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INTERNATIONAL HYDROLOGICAL PROGRAMME

22nd IHP Regional Steering Committee meeting for Southeast Asia and the Pacific

Yogyakarta, Indonesia, 13 and 14 November 2014

FINAL REPORT

IHP-VII Regional Steering Committee Meeting | No. 22
Regional Steering Committee for Southeast Asia and the Pacific
UNESCO Jakarta Office, 2014

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**The 22nd IHP
Regional Steering Committee Meeting for
Southeast Asia and the Pacific**

**Yogyakarta, Indonesia
13 and 14 November 2014**

Chairman: Mr. Kaoru Takara (Japan)
Secretary: Mr. Yasuto Tachikawa (Japan)

UNESCO Representatives: Mr. Shahbaz Khan (Jakarta Office)
Mr. Giuseppe Arduino (Headquarters)
Mr. Kazuaki Yoshida (Headquarters)
Ms. Ai Sugiura (Jakarta Office)
Ms. Eva Mia Siska (Jakarta Office)
Ms. Nina Marlana (Jakarta Office)
Ms. Vidyani Achmad (Jakarta Office)

Countries Represented: Australia, China, Indonesia, Japan, Malaysia, Mongolia,
Myanmar, Philippines, Republic of Korea, Thailand, Vietnam.
(See Annex A for the list of participants)

Observing Countries and
Organizations: Canada, Germany (GRDC), Pakistan, Asia Pacific Center for
Ecohydrology (APCE) and Humid Tropics Center Kuala Lumpur
(HTC KL)

1 WELCOME AND OPENING REMARKS BY LOCAL HOST AND UNESCO

The meeting was opened at 9:01am with opening remarks from RSC Secretariat (Mr. Shahbaz Khan) and introduction of the UNESCO representatives from Jakarta Office. Mr. Khan thanked the host country, Indonesia, and acknowledged the support from Indonesian Funds-In-Trust, Japan Funds-In-Trust, and Kyoto University. Category 2 centres, i.e. Asia Pacific Center for Ecohydrology (APCE) and Humid Tropics Center Kuala Lumpur (HTC KL) were also thanked for their participation at the meeting. Finally, Mr. Khan welcomed all participants.

The RSC Chairman (Mr. Kaoru Takara), RSC Secretary (Mr. Yasuto Tachikawa), and Governor of World Water Council (Mr. Soontak Lee) gave their welcome remarks.

The Indonesian IHP National Committee as the local hosts, represented by Mr. Hery Harjono, welcomed the participants and apologized for the absence of Mr. Iskandar Zulkarnaen as the chairman of Indonesian IHP National Committee. Mr. Harjono highlighted the message from Mr. Zulkarnaen that Indonesian IHP National Committee wished to contribute to IHP VIII. Mr. Harjono invited participants of the meeting to also enjoy and visit Yogyakarta as the capital of Javanese culture. Rounds of thanks for RSC Member to choose Yogyakarta for the venue of the meeting.

RSC Secretariat acknowledged the presence of UNESCO Representatives from Headquarters (IHP Secretariat) i.e. Mr. Giuseppe Arduino and Mr. Kazuaki Yoshida.

Mr. Kaoru Takara as the chairman of the meeting officially opened the 22nd session of RSC meeting. He further explained that the origins stem from a meeting in 1993 at which Mr. Yutaka Takahashi, Mr. Kuniyoshi Takeuchi and Mr. Soontak Lee were present. He gave an overview of the activities during the past days with the successful organization of the International Conference of Ecohydrology (ICE2014) on the 10th and 11th of November 2014 with more than 100 participants from more than 20 countries as well as the field trip on 12th. Furthermore, Mr. Takara reported that the APCE 1st Governing Board Meeting was held on 12th November 2014 to discuss future directions of ACPE.

Mr. Takara cordially welcomed all participants. He further emphasized the importance of 2014 as the 1st year of IHP VIII, thus this meeting has a particular importance particularly to establish regional cooperation in the region. He also mentioned that the year 2015 is also a very important year where the new SDGs will be developed and the 7th World Water Forum will be held in the Republic of Korea.

2 COMMEMORATION IN THE MEMORY OF MR. MOHD. NOR BIN MOHD. DESA AND MR. MIKE BONNELL

The chairman, Mr. Takara, invited tributes to be paid to Mr Mohd. Nor Bin Mohd. Desa and Mr Mike Bonnell who passed away during 2014.

Mr Daniell of Australia paid tribute to Mr. Mike Bonnell (see Annex B) for his contribution in particular to UNESCO, IHP and the SEA region.

The Malaysian delegate, represented by Mr. Mohd. Roseli Zainal Abidin, also commemorated the memory of Mr. Mohd Nor Bin Mohd. Desa for his achievement and contributions to IHP and IHP-RSC among many other contributions. (see Annex C)

The chairman called for a standing minute of silence in their memories.

3 OPENING COMMENTS ON BEHALF OF RSC AND INTRODUCTIONS

The chairman, Mr. Takara called for a self-introduction of all participants to the meeting including observers.

4 ELECTION OF RAPPORTEUR

RSC Secretariat suggested Ms. Ai Sugiura from UNESCO Office Jakarta to be a rapporteur and circulate draft minutes before lunch time on Friday 14th November 2014, which was agreed to by the meeting.

5 ADOPTION OF THE AGENDA

The draft agenda was presented by the chairman, Mr. Takara, and adopted by the members. The agenda was adopted with 2 amendments, i.e.:

- Group photo before coffee break around 10:30.
- Australia requested time for a small presentation (20min maximum) on Small Island Developing States in item 20 (Any Other Business)

The revised agenda was then adopted.

The adopted agenda was further modified during the meeting and re-adopted by moving the Agenda Item 14 “Proposal to Establish Regional Initiative such as Asia Pacific IFI, HELP and

Ecohydrology” to become Agenda Item 16 with title “Group discussion on 4 project areas”. The final adopted agenda can be viewed in Annex D.

6 SECRETARIAT REPORTS

The RSC Secretariat, Mr. Shahbaz Khan presented his report (See Annex E). He mentioned that it was for the 1st time that the crisis of regular program funding the office received support from the government of Indonesia, Japan and Malaysia.

The key activities of IHP in Asia and the Pacific Region since October 2013 were:

1. Organization of Conferences, Symposia, Training Courses, and Workshops:

- The 23rd IHP Training Course on “Ecohydrology under Climate Change” which was held during 2-13 December 2013 in Kyoto, Japan;
- MasterClass on “Network-enabled Collaboration on Water Related Disasters and Water Security” which was held on 23 January 2014 in Bandung, Indonesia;
- The “PERI-URBAN 2014” International Conference which was held during 8-10 July 2014 at Western Sydney University, Sydney, Australia;
- The “Sustainable Landscape Futures” International Conference with theme ‘Sustainable Landscape Futures: Solving complex problems through sustainability science’ took place during 10 - 11 July 2014, at the University of Canberra, Canberra, Australia,
- The 17th International River Symposium, which was held during 15-18 September 2014 in Canberra, Australia.

- Workshop on IWRM for Peace and Development in Davao City, Philippines on 22-23 October 2014.

2. Project implementations:

- Working with the Government of Medan City, Indonesia on “Securing Medan Water Futures 2030”
- One of the representatives from UNESCO Headquarters (IHP Secretariat), Mr Kazuaki Yoshida gave the latest updates on the flood project in Pakistan: “Project Strategic Strengthening of Flood Warning and Management Capacity of Pakistan”. The project was delivered and external evaluation was completed (July 2011- December 2014).
 - UNESCO in close collaboration with the Japan International Cooperation Agency (JICA) and in coordination with the Government of Pakistan implemented this project.
 - IHP National Committee of Pakistan, the International Centre for Water Hazard (ICHARM), Japan Aerospace Exploration Agency (JAXA), Pakistan Meteorological Department (PMD) and Pakistan Space and Upper Atmosphere Research Commission (SUPARCO) collaborated as project partners.
 - Currently Phase 2 of the project was proposed and should it gets approved, there will be a call for active participations from the region as it will include Afghanistan.
- Water portal (<http://water.jfit-for-science.asia/>) is now ready for use by UNESCO partners and will be linked with RSC webpage (<http://hywr.kuciv.kyoto-u.ac.jp/ihp/rsc/history.html>)

3. Ongoing and future events and projects:

- The series of events in that took place during 8-14 November 2014 in Yogyakarta, Indonesia are as follows:

- Training Course on Ecohydrology “A Tool for IWRM Implementation at the River Basin Level” during 8-9 November 2014;
- International Conference on Ecohydrology “Ecohydrology Approaches Facing The Global Water Environment Challenges” (ICE 2014) during 10-12 November 2014;
- The 22nd UNESCO IHP RSC for SEAP meeting during 13-14 November 2014 in which the representation of the region is improving.
- Forthcoming projects in the region and are now advertised on UNESCO JAK website (<http://www.unesco.org/new/en/jakarta>);
- The upcoming 24th IHP Training Course will take place from 23rd November to 7th December 2014 at Nagoya University, Japan. Five participants from the region will participate in the training course based on recommendation of the RSC;
- Malaysian Initiative ASEAN water footprint;
- The 7th World Water Forum (which will be further discussed in Agenda Item 11 and 12).

The RSC Secretariat requested one of the representatives from UNESCO HQ (IHP Secretariat), A report was given by Mr Arduino, IHP Secretariat:

- Ms Flavia Schlegel from Switzerland is the new ADG science since 1st October 2014.
- The Division of Water Science is being reorganized into 3 sections, namely:
 - Hydrological changes and water scarcity SC/HYD/HSS (IHP VIII themes 1, and part of 3)
 - Groundwater systems and settlements SC/HYD/GSS (IHP VIII themes 2-4)
 - Ecohydrology, water quality and water education SC/HYD/EQE (IHP VIII themes 5,6 and part of 3)
- On 13th and 14th of November 2014, an IHP Bureau meeting is organised in Merida, Mexico and attended by part of the IHP Secretariat (Paris) and all Bureau Members and concerning, among others the following agenda items:
 - Follow up on the evaluation of IHP VII
 - IHP 40th anniversary, 2015
 - The report of this meeting will be shared with all IHP National Committees

It was suggested that the secretariat should go through the follow up actions emanating from the 21st RSC meeting by members of the committee.

The RSC Secretariat went through five actions that were proposed during the last RSC meeting and how they were addressed during this year (See Annex 1 of Adopted Agenda- Annex D)

- 1) Water Education using hydrological analysis tools which will be addressed in Agenda Items 13;
- 2) Mapping of projects on to themes of IHP VIII and place it on the web (Annex 2 of Adopted Agenda – Annex D): the participants will review the table available on <http://hywr.kuciv.kyoto-u.ac.jp/ihp/rsc/ihp8/IHP8mapRSC.html> and give updates to RSC Secretary, Mr. Tachikawa and RSC Secretariat, Mr. Khan;
- 3) MasterClass for Hydrological Analysis Education: if any other members want to propose a Masterclass, then they are welcome to and Mr. Jayawardena proposed a MasterClass. There is a need for more regular meetings and updates;
- 4) For the World Water Forum contribution of RSC will be covered by Agenda Item 11 and 12 (See Annex 3 of Adopted Agenda – Annex D) and any updates are to be given to RSC Secretary, Mr. Tachikawa and RSC Secretariat, Mr. Khan;
- 5) Water related SDG: the table of how they stand now was distributed and suggestions from this committee were welcomed (See Annex 2 of Adopted Agenda – Annex D).

Coffee break and then a photo session took place before the meeting started again.

7 COUNTRY REPORTS

The Australian delegate, Mr. Daniell, asked if IHP VII evaluation could be included as part of the Agenda for the RSC meeting and the chairman replied that country report can include self-evaluation of IHP VII.

Each country had 4 minutes to report their activities since last RSC meeting in October 2013.

Country	Reports main points (Full country reports are available in Annex F)
Australia (Mr. Trevor Daniell)	<p>His presentation covered the following points:</p> <ul style="list-style-type: none"> - The lack of support by the Australian Government for Water and Climate Change activities; - Status of IHP-VII activities; - Activities in the framework of IHP; - The major announcements from the Bureau of Meteorology in Water Week: <ul style="list-style-type: none"> o The <u>Australian Groundwater Explorer</u>; o 3D hydrostratigraphy model has been developed for the Murray Basin; o Water Data Online; o Australian Hydrological Geospatial Framework (Geofabric). - The involvement of Australia IHP National Committee in the Pacific Islands through the Pacific Regional Program: Practical Climate Resilient Approaches for Food and Water Security and Coastal Zone Management (Information supplied by Ian White and Tony Falkland); - Updates on HELP; - WIRADA (Water Information Research and Development Alliance); - Educational and training courses; - Publications.
China (Ms. Yan Huang)	<p>Her presentation covered the following points:</p> <ul style="list-style-type: none"> - There are new appointment of committee members; - Emphasized on activities under “Education and Training Course” (See Chapter 1.3 of China Country Report) which included training for people from Latin America as contribution to IHP at global scale; - The International Hydrological Prize awarded to Prof. Xia Jun <ul style="list-style-type: none"> o (1st ACTION POINT) RSC Chairman will send congratulations on behalf of this committee - Project reservoir delivered; - China is working in Pakistan with WAPDA (building dams) and the project was officially started; - China delegate asked the status of on World Large River Initiative → recommendation experts from national committee to participate <p>Responses from the delegates are as follows:</p> <ul style="list-style-type: none"> o Mr. Soontak Lee stated that it has finally been approved last IHP (June 2014); o RSC secretariat advised China should write to Mr. Siegfried Demuth for clarification; o Chairman stated that in Resolution 5 (IHP-IGC June 2014) a working group will be formed as part of this resolution for this initiative and should be confirmed with Mr. Siegfried Demuth.
Indonesia Mr. Hery Harjono	<p>His presentation covered the following points:</p> <ul style="list-style-type: none"> - New IHP structure for Indonesia national committee with 5 working groups for each theme of IHP VIII; - The organisation of 2016 Bali World Lake Conference; - Annex 2 in Annex D for Indonesia projects - Contribution to Free Flow;
Japan	His presentation covered the following points:

