Energy, Green Technology and Water and the Ministry of Science, Technology and Innovation.

b. Forum on Making Integrated Water Resources Management (IWRM) Works: A Review of Current Regional and Global Programmes and Initiatives, Open University of Malaysia, Kuala Lumpur, 22th October 2009.

3.4 Technical Input and Advice

Malaysia – UNESCO Corporative Programme (MCUP)

HTC Kuala Lumpur participated in the preparation of training list in the area of science and education, in support of the Malaysian National Commission for UNESCO; under the Ministry of Education Malaysia in enhancing South-South Cooperation for capacity building in education and science for the benefit of the Least Developed Countries.

4. QUALITY MANAGEMENT SYSTEM

Since HTC Kuala Lumpur was awarded the MS ISO 9001:2000 quality management certification, continual improvement has always being carried out. On 19 September 2009, the certification was upgraded to MS ISO 9001:2008.

5. FUTURE PROGRAMME

The future activities planned apart from the IHP phase VII as shown in the table below.

No	Title	Year	Funding/ Collaborator
1.	Research and Development on Application on Water Sensitive Urban Drainage Design for Integrated Storm Water Management at Local Scale in Kuala Lumpur, Malaysia (HTC Office Compound) <ul style="list-style-type: none">- To construct and implements project components :<ul style="list-style-type: none">5.1.Rainwater Harvesting System5.2.Greywater Reuse System5.3.Green Roof System5.4.BioRention System5.5.Porous Pavement System5.6.Constructed Wetland System- To publish Design Manual under UNESCO-IHP and distributed locally, regionally and internationally.- To promote R&D Monitoring report.- To compile the bill of quantities, design construction drawings, as built plans, pictures of projects during construction.- To produce Operation and Maintenance Manual.- Write up of various Technical Papers (so far 2 technical papers have been written).	2008 - 2010	Government of Malaysia

2.	Training Workshop on the Application of GIS and RS on Water Resources Management to be held in Japan	2010	RCUWM Tehran, ICHARM Japan, HTC Kuala Lumpur
3.	Application of Water Sensitive Urban Drainage (WSUD) for Integrated Stormwater Management at Local Scale Phase II – Rainwater Harvesting System	2010 - 2014	Government of Malaysia
3.	Up scaling of Water Sensitive Urban Design at Catchment Level	2010 - 2015	Government of Malaysia
4.	Development of Light Foam Concrete Drain including pilot project	2011 - 2015	Government of Malaysia
5.	Development of Interlocking Modular Erosion Control (MESCO) and River Slope Protection Structure (Chau river, Putrajaya)	2011 - 2015	Government of Malaysia
6.	Hydrologic Regionalization of watershed in Malaysia	2010	Government of Malaysia
7.	Enhanced Flood Forecasting and Alert System for Tropical Region	2010	Government of Malaysia

6. AP FRIEND WATER ARCHIVE

6.1 River Catalogue

The Catalogue including 114 rivers of 13 countries have been published in five (5) volumes. The river catalogue for Vol. VI is expected to be published soon.

6.2 Water Data Archive

The Centre was facing problem to upload the river catalogue information because of the different format file and the outgoing staffs who are in charge of the system. Currently, the Centre has engaging experts in the related field to overcome it. The new format database can be reached at <http://htckl.org.my/apfriend>. Feedback and comments from member countries are welcome.

Currently, Water Data Archive consisting of 51 river basins from 13 countries. Most of the information is taken from the river catalogue Vol. 1 to Vol. III.

7. FINANCE AND HUMAN RESOURCES

a. Operation and Maintenance

The annual operating budget for the year 2009 is shown in the table below.

No.	Component	Amount (USD \$)	Contributing Agency
1.	<u>Operation and Maintenance</u> <ul style="list-style-type: none">Trust AccountOperating allocation Subtotal	30,000 60,000 90,000	Government of Malaysia Government of Malaysia
2.	<u>Emolument</u> <ul style="list-style-type: none">Staff salary Subtotal	150,000 150,000	Government of Malaysia
	<u>TOTAL</u>	240,000	

8. STAFFING

8.1 Incoming

- Dr. Mohamed Roseli Zainal Abidin, Director of HTC Kuala Lumpur, effective from 16th May 2009.
- Mrs Rohani Ahmad, Deputy Director, reported for duty on the 16th May 2009.
- Miss Devi Peechmani, Civil Engineer, reported for duty on the 8th June 2009.
- Mr. Shah Razif, Technician, reported for duty on the 15th November 2008.