Mr. Yasuto Tachikawa	<ul style="list-style-type: none"> - Changes in the IHP Japanese IHP National Committee members; - Examples of projects/programmes funded by MEXT with contribution to specific IHP Focal Areas; - Participation to IHP Steering Committees/Working Groups; - Participation to international meetings; - Domestic IHP meetings; - Announcement of the new appointment of ICHARM Director, Prof. Toshio Koike on 1st of October 2014.
Malaysia (was given at 13:38 after the lunch break with Mr. Hanapi Mohamad Noor arrival)	<p>His presentation covered the following points:</p> <ul style="list-style-type: none"> - Standing committees for the implementation of UNESCO-IHP Malaysia activities; - Participations in meetings; - Committee on Education, Training and Public Information: <ul style="list-style-type: none"> o National Water Watch for Young Leaders Programme; o March 2014 National World Water Celebration in Putrajaya; o June 2014 Malaysia Water Resource Forum; - Committee on Research; - Committee on Standardization of Hydrological Practices; - Future activities for 2015 and long term.
Mongolia Mr. Gantulga Bat-ochir	<p>First participation to RSC and presentation will focus on policy planning, policy implementation and water policy.</p> <p>His presentation covered the following points:</p> <ul style="list-style-type: none"> - Institutional settings of Mongolian National Committee for IHP; - General information of Mongolia: <ul style="list-style-type: none"> o water resources, legal structure, challenges faced: high demand of water for development purposed but uneven distribution of water. - projects contributing to IHP VIII (Available in Annex 2 of Mongolia Country Report)
Myanmar Mr. Than Zaw	<p>His presentation covered the following points:</p> <ul style="list-style-type: none"> - Meeting of the IHP National Committee; - Activities at National Level in the framework of the IHP; - Educational and Training Courses; - Participation in International Scientific Meeting; - Activities foreseen for 2014-2015.
New Zealand Mr. Dennis Jamieson	<p>His presentation covered the following points:</p> <ul style="list-style-type: none"> - New Zealand government would like to get more involved in IHP activities ; - IWRM and Ecohydrology concepts are already applied at very large scale and there is an opportunity to retrofit New Zealand experiences for the benefit of all; - New Zealand underlined the importance to connect river basins management reconnected to economical activities; - A Video showing the scale of implementation of IWRM project in New Zealand was presented to demonstrate IWRM is not at demonstration scale anymore but fully implemented.
Papua New Guinea Mr. Joseph Jure	<p>It was the first participation of Mr. Jure who was welcomed by the Chair. Activities between 2011-2014 were then presented as Papua New Guinea did not participate to RSC for the last 2years.</p> <p>His presentation covered the following points:</p> <ul style="list-style-type: none"> - Activities Organized by the National Committee; - Other Hydrological & Water Related Activities Conducted by Individual Water Agencies; - Participation in Regional Programs.
Philippines Mr. Leonardo Liongson	<p>His presentation covered the following points:</p> <ul style="list-style-type: none"> - Changes in the composition of the Philippines IHP National Committee; - National/local scientific and technical meetings; - Participation in IHP Steering Committees/Working Groups; - Research/applied projects supported or sponsored;

	- Other initiatives from different departments in the Philippines.
Republic of Korea Mr. Soontak Lee	His presentation covered the following points: <ul style="list-style-type: none"> - Activities of Korean IHP National Committee were submitted to the IGC (See Annex E) and the presentation will cover activities since last IHP-IGC last June 2014 - Work is ongoing on IHP VII and the implementation of IHP VIII is started. - Several big meetings took place: <ul style="list-style-type: none"> o The 2nd consultation meeting was held in February 2014; o Na-Ri water week for 2015 as part of the 7th World Water Forum preparation; o A workshop on AP-HELP; o Mainly the activities are related to the preparations of the 7th World Water Forum.
Thailand Ms Wandee Pattanasatianpong	Her presentation included the following points: <ul style="list-style-type: none"> - Meeting of the IHP National Committee; - Activities at national level in the framework of the IHP; - Educational and training courses; - Participation in international scientific meeting; - Other activities at regional level; - Future Activities; <ul style="list-style-type: none"> o Activities planned until December 2015; o Activities foreseen for 2015-2016; o Activities envisaged in the long term.
Vietnam Mr. Tran Thuc	His presentation included the following points: <ul style="list-style-type: none"> - Meeting of the IHP National Committee; - Activities at national level in the framework of the IHP; - Publications; - Participation in international scientific meetings.
Pakistan (observer) Mr. Hamza Farooq Gabriel	His presentation included the following points: There were two UNESCO supported projects in Pakistan between October 2013 and November 2014 <ul style="list-style-type: none"> o Application of FILTER technology for Wastewater Treatment (a zero waster, zero energy project) o International Training workshop for community workers (community based flood management) with material produced in 3 languages (English, Urdu and Hindi)

A discussion session on the country reports was then initiated.

(2nd ACTION POINT) The RSC Secretariat, Mr. Shahbaz Khan, suggested initiating a platform on which updates on projects are available and exchanges on major events among RSC members would be possible in particular between RSC meetings. This platform can be hosted on UNESCO JAK website (with coordination with RSC Secretary, Mr. Tachikawa).

The IHP Secretariat, Mr. Giuseppe Arduino, reported on the expansion of Ecohydrology in Africa which was marked by the approval of African Ecohydrology Center in the last ICG. Thus, south-south collaboration would be very helpful as well as on IWRM implementation it could happen with the platform that is being developed in order to link regions.

The delegate from Republic of Korea, Mr. Soontak Lee proposed to look back on the achievements of the region. He further mentioned that Catalogue of Rivers and AP-FRIEND used to be the opportunities of collaboration and used to be more active but now they are almost inactive therefore there is a need to create some motivation for collaboration again inside the region.

The Mongolian delegate, Mr. Gantulga Bat-ochir, stated that the IHP looks like a hydrologists club and should be open to other specialists and professionals (hydrogeologist, more industries, urban planner, coastal specialists). Chairman welcomed the proposal to organize some new events with more interdisciplinary views outside of IHP.

The Australian delegate, Mr. Trevor Daniell, stated that the IHP VIII mapping of activities is supposed to generate opportunities/activities inside the region with collaborative work between countries. There needs to be a revitalisation of leadership for each of the IHP VIII themes.

The New Zealand delegate, Mr. Dennis Jamieson, stated that the AP-FRIEND outputs were very significant in New Zealand for formulation of policies. Here is an opportunity with IHP VIII and he agreed to the Mongolian suggestions that we need to show more how our outputs can contribute to policies (such as including proper business aspects).

The Philippines delegate, Mr. Leonardo Liongson, agreed with Australian delegate on the AP-FRIEND outputs volumes and trainings. The IHP VIII themes should be a good occasion to reinvent AP-FRIEND mission like building up on disasters impacts like the disaster when Typhoon Haiyan hit including ecosystems changes/destructions point of view.

The Australian delegate, Mr. Trevor Daniell, stated that there were users of the reports developed under this RSC and under AP-FRIEND, operating in the fields of mining and meteorology. The Australian report includes hyperlinks to the groundwater and data on line websites which are available for global consultation. Mr. Daniell suggested that workshop sessions for mapping against IHP VIII themes should be undertaken.

Provide hyperlinks of national reports to be available on RSC platform

Chinese delegate, Mr. Yan Huang, stressed the need for projects to be linked together within the region by building on the IHP VIII projects contribution mapping such as funds “sharing” and collaboration which would lead to more implementations.

(3rd ACTION POINT) RSC Secretariat, Mr. Khan, suggested reserving 1 hour after agenda item 12 to have a brainstorming session on IHP VIII or initiatives and to come up with proposals skeletons. Real commitments will be then asked in day 2 morning during the group discussion on the following four projects areas:

- IWRM, AP FRIEND, AP Ecohydrology
- Water disasters
- Water Security
- Water Education

8 UPDATES FROM THE CENTERS (EXISTING AND PROPOSED) UNDER THE AUSPICES OF UNESCO IN THE ASIA PACIFIC REGION PRESENT AT THE MEETING

Narrative reports were received from HTC KL and ICHARM (included in Japan report).

Centres present during the meeting.

Centres	Announcement
1) I-WSSM	Mr. Soontak Lee reported the new Korean centre was approved during the last IGC and the signature of the agreement between Korean government and UNESCO will be held at the 7 th WWF.
2) HTC KL	Mr. Mohamed Roseli Zainal Abidin presented the updates on activities of HTC (Annex G)

3) APCE	Mr. Ignasius Sutapa presented the updates on activities of APCE (Annex G) The chairman emphasized on the outcomes of APCE Governing Board Meeting and stressed out the fact that APCE should be a regional center and activities need to become regional and not only for Indonesia.
4) Australia	<ul style="list-style-type: none"> • Mr. Trevor Daniell reported the Australian proposition to establish a new category 2 centre at University of New South Wales, the provisional name being International Centre for Water Management in Regions with Highly Variable Climates. • The RSC Secretariat, Mr. Shahbaz Khan and IHP Secretariat, Mr. Giuseppe Arduino are supportive of the proposal, however they emphasized on the necessity to go through UNESCO formal process with is long and constrained by UNESCO’s Executive Board and General Conference calendar. Therefore the earliest timeframe for establishment such center would be in 2017 within the next UNESCO’s General Conference. • RSC Secretariat, Mr. Shahbaz Kham, and Mr. Soontak Lee also urged the necessity for the proposed centre to have a specific area of contribution and avoid overlapping with the existing 33 established centres. • Mr Daniell stated he will take these comments back to the relevant people in Australia
5) RCUWM-Tehran	Through the RSC Secretariat, the new director Dr Ali Chavoshian would like to express his will to reestablish connection between RCUWM with RSC SEAP. (4th ACTION POINT) Chairman will make sure next time RCUWM-Tehran will be invited.

9 REPORT FROM ASIAN PACIFIC FRIEND INCLUDING 7TH GLOBAL FRIEND CONFERENCE AND THE FIGCC IN OCTOBER 2014, MONTPELLIER, FRANCE

The Australian delegate, Mr. Trevor Daniell presented the main outputs of the meeting in Montpellier entitled Hydrology in a Changing World: Environmental and Human Dimensions. He commended that there was very good participation from the region with over 140 participants. The final output is the publication of the ‘Redbook’ with Mr. Daniell being the chief editor. The publication was generously supported by UNESCO Office Jakarta.

Members of FIGCC discussed the future direction of all programs stating that there needed to be a coordinated activity to map them against IHP VIII. It was thought that AP-FRIEND needs to be revitalized. Hindu-Kush FRIEND will be terminated but could be included into AP FRIEND.

The Rep. of Korean delegate, Mr. Soontak Lee stated that now HELP and FRIEND are not the main cross-cutting programs anymore. There is a need to consult with all IHP associated programs and not only on HELP and FRIEND.

Mr. Mohammed Roseli pointed out the need to carry on with AP-FRIEND and the need for a new focus, so suggested a new focus on Lake Ecosystem.

10 REPORT FROM THE 21ST IHP INTERGOVERNMENTAL COUNCIL, JUNE 2014

Mr. Soontak Lee was a bureau member until last June and expressed appreciation for full support of this committee during his involvement as the chair and vice-chair of IHP IGC. He further mentioned that the main achievement is IHP VIII is the backbone building with the theme of water security. He stated that IHP tried to keep HELP/FRIEND as crosscutting programs in IHP VIII but it was not possible.

Mr. Takara thanked for Mr. Lee for his strong leadership as the chair and vice-chair of IHP IGC and also the achievement in shifting from water scarcity to water security as main theme for IHP VIII.

It was reported that Mr Ian White from Australia is the Vice Chair from this region for the next two years. Mr Lee was thanked by Australia for his outstanding leadership for the region over the past 4 years on the IGC. Ms Yan Huang was elected Chairperson of Communication and Outreach committee at the IGC.

(5th ACTION POINT) As contribution to the celebration of the 40th anniversary of IHP/50th anniversary for Water Science Programme visibility activity is needed and Ms. Yan Huang encouraged all IHP national committee in AP region to contribute to the work of communication and outreach of IHP by sharing:

- Ideas on how to increase public recognition, strengthen the engagement of IHP and other stakeholders through collaborative communication and how to enhance the outreach of IHP's messages and their relevance to actual and mounting global challenges;
- Examples of communication and outreach regarding increasing public recognition of IHP through means such as social media, website, documentation/reports, etc.;
- Other ideas and examples/materials, etc. are welcomed and to please send it to Ms. Yan HUANG (yhuang@cjwsjy.com.cn) before 10 December 2014.

The IHP Secretariat, Mr. Giuseppe Arduino, reported about the finance committee outcomes. A table is available at the end of the report from the council. Nineteen questions were received and the committee would like to see the programs implementation, project activities that were undertaken to implement the themes of IHP, what was allocated as extra- budgetary for each theme. The 1st draft will be submitted at next bureau meeting. The council wants to see how the resources are allocated in terms of resources and funds and those without any resources and funds might then be then terminated.

The chairman stated the IGC final report is now available online.

Ms. Yan Huang reported on the Communication and Outreach Committee. Each member could contribute for example by submitting design of the logo. The strategic document will be shared shortly to the RSC.

Mr. Kaoru Takara proposed that the RSC SEAP can celebrate the 40th IHP anniversary next year. The RSC Secretariat, Mr. Shahbaz Khan, proposed to discuss this matter on agenda item 17 with Myanmar representative to link the organization of the 23rd RSC with with the anniversary.

11 REPORT ON PREPARATION OF THE 7TH WORLD WATER FORUM AND NAKDONG RIVER INTERNATIONAL WATER WEEK 2014/INTERNATIONAL WATER FORUM (NA-RI IWW/IWF 2014)

Mr. Soontak Lee gave a presentation with the following main points (See Annex H).

- The Nakdong International Water Week and International Water Forum were successfully conducted as the preparation meetings of the 7th WWF.
- There was an increasing participation of the World Water Forum and currently the world is organizing the 7th Forum. There were criticisms that there are STILL are a lot of water problems in the world. The role of the previous WWFs was questioned. Therefore the main theme of the following WWF is “Water for Our Future” which will implement the solutions from the 6th WWF;
- At Gyeongbuk, the Political Process and Citizen Forum will take place;
- At Daegu , the Region and Science and Technology Process will be held;
- There will be 16th themes in total and proposals were received for each theme;
- The contribution to SDGs would be through a joint special session;
- Details on each processes were given as follows:
 - o The Political Process is including local and regional authorities processes;
 - o At Istanbul WWF, the theme was charming cities but at Daegu it will be sustainable cities;
 - o The Regional Processes used to be by continent but there is a need for sub-regions so there will be division into 4 regions (Asia-Pacific, Africa, America and Europe) and 3 cross-region (Arab, Economically Water Insecure and Mediterranean region).
 - o All the sessions (more than 200) are already proposed and notification of acceptance will be given by then end of November 2014.
 - o However, the call for side event is still open until the end of November 2014 (See Annex 3 of the Adopted Agenda – Annex D).

- Malaysian delegate, Mr. Hanapi Mohd Noor stated that during the 6th WWF there was difficulties in finding hotels availability therefore delegations are staying far from the venue.
- Mr. Soontak Lee responded that the same problem is foreseen to be faced in Republic of Korea but he can facilitate early hotel bookings.
- Malaysian delegate, Mr. Hanapi Mohd Noor. stated they will send 100 participants to all 16 themes and will organize a post-forum meeting to disseminate information obtained in the forum to other Malaysians.

12 DISCUSSION ON RSC INPUT TO THE 7TH WWF IN KOREA 2015 INCLUDING POSSIBLE SIDE EVENT

Mr. Yasuto Tachikawa presented the current status of the RSC proposals submitted on the 16th of October 2014 (See the Annex 3 of Adopted Agenda - Annex D) entitled “Scientific and educational collaborations in Asia and Pacific regions for robust and resilient water policy and management -- UNESCO-IHP RSC-SEAP activities and beyond for the coming decade of SDGs --“within Main Focus 3: Water and Natural Disasters.

Comments for revision by changing the focus of the proposal from education to implementation were sent to Mr. Tachikawa and a revised proposal has to be submitted by 15th November 2014. Therefore, commitments from RSC members for participation to the session should be submitted to Mr. Tachikawa by Friday, 14th November noon.

The RSC Secretariat reported there will be an APWF contribution to WWF meeting on the 19th of November 2014 in Seoul, Republic of Korea with current contribution of by RSC to :

- o IWRM with NARBO
- o Urban water
- o Food security with FAO

The RSC Secretariat, Mr. Shahbaz Khan, also proposed a session on Main Focus 5: Understanding and Managing Ecosystem Services for Water entitled “Role of Science, Technology and Innovation for cost effective water ecosystem services”. (See Annex 3 of the Adopted Agenda- Annex D)

Furthermore, the Mr. Khan mentioned the possibility to organise also a SIDE EVENT for which the deadline for proposal submission is the 30th of November 2014. (See Annex 3 of the Adopted Agenda – Annex D)

13 POST- CATALOGUE OF RIVERS INITIATIVE

Mr. Hidetaka Chikamori and Mr. Kenichiro Kobayashi presented a “Proposal of Catalogue for Hydrologic Analysis” which output would be a reference book with target practitioners and university students. He presented the example of table of contents with 5 themes of IHP VIII and example of format including map of study area, data, dataset and calculation. (See Annex I for detailed presentation)

Vietnamese delegate, Mr. Tran Thuc, supported the proposal and recommended to account for the history of the data records from the catalogue and carrying on updating it.

The chairman, Mr. Kaoru Takara, suggested updating the data of the previous Catalogue of Rivers and including them in the new initiative.

Australian delegate, Mr. Trevor Daniell, also proposed that the Australian Rainfall-Runoff project of 9 books (already available) can assist in some examples.

The Rep. of Korea delegate, Mr. Soontak Lee, stated that the proposal is a very good idea and should be implemented through a consultative process by sending the format template to all members a.s.a.p.. All delegates are requested to send back comments by the end of November. Mr. Chikamori and Mr. Kobayashi should incorporate these comments into the format and if a draft is ready on time, it would be very good to have it presented at the RSC session in the 7th WWF.

The RSC Secretariat, Mr. Shahbaz Khan, asked about the timeline and what was already ready. He further proposed the use of CONNECT-Asia with some regular courses on this initiative should also be considered.

Mr. Chikamori stated that the timeline depends on the way this initiative can be supported, the format can be circulated and comments taken in account.

The RSC Secretariat, Mr. Shahbaz Khan, asked if there was a need for funding. If yes, then there is a need to work together to put a proposal through MEXT and first draft should be produced within the next 6 month.

Mr. Chikamori stated the needs of funds depends on what will be produced. If it is, 200-300 printed books with CD of the program and publishing e-book through website then funds are necessary. Mr. Chikamori will send an assessment of how much is necessary.

Mr. Soontak Lee urged that if the members agreed to launch this during the 7th WWF then it should be addressed in very URGENT manner. Proposed to launch a demo version as the first draft in 7th WWF.

(6th ACTION POINT) Proposal/concept note to be send to RSC Secretariat a.s.a.p.

14 PROPOSAL TO ESTABLISH REGIONAL INITIATIVE SUCH AS ASIA PACIFIC IFI, HELP, ECOHYDROLOGY

This point was discussed into groups and reported in Agenda Item 16

15 SERVICES OF THE GLOBAL RUNOFF DATA CENTRE

Mr. Ulrich Looser made a presentation on the services of Global Runoff Data Centre (GRDC) that operates for more than 25 years under the auspices of the WMO. (Details of presentation is available in Annex J)

The river discharge database is for free use in science, research and teaching but with a strict data use policy. Indeed, the use of data is constrained and data can be received only after submitting a signed declaration (the data may not be used for commercial purposes).

Comments received were:

- GRDC has river discharge data for all of the represented countries. Some of the data is outdated. Recently an update has been received from Indonesia;
- Mr. Soontak Lee stated that previously RSC SEAP had Water Archive with nodes at Yamanashi University and Melbourne University as databases but failed to keep them updated, therefore should be reactivated through collaboration with GRDC.
- Mr. Kaoru Takara stated there should be a link between FRIEND, Catalogue for Rivers and the new proposal from Mr. Chikamori and Mr. Kobayashi.

16 GROUP DISCUSSION ON 4 PROJECT AREAS (AGENDA ITEM ADDED DURING DAY 1)

All members were divided into 4 groups with the following discussion theme in order to facilitate collaboration for IHP VIII projects in the region:

- 1) Water Security (surface and groundwater) chaired by Mr. Giuseppe Arduino
- 2) Water Related Disaster chaired by Ms. Ai Sugiura
- 3) IWRM chaired by Mr. Kazuaki Yoshida
- 4) Water Education chaired by Ms. Eva Mia Siska.

The chairman closed day 1 at 17:53.

Day 2

The session was opened at 9:04am by the chairman, Mr. Kaoru Takara.

Mr. Takara started the session by commenting on Day 1 activities in which reports were delivered from RSC Secretariat and IHP Secretariat, country reports, category 2 centres reports and group discussions on project collaborations which should be implemented in the near future.

Mr. Yasuto TACHIKAWA and Mr. Tariq Rana gave the summary of the 4 group discussions in project areas:

- 1) Water Security group outcomes (Surface and groundwater) with 2 proposals
- 2) IWRM group outcomes with 1 proposal
- 3) Water related disasters group outcomes (6 proposals)
- 4) Water Education group outcomes (5 proposals)

(Details are available in Annex K)

RSC Secretariat, Mr. Shahbaz Khan, stated the fact there is a need for funding now and it is necessary to develop proposals together. He further requested all participants to register their interests for each project with updated email addresses as well as a commitment for leadership on the specific project proposals before leaving the meeting.

Mr. Ulrich Looser from GRDC stated that WMO is developing projects with very similar interests and should be contacted.

Ms. Yan Huang requested to set up working groups and working with deadlines for proposal submission. The RSC Secretariat, Mr. Shahbaz Khan, requested members to set leaders for projects who will lead the working groups.

All members agreed on the proposal to form project areas of working groups and submit proposal by the end of January 2015.

17 ORGANIZATION OF THE 23RD RSC MEETING IN MYANMAR AND ASSOCIATED CONFERENCE

Myanmar delegates, Mr. Than Zaw, presented the proposal for the organization of the next 23rd RSC meeting with an International Conference on Integrated Management of Droughts and Floods for Water Security in Mandalay, Myanmar and time proposed is 19-23rd October 2015. (Details of the proposal are attached in Annex L).

Malaysian delegate, Mr. Hanapi Mohd, Noor, commented on transportation facilities which are quite low in Mandalay.

Chinese delegate, Ms. Yan Huang, raised concern about the necessity of to transfer from Yangon.

The RSC Secretariat, Mr. Shahbaz Khan, raised concern about the cost of hotel in Mandalay therefore may be Yangon could be also an option. Moreover, for the conference, the cost of hotel might be even more of an issue.

The chairman emphasized that it is important to attract more people as the 40th year anniversary event will also take place.

The chairman thanked Myanmar for organizing the next meeting and (**7th ACTION POINT**) requested confirmation to be sent to the RSC Secretariat about the location of the meeting and conference as two options could be considered: Mandalay or Yangon.

18 40YEARS OF IHP (1975-2015) PROPOSAL

- RSC Secretariat, Mr. Shahbaz Khan, proposed to organize a special side event at 7th World Water Forum to celebrate the anniversary and give RSC medals for the top five contributors to the meetings to be invited during the side event (**8th ACTION POINT**);
- In UNESCO HQ there will be events and probably a booth will be available at the 7th World Water Forum;
- Indonesian delegate, Mr. Hery Harjono, proposed each country to organize celebration in their own countries and therefore disseminate IHP more widely in their countries;
- The chairman and RSC secretariat proposed that:
 - o Each national committee summarized their key achievements (maximum two pages) during the past 40 years (RSC Secretariat will also summarize their activities in the past 36 years);

- Key contributors of their committees (to be acknowledged at the event in the 7th WWF in Rep. of Korea and in the 23rd RSC Meeting in Myanmar);
- IHP celebration to be held in each country.
- Mr. Bisher Imam from UNESCO HQ is compiling achievements for the 40th anniversary;
- Mr. Soontak Lee stated there will be some kind of event to celebrate the 40th anniversary however he mentioned that there is an issue due to tight schedule of UNESCO DG who will be available for half or one day in Republic of Korea.
- **(9th ACTION POINT)** Mr. Takara will edit the draft RSC achievements to be circulated by the end of January, the editorial board will be the previous chairmen and secretaries of RSC SEAP. Mr. Tachikawa will follow up the drafting for the IHP 40years. Table of content will be circulated by end of December.

19 ORGANIZATION OF THE 24TH RSC MEETING

No member volunteered for the organization of the 24th RSC meeting.

The RSC meeting organizer should be a member country which has only hosted the RSC meeting once, i.e. Australia, Cambodia, Mongolia, New Zealand, and Papua New Guinea. Philippines delegate, Mr. Leonardo Liongson proposed to be the host of 25th RSC meeting.

Mr. Soontak Lee proposed to contact Cambodia but as they are organizing MAB event in December 2014 it might be difficult for them.

(10th ACTION POINT) RSC Secretariat to look for host for the 25th RSC Meeting.

20 ELECTION OF RSC SECRETARY

Mr. Tachikawa was reelected as RSC Secretary for another 2 years with full support from all members.

21 ANY OTHER ISSUES

- Mr. Trevor Daniell gave a presentation on Pacific Island Developing States and stated that these states are part of the RSC and need further collaboration with other RSC member countries (Annex M).
- Comments from New Zealand delegate, Mr. Dennis Jamieson, there is a need to make sure collaboration with other initiatives, as there is a lack of governance.

22 ADOPTION OF RESOLUTIONS

No resolution was received.

21 CLOSURE OF THE MEETING

22nd RSC meeting action points were presented and agreed as follow:

	Action	Responsible person	Deadline
1	RSC Chairman will send congratulations to Prof. Xia Jun for the International Hydrological Prize on behalf of this committee	Chairman	asap
2	To initiate the use of platform on which updates on projects and exchanges about major events among members would be possible between RSC meetings.	RSC Secretariat and Secretary	to be confirmed by RSC

	This platform can be hosted on UNESCO JAK website (with coordination with Mr. Tachikawa)		Secretariat
3	Form working group with identified leaders for project areas and submit proposal by the end of January (register interest including name and emails to Secretariat)	Leaders of project areas	end of January 2015
4	Chairman will make sure Iran cat 2 centre to be invited to next RSC meeting.	Chairman and RSC Secretariat	For next RSC meeting
5	Encourage IHP national committee of Member States of AP region to contribute to the work of communication and outreach of IHP by sharing: <ul style="list-style-type: none"> o <i>ideas on how to increase public recognition, strengthen the engagement of IHP and other stakeholders through collaborative communication, and how to enhance the outreach of IHP's messages and their relevance to actual and mounting global challenges.</i> o examples of communication and outreach regarding increasing public recognition of IHP through means such as social media, website, documentation / reports etc. o Any ideas and examples / materials etc. are welcome and to please send to Ms. Yan HUANG (yhuang@cjwsjy.com.cn) before 10 December 2014. 	Ms. Yan Huang	10-Dec-14
6	Action on Proposal of Catalogue for Hydrologic Analysis: Mr. Chikamori and Mr. Kobayashi to circulate template format to all members and members to send back comments by the end of November. Proposal/concept note for contribution to be send to Secretariat a.s.a.p. to try to launch first draft at 7 th WWF	Mr. Chikamori and Mr. Kobayashi	end of November 2014
7	Myanmar has to confirm to secretariat whether the meeting will be in Yangon or Mandalay for 23 rd RSC meeting.	Mr. Than Zaw	asap
8	For 40 th anniversary, showcase RSC achievements as side event of 7 th WWF with the RSC medals to key contributors and each country to celebrate.	All members	30-Nov-14
9	Mr. Takara will edit the draft RSC achievements to be circulated by the end of January, the editorial board will be the previous RSC chairmen and secretaries. Mr. Tachikawa will follow up the drafting for the IHP 40 years. Table of content will be circulated by end of December 2014.	Chairman	end of January 2015
10	Volunteer country to be found for 24 th RSC meeting organization.	RSC Secretariat	asap

The 22nd RSC meeting was closed by the chairman at 10:30 after reviewing action points.