8.2 Outgoing

- Ir. Dr. Hj. Mohd. Nor Mohd Desa, the former Director of HTC Kuala Lumpur retired on 15th May 2009.
- Mr. Idris Yussof, the former Deputy Director has been transferred to Coastal Division. Department of Irrigation and Drainage on the 15th May 2009 due to promotion.

Note : HTC Kuala Lumpur Organisation Chart is as shown in Figure 1

9. PUBLICATIONS

9.1. Proceedings

- None -

9.2. Technical Papers

- a. Lim, C.H. and Roseli, M (2009). “Enhancing the Management of Water Resources Towards Sustainable Environment: Managing Environment Flow”, National Colloquium on Water Demand Management, PWTC, Kuala Lumpur, 19 – 21 Oct, 2009.
- b. Lariyah, M.S., Roseli, M., Noarazli, O., Mohd Nor M.D., Zulkefli, M. and Aminah, H. (2009). “Development of Water Sensitive Urban Design (WSUD) expert System (WET) for Integrated Stormwater Management at Local Scale”.

9.3. Power Point Presentations

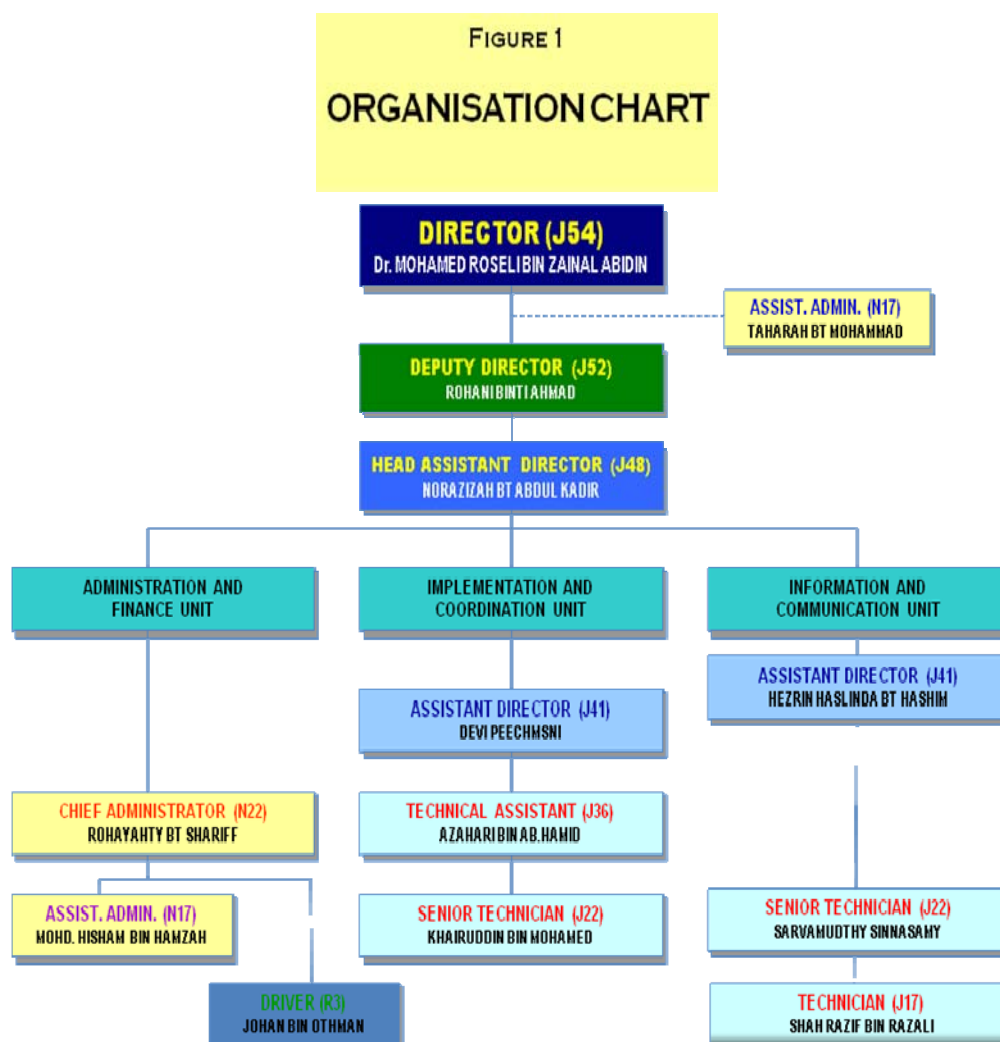
- a. Husaini A., and Roseli, M. (2009). “Keynote Address 2: Research and Development from Science, Technology and Innovation Perspective”, AWAM09 Conference, Corus Hotel, Kuala Lumpur, 27 – 29 Oct, 2009.
- b. Roseli, M. (2009). “Introduction to River Management in Malaysia – Clean, Living and Vibrant River”, the Malaysian Technical Cooperation Programme (MTCP) 3rd International Course on Flood Mitigation and Stormwater Management, NAWMI, Kota Bharu, Kelantan, Malaysia, 5 – 23Oct 2009.
- c. Roseli, M. (2009). “Malaysia’s Initiative in Integrated Water Resources Management (IWRM) and Integrated River Basin management (IRBM) – Making Space for Water”, The Malaysian Technical Cooperation Programme (MTCP) 3rd International Course on Flood Mitigation and Stormwater Management, NAWMI, Kota Bharu, Kelantan, Malaysia, 5 – 23Oct 2009.
- d. Roseli, M. (2009). “River Restoration and River Hydraulics”, The Malaysian Technical Cooperation Programme (MTCP) 3rd International Course on Flood Mitigation and Stormwater Management, NAWMI, Kota Bharu, Kelantan, Malaysia, 5 – 23Oct 2009.
- e. Lim, C.H. and Roseli, M (2009). “Enhancing the Management of Water Resources Towards Sustainable Environment: Managing Environment Flow”, National Colloquium on Water Demand Management, PWTC, Kuala Lumpur, 19 – 21 Oct, 2009.