**ANNEX A PARTICIPANTS, 22ND MEETING OF
THE IHP REGIONAL STEERING COMMITTEE
FOR SOUTHEAST ASIA AND THE PACIFIC**

LIST OF PARTICIPANTS

**THE 22ND IHP Regional Steering Committee for Southeast Asia and Meeting
13 -14 November 2014, Yogyakarta, Indonesia**

No.	Mr/Ms	Name	Country/Institution
1	Mr	Tariq Rana	Australia
2	Mr	Trevor Maurice Daniell	Australia
3	Ms	ShanShan Xiong	China
4	Ms	Xiao Yuan Zhu	China
5	Mr	Xin Zhao	China
6	Ms	Yan Huang	China
7	Mr	Ulrich Looser	Germany
8	Mr	Arief Rachman	Indonesia
9	Mr	Iskandar Zulkarnain	Indonesia
10	Ms	Nur Triaries Suistingtyas	Indonesia
11	Mr	Tri Widiyanto	Indonesia
12	Ms	Mina Madani	Iran
13	Mr	Akira Kawamura	Japan
14	Mr	Kaoru Takara	Japan
15	Mr	Kenichiro Kobayashi	Japan
16	Ms	Shi Yongxue	Japan
17	Ms	Sono Inoue	Japan
18	Mr	Yasuto Tachikawa	Japan
19	Mr	Akashah Bin Majizat	Malaysia
20	Mr	Dato' Hanapi Mohammad Noor	Malaysia

21	Mr	Elfithri Rahmah	Malaysia
22	Ms	Normaliza Noordin	Malaysia
24	Mr	Gantulga Bat-ochir	Mongolia
25	Mr	Than Zaw	Myanmar
26	Mr	Dennis Jamieson	New Zealand
27	Mr	Hamza Farooq Gabriel	Pakistan
28	Mr	Joseph Jure	Papua New Guinea
29	Mr	Ricardo Leonardo Quesada Liongson	Philippines
30	Mr	Joong Hon Kim	Rep. of. Korea
31	Mr	Seungho Lee	Rep. of. Korea
32	Mr	Soontak Lee	Rep. of. Korea
33	Mr	Adisorn Champathong	Thailand
34	Mr	Inkeaw Surapun	Thailand
35	Mr	Jaray Thongduang	Thailand
36	Mr	Ratikarn Paptib	Thailand
37	Ms	Wandee Pattanasatianpong	Thailand
38	Ms	Yoowong Kanokwan	Thailand
39	Mr	Tran Thuc	Vietnam
40	Mr	Giuseppe Arduino	UNESCO HQ Paris
41	Mr	Kazuaki Yoshida	UNESCO HQ Paris
42	Mr	Shahbaz Khan	UNESCO Jakarta
43	Ms	Achmad Vidyani	UNESCO Jakarta
44	Ms	Ai Sugiura	UNESCO Jakarta

45	Ms	Eva Mia Siska	UNESCO Jakarta
46	Ms	Nina Marlana	UNESCO Jakarta
47	Mr	Hery Harjono	UNESCO Cat.2 Center: APCE
48	Mr	Ignasius Dwi Atmana Sutapa	UNESCO Cat.2 Center: APCE
49	Mr	Mohammad Roseli Zainal Abidin	UNESCO Cat.2 Center: HTC
50	Ms	Ski Yongxne	Kyoto University
51	Mr	Hidetaka Chikamori	Okayama University
52	Ms	Nur Tri Aries	LIPI
53	Mr	Van Thanh Van Nguyen	Mc Gill University Canada

ANNEX B
COMMERATION IN THE MEMORY OF
PROF MICHAEL (MIKE) BONELL

Professor Michael (Mike) Bonell
(1943-2014)

In Memoriam, Professor Michael (Mike) Bonell (1943-2014)



- The hydro-meteorological community around the world lost a greatly valued and influential colleague with the untimely death of Professor Mike Bonell in Paris on 11 July 2014.

- Mike was Professor of Catchment Science in the UNESCO Centre for Water Law, Water Policy and Science, University of Dundee in Scotland and an Honorary Professor at the Lancaster Environment Centre, Lancaster University (UK). From 1992 to 2006 Mike was a key member of UNESCO's Division of Water Sciences where he initially had responsibility for the "impacts of climate variability and change on hydrology and water resources" and the Humid Tropics Programme. He later rose to become the Division's inaugural Chief of Section: Hydrological Processes and Climate.
- While in UNESCO, Mike undertook the global coordination of two major cross-cutting IHP initiatives: Flow Regimes from International Experimental and Network Data (FRIEND); and Hydrology for the Environment, Life and Policy (HELP).



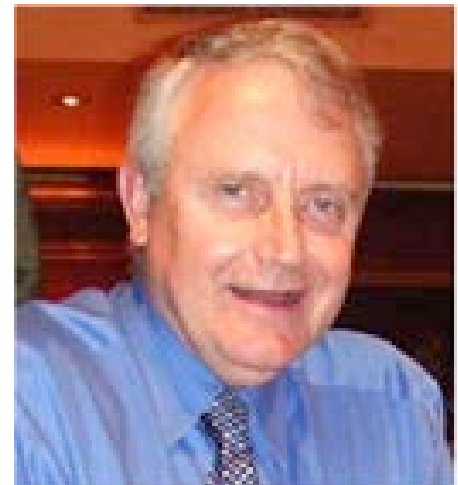
- Mike's many strengths were obvious in his research on tropical rainforest hydrology, which he pursued so enthusiastically with students and colleagues. Fieldwork in tropical hydrology is extremely difficult and very demanding. It takes great strength of character to continue to persist when you are soaked to the skin, mud to your armpits, threatened by crocodiles, pestered by mosquitoes and your instruments have either been washed away or refused to record the event you've been waiting for. Far easier to sit in front of a computer screen and model what happens. Mike passionately believed that it was only through careful field observation and a solid grounding in theory that we can understand what processes are important and which ones must be managed with care.



- Mike recognised that no matter how good the science was, if it did not result in improved conditions for humankind it was wasted effort. He saw that much excellent hydrology did not result in changed attitudes or improved public water resources policy. Mike set out with typical energy, drive and determination to initiate UNESCO's other crosscutting initiative, HELP, involving collaboration with the World Meteorological Organisation. HELP addresses the key water resources management issues and integrates them with policy and management in order to deliver social, economic and environmental benefits to communities across the globe. There are now over 91 HELP Basins in 67 countries across the world, an amazing platform for the international sharing of water knowledge and expertise and testament to Mike's and his IHP colleagues' vision, commitment, energy and dedication.



- He has left us with many cherished memories of earnest scientific debates interspersed with his marvellous anecdotes and infected with his wonderful sense of humour and his warm humanity. His legacy lives on in the international initiatives he started and supported, in his published work, in his students and in us, his very grateful colleagues.



**ANNEX C COMMEMORATION IN THE
MEMORY OF
MR. MOHD. NOR BIN MOHD. DESA**

Commemoration in the memory of Dr. Mohd. Nor bin Mohd. Desa

UNESCO-IHP Southeast Asia and the Pacific, the Regional Steering Committee (RSC), Asia Pacific Flow Regimes from International Experimental and Network Data (AP FRIEND), Joint Committee on Urban Drainage (JCUD), International Water Association (IWA), the International Association for Hydro-Environment Engineering and Research (IAHR) loss a colleague and friend with the death of Dr. Mohd. Nor Desa. Dr. Mohd Nor passed away peacefully on 4th Mac 2014 (Tuesday) at his house in Kuala Lumpur. He was diagnosed with bacterial infection to his lung.

He has contributed significantly especially in the field of hydrology, urban drainage and water resources. He was involved in the set-up of The Regional Humid Tropics Hydrology and Water Resources Centre for Southeast Asia and The Pacific (HTCKL) and become its first Director for 10 years until early 2009. One of his earlier contributions was as editor for several volume of River Catalogue in AP FRIEND. In that catalogue he contributed five rivers from Malaysia. His main interest was in short duration rainfall pattern in the humid region. He contributed many studies and papers in this aspect.

Together with UNESCO Jakarta, he organized several conferences/seminars and workshops in and outside Malaysia.

Later in 2009 he joint Universiti Tenaga Nasional (UNITEN), Malaysia as a professor and lecturer in stormwater management for four (4) years until 2013. He heads one of the research centers in the university. He was also one of those who initiated the study, Urban Ecohydrology for Resilient Environment (UCOREN), Penchala River Malaysia. He heads the Working Group 1: Urban Hydrology. This study is on-going.

Within UNESCO-IHP and other international bodies, his contribution covers the following:

- Asia Pacific FRIENDS (AP FRIENDS)
- Flood Design and Warning System Assessment of Tropical Region (UNESCO)
- Water Sensitive Urban Design for Local Scale at HTCKL

- Disaster Reduction Hyperbase (NIED Japan)
- Collaborative research on Flood Resilience in Urban Areas (CORFU)
- Research & Development for Reducing Geo-Hazard Damage in Malaysia caused by Landslide & Flood (JICA/JST-UNITEN/MMU/USM collaborative projects)

One of his last contributions was to bring the 13th International Conference on Urban Drainage (ICUD2014) to be held in this part of the world, i.e. Asia-Pacific Region. Normally ICUD was held in Europe. The 12th ICUD was held in Brazil. He was the Co-Chairman for the 13th ICUD.

The 13th ICUD was held in Borneo Convention Centre Kuching (BCKK) , Sarawak, Malaysia, on September 7-12, 2014. He was not able to see the success of this conference that he has initiated with many others. The conference was organized by the Ministry of Natural Resources and Environment (NRE) , Department of Irrigation and Drainage (DID) Malaysia, Joint Specialist Group On Urban Drainage, International Water Association (IWA), The International Association for Hydro-Environment Engineering and Research (IAHR) and co-organized by Universiti Tenaga Nasional (UNITEN) and Universiti Malaysia Sarawak (UNIMAS). 440 participants attended the conference, 220 (47.73%) from the developing world. The number of students who attended the conference reached 106, 27 from developing countries. All the continents were represented, with 33.86% of participants coming from Europe, 2.73% from South America, 8.86% from Oceania, 50.34% from Asia, 3.18% from North America, and 1.14% from Africa. During the Conference, 350 papers were presented, 10 of them on poster sessions.

Topics presented and discussed during the six days event were (i) Urban hydrologic and hydraulic processes Urban hydrology - case studies, Hydraulic performance of urban drainage systems, Processes in sewer systems, Combined and separate sewer overflows, Pollutants sources and transports in urban area, Receiving environment pollution impacts, Adaptation and mitigation towards water related disaster, Urban heat island and microclimate change, Small scale storm water systems (ii) Urban technological issues, Storm water source control and best management practices, Low impact development techniques, water sensitive urban design and sustainable urban drainage systems, Appropriate urban drainage technologies for developing countries, Data collection, monitoring, processing and archiving, Novel and emerging technologies, Operation and maintenance of urban hydrological network, Small scale stormwater systems, Ponds, wetlands, infiltration basins, Storm water and waste treatment and reuse, Urban

flood modelling, forecasting and warning, Hydroinformatics - modelling and simulation of integrated urban water systems, Rainwater harvesting, Erosion and sediment control (iii) Institutional, managerial and legal issues, Urban drainage and urban planning, Integrated urban water planning and management in developing countries, Decision support system and modelling, Regulation and institutional frameworks, Real time control and decision support system, Risk management analysis, Integrated water resources management from urban catchments to river basins, Participatory processes, decision making and social acceptance of urban drainage technologies, Public perception and awareness, Economics and life cycle analysis, Water security and water quality, Hydro informatics and knowledge information system (iv) Special Sessions, UN-Habitat drainage strategy, Source controls or LID measures, Urban rainfall and climate change impact on rainfall extremes and urban drainage, Integrated modelling and assessment of urban water systems.

Six keynote lectures were given in plenary sessions by various prominent figures including Prof. Hubert J. Gijzen (UNESCO Regional Director and Representative of Regional Science Bureau for Asia and the Pacific, Jakarta) entitled "Water in the City of the Future".

Based on the indications of the 13 ICUD Scientific Committee some papers presented in the conference were selected and submitted to the Water Science and Technology and Urban Water Journals to be evaluated for publication.

Many have gain benefit from this conference through his many effort. This is just an example from his many contributions to the 'water world'.

May Dr. Mohd Nor bin Mohd Desa rest in peace.

Dr. Mohamed Roseli bin Zainal Abidin
Humid Tropics Centre Kuala Lumpur

6 November 2014

ANNEX D ADOPTED AGENDA

**ANNEX 1 FUTURE ACTIONS FROM THE 21ST MEETING OF
THE IHP REGIONAL STEERING COMMITTEE
FOR SOUTHEAST ASIA AND THE PACIFIC (INCL.
SDGS WATER TABLE)**

**ANNEX 2 MAPPING OF PROJECTS ON TO THEMES OF IHP
VIII**

**ANNEX 3 PROPOSAL FOR SESSIONS IN THE 7TH WORLD
WATER FORUM**

No	Agenda Item	Responsible Person	Document/ Presentation
Day 1			
1	Welcome and opening remarks by local host and UNESCO	Indonesian delegate	Comments
2	Commemoration in the memory of: - Mr Mohd. Nor Bin Mohd. Desa - Mr Mike Bonnell	Kaoru Takara, Chairperson, Malaysian delegate and Australian delegate	Comments
3	Opening comments on behalf of RSC and introductions	Kaoru Takara, Chairperson	Comments
4	Election of Rapporteur	IHP delegates	
5	Adoption of the Agenda	Kaoru Takara, RSC Chairperson	Draft agenda
6	Secretariat report	Shahbaz Khan, RSC Secretariat,	Presentation
7	Country Reports (4min max) and discussion Including contribution to IHP VIII backed up with budget and based on the working matrix (http://hvwr.kuciv.kvoto-u.ac.jp/ihp/rsc/ihp8/ihp8maprsc.html)	IHP delegates	Country Reports
8	Updates from the centres (existing and proposed) under the auspices of UNESCO in the Asia Pacific Region present at the meeting	Centres present during the meeting.	Presentation/ Reports
9	Report from Asia Pacific FRIEND including 7 th Global FRIEND October 2014, Montpellier, France	Trevor Daniell	Presentation
10	Report from the 21st IHP Intergovernmental Council, June 2014	Soontak Lee, Kaoru Takara, and Shahbaz Khan	Presentation/ report
11	Report on preparation of the 7th World Water Forum and Nakdong River International Water Week 2014/International Water Forum (Na-Ri IWW/IWF 2014)	Soontak Lee	
12	Discussion on RSC input to the 7 th WWF in Korea 2015 including possible side event	Kaoru Takara, RSC Chairperson	WWF Action Areas
13	Post- Catalogue of Rivers Initiative	Hidetaka Chikamori and Kenichiro Kobayashi	Presentation
14	Proposal to establish Regional Initiative such as Asia Pacific IFI, HELP, Ecohydrology.	RSC Secretariat	
15	Services of the Global Runoff Data Centre	Ulrich Looser Head of Global Runoff Data Centre (GRDC)	Presentation
16	Group discussion on 4 project areas (agenda item added during day 1)	RSC Secretariat	Brainstorming session

Day 2			
16	Continuation of 1 st Day Group Discussion on 4 project areas	RSC Secretariat	Presentation
17	Organization of the 23rd RSC meeting in Myanmar and associated conference	Myanmar delegate/ RSC Secretariat	Presentation
18	40 th years of IHP (1965-2015) proposal	IHP delegates	Announcement
19	Organization of the 24 th RSC meeting	IHP delegates	
20	Election of RSC Secretary	IHP delegates	
21	Any Other Business (AOB)	IHP delegates	
22	Adoption of Resolutions	IHP delegates	Draft Resolution
23	Closing of the Meeting	Kaoru Takara, RSC Chairperson	

ANNEX 1

Future Actions from the 21st RSC (from 21st RSC meeting report)

Actions	Responsible	Deadlines
1. Water Education using hydrological analysis tools	Kenichiro Kobayashi and Hidetka Chikamori	
2. Mapping of projects on to themes of IHP VIII and place it on the web	All countries to provide their mapping sheets to secretariat an	http://hywr.kuciv.kyoto-u.ac.jp/ihp/rsc/ihp8/IHP8mapRSC.html (attachement)
3. MasterClass for Hydrological Analysis Education	Secretariat with Trevor Daniell	MasterClass on Network-enabled Collaboration on Water Related Disasters and Water Security ,23 rd January 2014, Bandung, Indonesia
<p>4. For the World Water Forum contribution of RSC</p> <p>- Position paper on adaptation to variability and uncertainty – case studies from member states,</p> <p>- Map our contribution to IHP VIII against World Water Forum goals/themes</p>	<p>Trevor Daniell to circulate a request to member states</p> <p>(End of November 2013) Secretariat</p>	<p>- <u>Proposition Focus3: Water and Natural disasters</u></p> <p>Session objectives and outputs: The session discusses and defines concrete collaborative actions for Sustainable Development Goals (SDGs), Hyogo Framework for Actions Second Phase (HFA-II) and IHP Eighth Phase (IHP-VIII).</p> <p>Session description: In Southeast Asia and the Pacific (SEAP), regional cooperation has been made through the UNESCO's IHP (International Hydrological Programme) Regional Steering Committee (RSC) consisting of the 17 IHP National Committees since 1993. To enhance the cooperative activities in RCS and to cope with natural disasters induced by the changing hydrologic cycle and water resources, various stakeholders including researchers, engineers and practitioners related to RSC-SEAP, UNESCO-IHP, Asia Pacific Association of Hydrology and Water Resources (APHW) and other relevant organizations come together to discuss the following topics to define the direction of actions for Sustainable Development Goals (SDGs),</p>

		<p>Hyogo Framework for Actions Second Phase (HFA-II) and IHP Eighth Phase (IHP-VIII):</p> <ul style="list-style-type: none"> ■ Scientific and educational collaborations to address water-related disasters due to climate change; ■ Planning a concrete collaborative research and education projects in line with IHP-VIII Programme “Water Security” 2014-2021; ■ Enhancing earth observation data archiving system to reduce water-related disasters ■ Defining and planning collaboration between IHP National Committees and the category-two centers in RSC-SEAP to cope with water-related disasters; ■ How to contribute to global decadal initiative such as SDGs and HFA-II ; and ■ Other issues. <p>- <u>Proposition to Focus5: Understanding and managing ecosystem services for water</u></p> <p>Session objectives and outputs: The session is aimed at show casing ecosystem solutions in the following areas using over 30 demonstration projects in the world.</p> <ul style="list-style-type: none"> • ‘Ecological solutions’ leading to ecologically sustainable development focusing on water quality improvement at all levels. • Examples of ‘green’ infrastructure for restoration of natural ecosystems to achieve post 2015 agenda water goals. • New technologies of future green cities from SWITCH in Asia in collaboration of ecologists, engineers, city planners. <p>Session description: This session will also help open the paradigm lock between science and technology community and water policy makers who are struggling to manage complex interactions between biological diversity, climate change, land use change and freshwater use limits and constraints. It will focus on how science and technology can help avoid crossing four of the nine boundaries of the Earth System processes recommended not to be</p>
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		<p>crossed to avoid unacceptable environmental change to humanity. The conceptual and theoretical discussions and case studies presented in this session will help guide member states in devising river basin management plans for maintaining and enhancing the multifunctional productivity of water and ecosystem resources to optimise physical, economic, social and environmental benefits without compromising the quality of these resources .</p>
<p>5. UNESCO HQ request for regions water related SDG.</p>	<p>The secretariat will refine and expand using mapping matrix the following information.</p>	

SDG WATER

Goal 3.	Ensure healthy lives and promote well-being for all at all ages		
3.3	by 2030 end the epidemics of AIDS, tuberculosis, malaria, and neglected tropical diseases and combat hepatitis, water-borne diseases, and other communicable diseases	Green	
3.9	by 2030 substantially reduce the number of deaths and illnesses from hazardous chemicals and air, water, and soil pollution and contamination	Green	
Goal 6.	Ensure availability and sustainable management of water and sanitation for all		
6.1	by 2030, achieve universal and equitable access to safe and affordable drinking water for all	Green	
6.2	by 2030, achieve access to adequate and equitable sanitation and hygiene for all, and end open defecation, paying special attention to the needs of women and girls and those in vulnerable situations	Green	
6.3	by 2030, improve water quality by reducing pollution, eliminating dumping and minimizing release of hazardous chemicals and materials, halving the proportion of untreated wastewater, and increasing recycling and safe reuse by x% globally	process target	Need to be more specific on water quality levels and minimum level of reuse e.g. at 50% or more

6.4	by 2030, substantially increase water-use efficiency across all sectors and ensure sustainable withdrawals and supply of freshwater to address water scarcity, and substantially reduce the number of people suffering from water scarcity	process target	Specific increased water use efficiency target e.g. 50% from current base line
6.5	by 2030 implement integrated water resources management at all levels, including through transboundary cooperation as appropriate	process target	Need to a clear target to implement IWRM in all countries
6.6	by 2020 protect and restore water-related ecosystems, including mountains, forests, wetlands, rivers, aquifers and lakes	Political statement	Need clear target on environmental flows to be ensured across all water systems
6.a	by 2030, expand international cooperation and capacity-building support to developing countries in water and sanitation related activities and programmes, including water harvesting, desalination, water efficiency, wastewater treatment, recycling and reuse technologies	process target	Need to specify capacity building target for regions such as Africa
6.b	support and strengthen the participation of local communities for improving water and sanitation management	process target	Need to specify capacity building target for regions such as Africa
Goal 11.	Make cities and human settlements inclusive, safe, resilient and sustainable		
11.5	by 2030 significantly reduce the number of deaths and the number of affected people and decrease by y% the economic losses relative to GDP caused by disasters,		

	including water-related disasters, with the focus on protecting the poor and people in vulnerable situations		
Goal 12.	Ensure sustainable consumption and production patterns		
12.4	by 2020 achieve environmentally sound management of chemicals and all wastes throughout their life cycle in accordance with agreed international frameworks and significantly reduce their release to air, water and soil to minimize their adverse impacts on human health and the environment		
Goal 15.	Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss		
15.1	by 2020 ensure conservation, restoration and sustainable use of terrestrial and inland freshwater ecosystems and their services, in particular forests, wetlands, mountains and drylands, in line with obligations under international agreements		
15.8	by 2020 introduce measures to prevent the introduction and significantly reduce the impact of invasive alien species on land and water ecosystems, and control or eradicate the priority species		



IHP RSC for Southeast Asia and the Pacific

UNESCO International Hydrological Programme

[Home](#) [Structure](#) [Activities](#) [History](#) [River Catalogue](#) [Publications](#) [UNESCO Office Jakarta](#) [Links](#)

Mapping of RSC Future Projects against IHP VIII "WATER SECURITY: RESPONSES TO LOCAL, REGIONAL, AND GLOBAL CHALLENGES" (2014-2021)

Country	No.	1.1	1.2	1.3	1.4	1.5	2.1	2.2	2.3	2.4	2.5	3.1	3.2	3.3	3.4	3.5	4.1	4.2	4.3	4.4	4.5	5.1	5.2	5.3	5.4	5.5	6.1	6.2	6.3	6.4	6.5	Project title
Australia	1	x		x	x	x																										Operational Forecasting and effective information dissemination
	2	x				x							x																			Development of forecasting droughts for better water resources management
	3																										x	x				Water Education Tools and Hydrological Analysis Techniques using COR Data
	4													x																		Tools for stakeholder involvement in the Pacific Islands and Region
Indonesia	1																						x									Ecohydrology for water security in urban and rural areas
	2																				x											Strengthening water management capacity for local communities
	3																			x												Sustainable water management for developing resilience cities
	4																							x								Development of appropriate technologies for water security in marginal areas
Japan	1	x		x																												Climate change research focusing on impacts on water-related disaster risk
	2	x																														Global Earth Observation System of Systems and Asian Water Cycle Initiative
	3					x																										Sustainability/Survivability Science for a Resilient Society Adaptable to Extreme Weather Conditions
	4						x																									Groundwater as key for adaptation to changing climate and society
	5																										x	x				UNESCO IHP Training Courses
	6																										x	x				Catalogue of Hydrologic Analysis for Southeast Asia and the Pacific
Malaysia	1	x				x																										Promoting and Implementing Geospatial Water Related Disaster Management Programmes
	2																						x		x							Contributing urban water management through the implementation of Integrated stormwater management ecohydrology
	3												x		x	x													x	x	x	Upscaling water security to meet local, regional, & global challenges
	4																										x	x	x			Formulation of Water Education Subject in Primary School
Mongolia	1		x			x																										Operational meteorological and hydrological forecasting

																																		and effective information dissemination and use for water resource management
	2																																Improving groundwater monitoring with application of GEOSS to enhance ground water resource management	
	3																																Enhancing water education using demonstration of hydrological analysis	
Philippines	1																																AP-HELP	
	2																																CAP-LGU-WSM	
	3																																Top-Down Water Education	
	4																																Multiple Source Drought Management Using Sustainable Local Technology	
Thailand	1																																Formulation of Integrated Plan on Water Resources Management for river Basin and Provincial Water Security	
	2																																Improved Management of Extreme Event through Ecosystem-based Adaptation in Watersheds	
	3																																Promotion and Strengthening for Personal on Water Resources Management in Wetland	
Vietnam	1	x																															Extreme Events in hydrology	
	2																																Developing operation rule for reservoir system on Ba river basin in dry season	
	3																																Transboundary water issues of Vietnam	

List of Projects and Timeline - Australia

- 1. Project Title:Operational Forecasting and effective information dissemination**
Description:
Timeline:
Contribution to IHP VIII: Theme x Focal Area x.x 1.1, 1.3, 1.4, 1.5
- 2. Project Title:Development of forecasting droughts for better water resources management**
Description:
Timeline:
Contribution to IHP VIII: Theme x Focal Area x.x 3.2, 1.1, 1.5
- 3. Project Title:Water Education Tools and Hydrological Analysis Techniquesusing COR Data**
Description:
Timeline:
Contribution to IHP VIII: Theme x Focal Area x.x6.1, 6.2
- 4. Project Title:Tools for stakeholder Involvement in the Pacific Islands and Region**
Description:
Timeline:2014-2018
Contribution to IHP VIII: Theme x Focal Area x.x 3.3

(You may add or reduce the numbers according to your needs)

List of Projects and Timeline - INDONESIA

- 1. Project Title: Ecohydrology for water security in urban and rural areas**
Description: poverty, ecohydrology concept, water security, urban and rural areas
Timeline: 3 years
Contribution to IHP VIII: Theme V Focal Area V.3
- 2. Project Title: Strengthening water management capacity for local communities**
Description: low capacity, local communities, water management, capacity building
Timeline: 3 years
Contribution to IHP VIII: Theme VI Focal Area VI.5
- 3. Project Title: Sustainable water management for developing resilience cities**
Description: water management, resilience cities, sustainable management
Timeline: 3 years
Contribution to IHP VIII: Theme IV Focal Area IV.4
- 4. Project Title: Development of appropriate technologies for water security in marginal areas**
Description: water security, marginal area (peatland, coastal and small islands, flooding area, water polluted areas), appropriate technology
Timeline: 3 years
Contribution to IHP VIII: Theme V Focal Area V.3

(You may add or reduce the numbers according to your needs)

List of Projects and Timeline - Japan

- 1. Project Title:** Climate change research focusing on impacts on water-related disaster risk using “Earth Simulator”: MEXT SOSEI Project
Description: Climate change impacts on the hydrological cycle and consequent impact on water resources (Kyoto University, University of Tokyo, ICHARM, other universities and institutes)
Timeline: 2012-2016
Contribution to IHP VIII: Theme x Focal Area 1.1, 1.3
- 2. Project Title:** Global Earth Observation System of Systems (GEOSS) and Asian Water Cycle Initiative in Asian and Africa
Description: Global water cycle assessment in Asia and Africa (University of Tokyo)
Timeline: 2012-2016
Contribution to IHP VIII: Theme x Focal Area 1.3
- 3. Project Title:** Sustainability/Survivability Science for a Resilient Society Adaptable to Extreme Weather Conditions
Description: Interdisciplinary research and education at Ph.D. level is implemented for extreme weather and water conditions (Kyoto University)
Timeline: 2012-2016
Contribution to IHP VIII: Theme x Focal Area 1.5,
- 4. Project Title:** Groundwater as key for adaptation to changing climate and society
Description: Groundwater as key for adaptation to changing climate and society (RIHN)
Timeline: 2013-2018
Contribution to IHP VIII: Theme x Focal Area 2.1
- 5. Project Title:** UNESCO IHP Training Courses (TC)
Description: Water resources for sustainable development, hydrology and water resources under vulnerable Environment, and water interactions (Nagoya University and Kyoto University)
Timeline: 2013-2021
Contribution to IHP VIII: Theme x Focal Area 6.1, 6.1
- 6. Project Title:** Future of catalogue of rivers
Description: Catalogue of Hydrologic Analysis for Southeast Asia and the Pacific (IHP RSC SEAP)
Timeline: 2013-2021
Contribution to IHP VIII: Theme x Focal Area 6.1, 6.2

(You may add or reduce the numbers according to your needs)

Malaysia Proposed Projects and Timeline

1. Project Title: Promoting and Implementing Geospatial Water Related Disaster Management Programmes

Description: see handout

Timeline: 3 years (1st Phase)