9.4. Technical Reports

- a. Application of Water Sensitive Urban Design for Integrated Stormwater Management at Local Scale (progress report)
- b. The 10 Year Report of HTC Kuala Lumpur (in progress)

10. CONCLUDING REMARKS

This report gives a brief account about activities carried out by the Centre during the reporting period. HTC Kuala Lumpur has been in existence and in operational for the past 10 years since October 1999 under the agreement between the Government of Malaysia and the United Nations Education, Scientific and Cultural Organization (UNESCO) and is expected to continue to be the UNESCO Water Centre i.e. The Regional Humid Tropics Hydrology and Water Resources for Southeast Asia and the Pacific.



ANNEX 6

RESOLUTIONS

RESOLUTION RSC XVII-I

Archiving water-related disaster management/reduction technologies

The IHP RSC for South East Asia and the Pacific

- Recognizing the serious water-related hazards and disasters situation in Asia and the Pacific region as reported by many papers and reports at the Sessions of IHP Regional Steering Committee and related scientific meetings for many years, as well as the International Conference on Hydrology and Disaster Management (H&DM2009) held in Wuhan, China on 2-6 November 2009;
- Noting the importance of disseminating various disaster management and reduction technologies to policy makers and practitioners as well as the general public by effective means;
- Discussing utilization of a database that accommodates technology and knowledge useful for disaster risk reduction with the Disaster Reduction Hyperbase (DRH) ;
- Recommends to further develop an information data bank on water-related disaster reduction/ management technologies by using such system as the DRH with an association with the Water Archive prepared by Asia Pacific FRIEND project;
- Requests the IHP National Committees and UNESCO field offices in the region to support this idea and encourage relevant organizations to provide suitable contents for the DRH, which is beneficial not only to the country but also for all the members in the region.