Contribution to IHP VIII: Theme 1 Focal Area 1.1 & 1.5

2. Project Title: Contributing urban water management through the implementation of Integrated stormwater management ecohydrology (SME) as part of UNESCO SWITCH Programme and IHP VIII Plan

Description: see handout

Timeline: 3 years (1st Phase)

Contribution to IHP VIII: Theme 5 Focal Area 5.2 & 5.4

3. Project Title: Upscaling water security to meet local, regional, & global challenges

Description: River basin in Malaysia and Asia Pacific

Timeline: 3 years (1st Phase)

Contribution to IHP VIII: Theme 6 & 3 Focal Area 3.1, 3.3, 3.4 , 6.3, 6.4 & 6.5

4. Project Title: Formulation of Water Education Subject in Primary School

Description: Developing syllabus, teaching material, & curriculum development

Timeline: 3 years (1st Phase)

Contribution to IHP VIII: Theme 6 Focal Area 6.1, 6.3 & 6.4

List of Projects and Timeline - Mongolia

- 1. Project Title:** *Operational meteorological and hydrological forecasting and effective information dissemination and use for water resource management*

Description: *Observation data on precipitation, lake and glacier dynamics and other water and energy balance variables will be improved through benefiting from global and local Earth observation system of systems. Short range rainfall, solid precipitation and runoff forecast, climate and hydrology models will be developed. Drought yearly warning will be enhanced through seasonal forecasting improvement.*

Timeline: 2014-2017

Contribution to IHP VIII: *Theme 1, Focal Area 1.3 and 1.5*
- 2. Project Title:** *Improving groundwater monitoring with application of GEOSS to enhance ground water resource management*

Description: *Observation data on precipitation and groundwater will be improved through benefiting from global "Grace" and local Earth observation systems.*

Timeline: 2015-2019

Contribution to IHP VIII: *Theme 2, Focal Area 2.1 and 2.2*
- 3. Project Title:** *Enhancing water education using demonstration of hydrological analysis*

Description: *Demonstration result and illustration of hydrological analysis*

Timeline: 2016-2020

Contribution to IHP VIII: *Theme 6, Focal Area 6.1-6.3*

(You may add or reduce the numbers according to your needs)

Philippines IHP – prepared by Leonardo Q. Liongson

Proposed IHP VIII – themed Projects:

1. Project Title: AP-HELP

Description: Asia Pacific HELP as a multi-country partnership addressing and applying solutions in the issues of water security, governance, water law and policy, etc.

Timeline: 5 years

Contribution to IHP VIII: Themes 3, 4, 5, and 6.

2. CAP-LGU-WSM

Description: capacity-building of local governments in water security management (national government-LGU partnership).

Timeline: 5 years

Contribution to IHP VIII: Theme 3,4,5,6.

3. Top-Down Water Education (TD-WE)

Description: technical assistance from the tertiary and vocational levels of water expertise in order to promote and develop water education in the levels of children, youth and informal education sectors. (academe-NGO-LGU partnership).

Timeline: 5 years

Contribution to IHP VIII: Theme 6.

4. Multiple Source Drought Management Using Sustainable Local Technology (MSDM)

Description: promotion and development of water-saving devices and practices in agriculture (irrigation and aquaculture), rural water supply and sanitation, sourced from groundwater (springs, wells) and surface water sources (rainfall, rivers, lakes).

Timeline: 5 years

Contribution to IHP VIII: Themes 2, 3, 6.

List of Projects and Timeline - Thailand

1. Project Title:

Description: Formulation of Integrated Plan on Water Resources Management for river Basin and Provincial Water Security

Timeline: 2015-2018

Contribution to IHP VIII: Theme III Focal Area 3.1 Improving governance, planning, management, allocation, and efficient use of water resources

2. Project Title:

Description: Improved Management of Extreme Event through Ecosystem-based Adaptation in Watersheds

Timeline: 2013-2016

Contribution to IHP VIII: Theme 5 Focal Area 5.3 Ecohydrology system solution and ecological engineering for the enhancement of water and ecosystem resilience and ecosystem services

3. Project Title:

Description: Promotion and Strengthening for Personal on Water Resources Management in Wetland.

Timeline: 2015-2018

Contribution to IHP VIII: Theme 6 Focal Area 6.1 - Enhancing tertiary water education and professional capabilities in the water sector

List of Projects and Timeline - Vietnam

1. Project Title:

Description: Extreme Events in hydrology

Timeline: 2017-2018

Contribution to IHP VIII: Theme I Focal Area 1.1 Risk management as adaptation to global changes

2. Project Title:

Description: Developing operation rule for reservoir system on Ba river basin in dry season.

Timeline: 2015-2016

Contribution to IHP VIII: Theme 3 Focal Area 3.1- Improving governance, planning, management, allocation, and efficient use of water resources

3. Project Title:

Description: Transboundary water issues of Vietnam

Timeline: 2017-2021

Contribution to IHP VIII: Theme 6 Focal Area 6.5- Education for transboundary water cooperation and governance



ANNEX 3

7th World Water Forum 2015

April 12-17, 2015, Daegu & Gyeongbuk, Rep.of Korea

[Science and Technology Process] Session Proposal Form

To apply session for the Science and Technology Process of the 7th World Water Forum 2015, please complete this form and return it by e-mail to the corresponding Main Focus Coordinator indicated at the bottom of this document no later than Oct 21, 2014.

All fields marked with an asterisk (*) are mandatory

1. Session

Main Focus*

(Multiple selection is possible)

Main Focus 1. Efficient water management

Main Focus 2. Resource recovery from water and wastewater systems

Main Focus 3. Water and natural disasters

Main Focus 4. Smart technology for water

Main Focus 5. Understanding and managing ecosystem services for water

Session type*

- Session (Session Group)
- Concluding Session (Design Group only)

Joint Session with other processes
(Multiple selection is possible)

- Thematic Process (please specify: _____)
- Regional Process (please specify: _____)
- Political Process (please specify: _____)

Session title* (please kindly use media-friendly language)

**Scientific and educational collaborations in Asia and Pacific regions for robust and resilient water policy and management
--- UNESCO-IHP RSC-SEAP activities and beyond for the coming decade of SDGs**

Session description* (180 words, please kindly use media-friendly language)

In Southeast Asia and the Pacific (SEAP), regional cooperation has been made through the UNESCO's IHP (International Hydrological Programme) Regional Steering Committee (RSC) consisting of the 17 IHP National Committees since 1993. To enhance the cooperative activities in RCS and to cope with natural disasters induced by the changing hydrologic cycle and water resources, various stakeholders including researchers, engineers and practitioners related to RSC-SEAP, UNESCO-IHP, Asia Pacific Association of Hydrology and Water Resources (APHW) and other relevant organizations come together to discuss the following topics to define the direction of actions for Sustainable Development Goals (SDGs), Hyogo Framework for Actions Second Phase (HFA-II) and IHP Eighth Phase (IHP-VIII):

- Scientific and educational collaborations to address water-related disasters due to climate change;
- Planning a concrete collaborative research and education projects in line with IHP-VIII Programme "Water Security" 2014-2021;
- Enhancing earth observation data archiving system to reduce water-related disasters
- Defining and planning collaboration between IHP National Committees and the category-two centers in RSC-SEAP to cope with water-related disasters;
- How to contribute to global decadal initiative such as SDGs and HFA-II; and
- Other issues.

Session Duration*

- 90min
- 120min

Session plan in detail	Order	Estimated lead time (min)	Presentations/ Discussion topic	Confirmed speakers
------------------------	-------	---------------------------	---------------------------------	--------------------

	1	15	UNESCO RSC activities and collaboration to address extreme weather and water-related disasters	Prof. Kaoru Takara
	2	15	IHP-VIII Programme "Water Security" 2014-2022 to cope with water related disasters	Dr. Shahbaz Khan
	3	15	Role of IHP activities under climate change	Prof. Soontak Lee
	4	15	Earth observation data archiving system to reduce water-related disasters	Prof. Toshio Koike
	5	15	Discussion on Scientific and educational collaborations to address water-related disasters due to climate change	Members of IHP-RSC, APHW, etc.
	6	15	Discussion on Enhancing earth observation data archiving system to reduce water-related disasters	Members of IHP-RSC, APHW, etc.
	7	15	Discussion on planning a concrete collaborative research and education projects in line with IHP-VIII Programme "Water Security" 2014-2022;	Members of IHP-RSC, APHW, etc.
	8	15	How to contribute to global decadal initiative such as SDGs and HFA-II	Members of IHP-RSC, APHW, etc.

Session objectives and outputs* (please kindly use media-friendly language)

The session discusses and defines concrete collaborative actions for Sustainable Development Goals (SDGs), Hyogo Framework for Actions Second Phase (HFA-II) and IHP Eighth Phase (IHP-VIII).

Targeted audience in your session*

- Government/Local government
 International Organization
 Public Corporation
 Academia, Research Institute
 Industry (Enterprises, etc.)
 CSO (Civil Society Organizations, NGO)
 Others()



7th World Water Forum 2015

April 12-17, 2015, Daegu & Gyeongbuk, Rep.of Korea

2.1 Session Organizer *

Title* Mr. Ms. Prof. Dr.

First Name*

Kaoru

Last Name*

Takara

Organization/Affiliation Name *

Disaster Prevention Research Institute, Kyoto University/ UNESCO IHP RSC-SEAP Chairperson

Type of Organization*

Central/Local Government International Organization Public Corporation Academia, Research Institute
 Industry (Enterprises, etc.) CSO (Civil Society Organizations, NGO) Other()

Country*

Japan

Telephone* (Country Code-Area Code-Number)

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E-mail*

takara.kaoru.7v@kyoto-u.ac.jp

Session Contributors

(Organization / Focal Point / E-mail)

- International Centre for Water Hazard and Risk Management (ICHARM)

- Dr. Yoshiyuki Imamura

- y-imamura@pwri.go.jp

2.2 Session Organizer-additional contact information (only if you are a session co-organizer)

Title Mr. Ms. Prof. Dr.

First Name

Yasuto

Last Name

Tachikawa

Organization/Affiliation Name

Department of Civil and Earth Resources Engineering, Kyoto University/ UNESCO IHP-RSC SEAP Secretary

Type of Organization

Central /Local Government International Organization Public Corporation Academia, Research Institute
 Industry (Enterprises, etc.) CSO (Civil Society Organizations, NGO) Other()

Country

Japan

Telephone (Country Code-Area Code-Number)

+81-75-383-3362

E-mail

tachikawa@hywr.kuciv.kyoto-u.ac.jp



7th World Water Forum 2015

April 12-17, 2015, Daegu & Gyeongbuk, Rep. of Korea

3. Session Format/Logistics

Expected number of Participants(room size)¹⁾ *

Less than 50pax 50~100pax 100~150pax 150~200pax More than 200pax (pax)

Preferred Room Type²⁾ *

Theater Type Classroom Type Roundtable Type Other()

Use of Translation English –Korean (Free of charge) *

Yes No

Use of Translation other languages(charged service) *

Yes (French Spanish Arabic Chinese Russian Other(Please indicate language(s))

No

1) The room size is subject to change.

2) The room type is subject to change.

3) The 7th World Water Forum Secretariat provides a simultaneous translation in English-Korean only. Please note that the use of translation service for other languages will be charged to the session organizers. The guidelines for the extra services for translation including the price and other details will be announced shortly.

- All rooms will be equipped with 1 computer, 1 video projector, 1 screen, 2 microphones and 1 staff.
- Additional equipments or services(furniture, catering service, additional staff, etc.) will be charged to the session convenors. The guidelines for the extra equipment and catering services including the price and other details list will be announced shortly.
- **Please submit a rough draft and return it by e-mail no later than 21 October 2014 to collect the basic session information for preparing**
(Contact information is different depending on themes. Please refer to the contact information on the bottom of the page)

I agree with the terms and conditions as stated in this form on behalf of this group.

Date October 12, 2014

Organization Kyoto University

Applicant Yasuto Tachikawa

Contact Points of Science and Technology Process of the 7th World Water Forum

Regarding Logistics, Schedule

Korea Water Forum (Coordinating Organization) | Mr. Sangyoung Park, sypark119@kwater.or.kr

Design Group Coordinators

Main Focus 1	Main Focus 2	Main Focus 3	Main Focus 4	Main Focus 5
American Water Resources Association(AWR A)	UNESCO International Hydrological Programme	Korea Environment Institute(1)	Smart Water Grid Research Group(1)	Non-point sources Management Research Center
		Young-Il Song, yisong@kei.re.kr	EunSeul Hong, swghes@naver.com	
Mr. John Tracy, tracy@uidaho.edu	Sarantuyaa Zandaryaa, s.zandaryaa@unesco.org	Korean Society of Hazard Mitigation(2)	K-water(2)	Kim, Lee-Hyung, leehyung@kongju.ac.kr
		KimHung-soo, sookim@inha.ac.kr	Jongchan Kim, jchan@kwater.or.kr	

Any other business

Yoonjin Kim | wwfyoong@gmail.com, wwfyoong@wwf7.or.kr



7th World Water Forum 2015

April 12-17, 2015, Daegu & Gyeongbuk, Rep.of Korea

[Science and Technology Process] Session Proposal Form

To apply session for the Science and Technology Process of the 7th World Water Forum 2015, please complete this form and return it by e-mail to the corresponding Main Focus Coordinator indicated at the bottom of this document no later than Oct 21, 2014.

All fields marked with an asterisk (*) are mandatory

1. Session

Main Focus*

(Multiple selection is possible)

Main Focus 1. Efficient water management

Main Focus 2. Resource recovery from water and wastewater systems

Main Focus 3. Water and natural disasters

Main Focus 4. Smart technology for water

Main Focus 5. Understanding and managing ecosystem services for water

Session type*

- Session (Session Group)
- Concluding Session (Design Group only)

**Joint Session with other processes
(Multiple selection is possible)**

- Thematic Process (please specify: _____)
- Regional Process (please specify: _____)
- Political Process (please specify: _____)

Session title* (please kindly use media-friendly language)

Role of science, technology and innovation for cost effective water ecosystem services

Session description* (180 words, please kindly use media-friendly language)

This session will also help open the paradigm lock between science and technology community and water policy makers who are struggling to manage complex interactions between biological diversity, climate change, land use change and freshwater use limits and constraints. It will focus on how science and technology can help avoid crossing four of the nine boundaries of the Earth System processes recommended not to be crossed to avoid unacceptable environmental change to humanity. The conceptual and theoretical discussions and case studies presented in this session will help guide member states in devising river basin management plans for maintaining and enhancing the multifunctional productivity of water and ecosystem resources to optimise physical, economic, social and environmental benefits without compromising the quality of these resources .

Session Duration*

- 90min
- 120min

Session plan in detail	Order	Estimated lead time (min)	Presentations/ Discussion topic	Confirmed speakers
	1	15 min	Overall introduction of the area	Dr Shahbaz Khan (Indonesia)
	2	20 min	Science and technology innovations for Ecosystem Services	Professor Maciej Zalewski (Poland)
	3	20 min	Matching policy needs with ecosystem system response	Dr Bob Ferrier (UK)
	4	50 min	Moderated Discussion	Panelists from Brazil, Poland, UK, Australia,



7th World Water Forum 2015

April 12-17, 2015, Daegu & Gyeongbuk, Rep.of Korea

				Malaysia, South Africa and Nigeria
	5	15	Conclusions and way forward	UNESCO

Session objectives and outputs* (please kindly use media-friendly language)

The session is aimed at show casing ecosystem solutions in the following areas using over 30 demonstration projects in the world.

- 'Ecological solutions' leading to ecologically sustainable development focusing on water quality improvement at all levels.
- Examples of 'green' infrastructure fo restoration of natural ecosystems to achieve post 2015 agenda water goals.
- New technologies of future green cities from SWITCH in Asia in collaboration of ecologists, engineers, city planners.

Targeted audience in your session*

Government/Local government International Organization Public Corporation Academia, Research Institute

Industry (Enterprises, etc.) CSO (Civil Society Organizations, NGO) Others()



7th World Water Forum 2015

April 12-17, 2015, Daegu & Gyeongbuk, Rep.of Korea

2.1 Session Organizer *

Title* <input type="checkbox"/> Mr. <input type="checkbox"/> Ms. <input checked="" type="checkbox"/> Prof. <input checked="" type="checkbox"/> Dr.		
First Name* Shahbaz		Last Name* Khan
Organization/Affiliation Name * UNESCO Regional Science Bureau for Asia and the Pacific		
Type of Organization* <input type="checkbox"/> Central/Local Government <input checked="" type="checkbox"/> International Organization <input type="checkbox"/> Public Corporation <input type="checkbox"/> Academia, Research Institute <input type="checkbox"/> Industry (Enterprises, etc.) <input type="checkbox"/> CSO (Civil Society Organizations, NGO) <input type="checkbox"/> Other()		
Country* Indonesia	Telephone* (Country Code-Area Code-Number) +62 21 7399818	E-mail* s.khan@unesco.org
Session Contributors (Organization / Focal Point / E-mail)	<ul style="list-style-type: none"> - Professor Maciej Zalewski (Poland) – ERCE, Poland - Dr Bob Ferrier (UK), James Hutton Institute, UK - Dr Tariq Rana (Australia), Murray Darling Basin, Authority - Professor Hubert Gijzen (Zimbabwe), UNESCO, Southern Africa - Professor Sanjo Bamboye (Nigeria), RC IRBM, Nigeria - Professor Mazlin Mukhtar (Malaysia), UKM - Professor Henrique Chavez, Brazil 	

2.2 Session Organizer-additional contact information (only if you are a session co-organizer)

Title <input type="checkbox"/> Mr. <input type="checkbox"/> Ms. <input type="checkbox"/> Prof. <input type="checkbox"/> Dr.		
First Name		Last Name
Organization/Affiliation Name		
Type of Organization <input type="checkbox"/> Central /Local Government <input type="checkbox"/> International Organization <input type="checkbox"/> Public Corporation <input type="checkbox"/> Academia, Research Institute <input type="checkbox"/> Industry (Enterprises, etc.) <input type="checkbox"/> CSO (Civil Society Organizations, NGO) <input type="checkbox"/> Other()		
Country	Telephone (Country Code-Area Code-Number)	E-mail



7th World Water Forum 2015

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3. Session Format/Logistics

Expected number of Participants(room size)¹⁾ *

Less than 50pax 50~100pax 100~150pax 150~200pax More than 200pax (pax)

Preferred Room Type²⁾ *

Theater Type Classroom Type Roundtable Type Other()

Use of Translation English –Korean (Free of charge)*

Yes No

Use of Translation other languages(charged service)*

Yes (French Spanish Arabic Chinese Russian Other(Please indicate language(s))
 No

1)The room size is subject to change.

2)The room type is subject to change.

3)The 7th World Water Forum Secretariat provides a simultaneous translation in English-Korean only. Please note that the use of translation service for other languages will be charged to the session organizers. The guidelines for the extra services for translation including the price and other details will be announced shortly.

- **All rooms will be equipped with 1 computer, 1 video projector, 1 screen, 2 microphones and 1 staff.**
- **Additional equipments or services(furniture, catering service, additional staff, etc.) will be charged to the session convenors. The guidelines for the extra equipment and catering services including the price and other details list will be announced shortly.**
- **Please submit a rough draft and return it by e-mail no later than 21 October 2014 to collect the basic session information for preparing**
(Contact information is different depending on themes. Please refer to the contact information on the bottom of the page)

I agree with the terms and conditions as stated in this form on behalf of this group.

Date 19/10/2014

Organization UNESCO

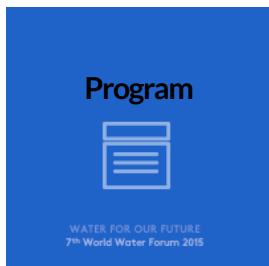
Applicant Shahbaz Khan

Contact Points of Science and Technology Process of the 7th World Water Forum

Regarding Logistics, Schedule				
Korea Water Forum (Coordinating Organization)		Mr. Sangyoung Park, sypark119@kwater.or.kr		
Design Group Coordinators				
Main Focus 1	Main Focus 2	Main Focus 3	Main Focus 4	Main Focus 5
American Water Resources Association(AWRA)	UNESCO International Hydrological Programme	Korea Environment Institute(1) Young-Il Song, yisong@kei.re.kr	Smart Water Grid Research Group(1) EunSeul Hong, swghes@naver.com	Non-point sources Management Research Center
Mr. John Tracy, tracy@uidaho.edu	Sarantuyaa Zandaryaa, s.zandaryaa@unesco.org	Korean Society of Hazard Mitigation(2) KimHung-soo, sookim@inha.ac.kr	K-water(2) Jongchan Kim, jchan@kwater.or.kr	Kim, Lee-Hyung, leehyung@kongju.ac.kr
Any other business				
Yoonjin Kim	wwfyoon@gmail.com , wwfyoon@wwf7.or.kr			

Home > Program > SideEvent > SideEventApplication

Side Event Application



Overview

Program

Process

Citizen's Forum

Side Event

Side Event Overview
[Side Event Application](#)



Any organizations can hold various types of Side Events at the **7th World Water Forum 2015**.

After sign up the website of the 7th World Water Forum, you can submit the side event application form.

Please be noted that you must be a registered Forum participant to organize your side event.

(Forum registration page can be found [here](#))

1 Forum ID can apply for only 1 Side Event.(For multiple applications, please contact the Forum Secretariat)

The schedule of side events will be preferentially arranged in the lunch break or the evening.

Important Notices

Application deadline: November 30, 2014

Confirmation notice: January 2, 2015

Rental fee for rooms

- Session Room up to 100pax: 300€ per hour

- Session Room over 100pax: 450€ per hour

Inquiries



7th World Water Forum 2015 - Side Event

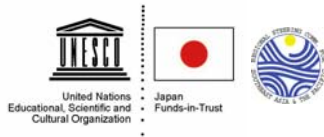
E-mail event@worldwaterforum7.org

[On-line Application Form](#)

ANNEX E RSC SECRETARIAT REPORT

SECRETARIAT REPORT UNESCO Science Bureau for Asia and the Pacific (October 2013-November 2014)

22nd RSC meeting
13-14th November 2014
Yogyakarta



1

Key Activities of IHP in Asia and the Pacific Region from October 2013

Recent IHP major events in the region

23rd IHP Training Course on Ecohydrology under Climate Change held on 2-13 December 2013, Kyoto, Japan

UNESCO Office Jakarta, Japan Trust-in-Fund, in collaboration with the Water Resources Research Center, Disaster Prevention Research Institute of Kyoto University organized the 23rd IHP training course on Ecohydrology under Climate Change.

[The 23rd IHP training course text book](#) can be downloaded.

MasterClass on “Network-enabled Collaboration on Water Related Disasters and Water Security” held on 23 January 2014 in Bandung

UNESCO Office Jakarta in collaboration with Asia Pacific Advanced Network (APAN) and Bandung Institute of Technology (ITB) organized a MasterClass on “Network-enabled Collaboration on Water Related Disasters and Water Security” on 23 January 2014, held in conjunction with the 37th APAN Meeting in Savoy Homann Bidakara Hotel in Bandung, Indonesia.

2

Recent IHP major events in the region



The PERI-URBAN 2014 International Conference: organized in partnership with the University of Western Sydney under the topic ‘Peri-Urban Landscapes; Water, Food and Environmental Security’ from 8 -10 July 2014.



The Sustainable Landscape Futures International Conference took place at the University of Canberra, Australia on the theme ‘Sustainable Landscape Futures: Solving complex problems through sustainability science’ on 10 - 11 July 2014.

These two events were concluded by the Sydney Declaration titled "Expanding Cities Sustainably" of July 10, 2014 and the Canberra Statement which concluded that "sustainability is a ‘way of living’ that requires a holistic approach“, and have highlighted the key role of IHP in these processes.

3

Recent IHP major events in the region



The 17th International River Symposium was held in Canberra, Australia in the Murray-Darling Basin (a UNESCO-IHP HELP river basin), from 15-18 September 2014, on overarching theme of ‘Large River Basins’. The conference and some specialist workshops have built together a statement on integrated river basin management to forge a stronger global agenda for coordinated action.



Workshop on IWRM for Peace and Development in Davao City, Philippines on 22-23 October 2014.

The two days workshop discussed the issues related to IWRM activities in Davao City and ended with a draft paper on IWRM proposal for the region of Mindanao and city of Davao.

4

Current IHP major activities in the region



Working with the Government of Medan City, Indonesia on "Securing Medan Water Futures 2030"

- Signed Memorandum of Understanding (MoU) between the Government of Medan City and UNESCO in "Supporting Study on Urban Water management in Medan City".
- Preparation of a Policy Brief on "Securing Medan Water Futures 2030" with the aim of supporting the design and implementation of the sustainable water management strategies and policies that will help to meet present and future water demands of Medan.

5

Pakistan Flood Project Delivered



Project Strategic Strengthening of Flood Warning and Management Capacity of Pakistan delivered and external evaluation completed (July 2011- December 2014). UNESCO in close collaboration with the Japan International Cooperation Agency (JICA) and in coordination with the Government of Pakistan implemented this project. IHP Pakistan, ICHARM, JAXA, PMD and SUPARCO collaborated as project partners.

6

Water Portal now ready for use by UNESCO partners



<http://water.jfit-for-science.asia/>

7

IHP major events in Asia and the Pacific

IHP events in Jogjakarta, Indonesia November 8-14 November 2014



Ecohydrology Training Course on the topic "Ecohydrology: A Tool for IWRM Implementation at the River Basin Level" . From 7-8 November 2014.



International Conference on Ecohydrology (ICE 2014) on the theme "Ecohydrology Approaches Facing the Global water Environment Challenges" will be organized from 10-14 November 2014, to synthesize information and knowledge gaps for addressing issues related to critical water environment systems; how the ecohydrology and ecotechnology could provide low cost environmentally sound technology for sustainable water management, especially in the Asia Pacific region. Yogyakarta Sustainable Water Actions Statement was developed and delivered.



The 22nd Meeting of IHP Regional Steering Committee for Southeast Asia (IHP-RSC SEAP) will be held from 13 to 14 November 2014.

8

Forthcoming research activities in Asia and the Pacific

IWRM, Ecohydrology and Sustainability Science projects:

- “Establishment of Sustainability Science Demonstration Pilot Project on Restoring and Managing Langat River, Malaysia for Future”
- "Customizing IWRM Guidelines in existing and expecting HELP River Basins in Asia-Pacific region”
- “Establishment of Sustainability Science Demonstration Pilot Project on Rice Terraces of the Philippines Cordilleras”
- “Establishment of Sustainability Science Demonstration Pilot Project on Restoring and Enhancing Angkor World Heritage Site and Siem Reap City Water Systems”
- “Customizing IWRM Guidelines in existing and expecting Ecohydrology demonstration sites in Asia-Pacific region”

9

Upcoming IHP major events in Asia and the Pacific

24th IHP Training Course on Forest Hydrology - Conservation of Forest, Soil and Water Resources to be held on 24 November to 7 December 2014, Nagoya, Japan

UNESCO Office Jakarta, in collaboration with the School of Internet Asia and CONNECT-Asia, will provide e-learning opportunities by broadcasting the whole training courses in numerous video conference spots in the region. This option offers good connection equipped with Video Conference facilities for convenient lectures and interactive sessions.

ASEAN Water Footprint Course

Tentatively schedule – mid February 2015, DID Training Centre, Kuala Lumpur

In collaboration with UNESCO IHP National Committee of Malaysia, this course will help to expand the understanding of water footprint concept to a bigger number of water managers in ASEAN countries.

10

Upcoming IHP major events in Asia and the Pacific

Sustainability Science from theory to action

Tentatively schedule – mid 9-10 March 2015, Kuala Lumpur in cooperation with UKM

In collaboration with UNESCO IHP National Committee of Malaysia, this course will help to expand the sustainability science concept and implementation of pilot projects.

7th World Water Forum, 12-17 April 2015, Daegu, Korea

UNESCO Office Jakarta will lead :

- Theme 3.4 Smart Implementation of IWRM
- Ecosystem Services under Main Focus Area 5 of Science and Technology Process
- Urban Water Management under the Asia Pacific Regional Process
- ++ please update during the agenda item 12.

11

ANNEX F COUNTRY REPORTS

NATIONAL REPORT ON IHP RELATED ACTIVITIES AUSTRALIA

1. ACTIVITIES UNDERTAKEN IN THE PERIOD October 2013 to November 2014

Australia was elected to the IHP Intergovernmental Council in Nov 2011.

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 Australian National Commission (NATCOM) for UNESCO (www.dfat.gov.au/intorgs/unesco) has 12 members, two parliamentary representatives and four honorary members.

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. Dr Dasarath Jayasuriya is the principal focus point for the National committee following the resignation of Mr Bruce Stewart who has taken up an appointment in the WMO. Ian White was elected Vice President of the InterGovernmental Council of IHP in Paris in June 2014.

Name	Expertise	Organization
Dasarath Jayasuriya	Flood and Seasonal Forecasting	Bureau of Meteorology
Tony Falkland	Island Hydrology	University of Adelaide
Trevor Daniell	Urban, Low and High Flow Hydrology	
Quentin Grafton	UNESCO Chair in Water Economics and Transboundary Water Governance	Australian National University
Peter Martin	Public Relations	CRC for Weed Management
Ian White	Hydrology/Water Quality	Australian National University
Jeff Camkin	Ecohydrology	University of Western Australia
	HELP Coordination	Centre for Excellence for Ecohydrology
Ian Cordery	Flood/Drought Hydrology	University of New South Wales
Peter Dillon	Groundwater	CSIRO Land and Water
Anne Jensen	Ecotones	Wetlands Care Australia
Ray Volker	Groundwater	University of Queensland

1.1.2 Status of IHP-VII 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. A description is provided below of some activities pertinent to IHP-VII. The Australian Bureau of Meteorology and CSIRO have also established a Water Information Research and Development Alliance (WIRADA) which undertakes research of direct relevance to the activities of the IHP.

Australia faces major challenges in ensuring sustainable water supply in the face of drying climate and rising demand for water. In response, the Australian Government's initiative, Water for the Future (<http://www.environment.gov.au/water/australia/index.html>) is built on four key priorities of taking action on climate change; using water wisely, securing water supplies and supporting healthy rivers.

THEME 1 Adapting to the impacts of global changes on river basins and aquifer systems

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.

- *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. HELP basins include the Lower Murrumbidgee catchment in the Murray Darling River Basin (coordinated by Awadesh Prasad, Murray Darling Basin Authority), Tully Basin (coordinated by Jim Williams, CSIRO), Lower Burdekin River Basin (coordinated by Keith Bristow, CSIRO), Fitzroy River basin (coordinated by Chris Carroll, Queensland Department of Environment Resources and Mines) and the Ord River Basin (coordinated by Jeff Camkin University of Western Australia and Dick Pasfield). Overall coordination in Australia is through Prof. Jeff Camkin, University of Western Australia.

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/>) has continued 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 and now offers a range of next generation products for Integrated catchment management, Complete River System management, Stormwater quality modelling, Urban water management and Ecological response management. This rapidly expanding product portfolio is the result of a partnership between the knowledge of leading scientists in the Australian water sector with the practical experience of frontline water managers from Government and Industry

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 Ecwise 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, Ecwise Environmental and the University of Adelaide have been investigating the vulnerability of water supply catchments in the Australian Capital Territory to global change.

The National Centre for Groundwater Research and Training (<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. CSIRO is researching use of aquifer storage and recovery with urban stormwater and recycled water to sustain depleted groundwater resources (www.clw.csiro.au/research/urban/reuse). 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 Ecwise 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.

A number of major programmes will be highlighted in detail later.

The Water Information Research and Development Alliance (WIRADA) brings together CSIRO's research and development expertise in water and information sciences and the Bureau of Meteorology's operational role in hydrological analysis and prediction. The Alliance has covered fields of data interoperability, hydrologic modelling, water accounting and water resource assessment. The [Water data transfer standards](#) project is defining and developing transfer standards and procedures for supply of specified data from water information providers and has contributed significantly to the development of an international data exchange standard named WaterML. Among the other significant contributions has been in improving the seasonal streamflow forecasting area using the Bayesian Joint Probability method which has been operationalised using the Bureau operational systems and now well accepted in the industry. One further development is the Australian Hydrological Geospatial Fabric which is a specialised Geographic Information System (GIS). This identifies the spatial relationships of important hydrological features such as rivers, lakes, reservoirs, dams, canals and catchments and makes working with geodata in a hydrological context much easier.

- *THEME 2 Strengthening water governance for sustainability*

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
- A framework for integrating water policy for managed aquifer recharge into water resources management was developed and is being taken up by those states where the need is most pressing (<http://www.nwc.gov.au/publications/waterlines/robust-policy-design-for-managed-aquifer-recharge>)

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

- CSIRO with NCGRT and IceWARM are providing training on MAR (management of aquifer recharge) including technical aspects, management policies and guidelines for health and environment protection
- Frameworks for determining sustainable yield of aquifers

CSIRO and SKM are each developing a thematic paper on groundwater governance for GEF-FAO (on groundwater recharge/discharge and aquifer equilibrium and on surface water-groundwater interaction, respectively)

- French-Australian Initiative on Water and Land Management through the UNESCO Chair in Water Economics and Transboundary Water Governance at ANU conducted "Food and Water Security shaping Land-use Futures" 12-14th June 2013 which has developed a continuing program of research on relevant issues in this focal area.

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

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.

The WIRADA [water resources assessment and water use accounting](#) project is developing methods and technologies, to enable the Bureau to provide integrated surface and groundwater

resource assessments, water accounts and water resource outlooks. The first 5 year agreement finishes in 2012 and will be reviewed for extension for a period of 3 more years

- *THEME 3 Ecohydrology for 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
 - Australia has three UNESCO Ecohydrology Program Demonstration sites (Ord River, Western Sydney and water planning in Australia, with all three featured in the 2012 UNESCO document "Ecohydrology for Sustainability").

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

The ANU and Ecwise 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. The Bureau has been given a new responsibility under the *National Plan for Environmental Information*, which is the first step on a long-term commitment to reform Australia's environmental information base and build this critical infrastructure for the future. It is initially a four-year program, and the first phase is a joint initiative between Commonwealth Department of Sustainability, Environment, Water, Population and Communities and the Bureau. The needs driving this initiative include looking at prioritising of investments in Natural Resource Management, identifying and predicting the impact of climate change, understanding environmental management decision impacts on the economy and society, activation of markets for environmental goods and services, improvement of the quality and transparency of environmental assessments for major projects and driving more sustainable resource management.

- *THEME 4 Water and life support systems*

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.

-
- An AusAID project has been approved to facilitate development of water quality guidance for managed aquifer in India. UNESCO Delhi office is assisting in project establishment.
- An IAH Commission on MAR project has commenced to produce a monograph on clogging in MAR and the international publication is being led by an Australian editorial team from AGT

and CSIRO. This addresses an important constraint on the effectiveness of recharge enhancement.

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

- 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. This now has partners in China, India and Singapore.
- Free exchange of information from Australian Water Conservation Reuse Research Program and UNESCO (<http://www.clw.csiro.au/publications/awcrrp/>)

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

- Climate variability and change and water resources for agriculture

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 for sustainable development*

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/)

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.

National Centre for Groundwater Research and Training (<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)

- The University of Western Australia has entered into a Memorandum of Understanding with the International Centre for Coastal Ecohydrology (under the auspices of UNESCO). Prof. Jeff Camkin, who coordinates HELP in Australia, has designed and delivered new components of the Erasmus Mundus MSc in Ecohydrology course in 2010, 2011, 2012. These courses have involved UNESCO HELP network participants from Australia, New Zealand, Malaysia, Philippines, France, Portugal, Spain, providing a bridge between UNESCO Ecohydrology and HELP programs and basins.
- *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. Australia currently has five UNESCO-IHP HELP basins (Ord, Murray Darling, Fitzroy (QLD), Burdekin and Tully. Further details are below.

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

1.2.1 National/local scientific and technical meetings

- MODSIM2013 congress held in Adelaide, South Australia, from Sunday 1st to Friday 6th December 2013. The theme for this MODSIM2013 event will be *Adapting to Change: the multiple roles of modelling*.
- Water Sensitive Urban Design 2013 WSUD 2013 Key dates, 25–29 November 2013 and the 8th International Water Sensitive Urban Design Conference 2013
<https://www.engineersaustralia.org.au/events/conferences>
- 35th Hydrology and Water Resources Symposium 2014 (HWRS 2014)
Perth, Western Australia to be held 17-23 February 2014 at the Pan Pacific Hotel. Website: <http://www.hwrs2014.com/>
- 2013 Asia Pacific Water Industry Modelling Conference the premier event in Asia Pacific for infrastructure modelling and management. The conference will be held on 4 & 5th September, 2013 at the Sofitel Hotel in Brisbane, Australia. <http://www.asiapacificwater.com/overview/>
- **WASH 2014 - Water, Sanitation and Hygiene for Everyone, Everywhere** **24-28 March 2014, Brisbane, Australia** **Web: www.wash2014.com.au**
- NOM5 Down Under - 5th IWA Specialist Conference on Natural Organic Matter Research 1-4 October 2013, Pan Pacific Hotel, Perth, Western Australia
Website: <http://www.awa.asn.au/NOM2013/>
- FENNER CONFERENCE FOR 2013 Shine Dome, the Australian Academy of Science, Canberra 10, 11 October 2013 "Population, Resources And Climate Change – Implications For Australia's Near Future"
- Stormwater 2014 - National Conference on Urban Water Management Hosted by the Stormwater Industry Association 13th - 17th October 2014, Hilton Adelaide, South Australia
- OZWATER'14 Brisbane Jan, 2014
- The 40th International Congress of the IAH hosted in Perth between 15 and 20 September, 2013. Themed 'Solving the Groundwater Challenges of the 21st Century'
- Stormwater 2014 **3rd National Conference on Urban Water Management**
13 - 17 October, 2014 - Adelaide, South Australia
- 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>).

- FRENCH-AUSTRALIAN FORUM ON WATER AND LAND MANAGEMENT
 “Food and Water Security shaping Land-use Futures”12-14th June 2013 The Australian National University, Canberra, Australia
 This event is the second forum for the French-Australian Initiative on Water and Land Management and had participation from a number of IHP Committee members -Profs Quentin Grafton, Ian White and Trevor Daniell

1.2.2 Participation in IHP Steering Committees/Working Groups

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. Jeff Camkin, University of Western Australia, was invited to the Steering Committee for the 2nd International HELP Symposium Building Knowledge Bridges for a Sustainable Water Future, Panama, November 2011.

Ian Cordery is a Member of International Hydrological Program (UNESCO) Working Party on “Coping with Water Scarcity”.

1.2.3 Research/applied projects Pacific Islands (Information supplied by Ian White and Tony Falkland)

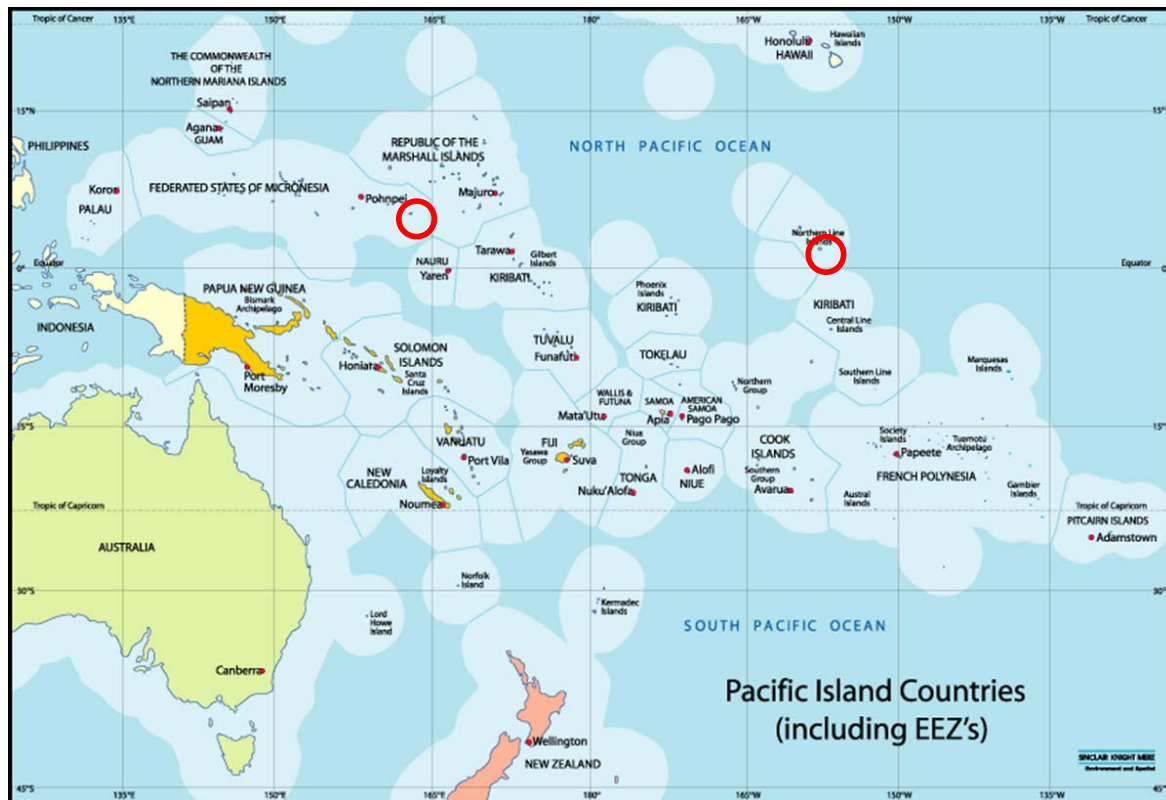


Figure 1. Pacific Island Countries (PICs) and their vast oceanic economic exclusion zones. The Pacific is a key element in the Earth’s water and energy cycles and supplies 75% of the world’s tuna stock. The red circles show the position of Kiritimati, Kiribati and Kosrae, Federated States of Micronesia

1.2.3.1 Context

The recent UN General Assembly Third International Conference on Small Island Developing States (SIDS) in Apia, Samoa held on 1-4 September 2014 concluded in the Outcomes that SIDS face numerous challenges to water resources:

- pollution
- overexploitation of surface & groundwater & saline intrusion,
- drought & water scarcity,
- Soil erosion & impacts on coral ecosystems & reefs,
- Lack of water & wastewater treatment, sanitation & hygiene.
- Changes in rainfall patterns related to climate change & impacts on water supply

In the Pacific (Figure 1), where many island states fall within the Least Developed Nations category, these challenges are exacerbated by limited resources and capacity. The SIDS are insignificant contributors to greenhouse gas emissions, yet will experience a disproportionate impact of climate change, especially the projected impacts of sea-level rise (Figure 2).

The above significant challenges coupled with resource and capacity limitations, mean that PICs as a whole will not meet the 2015 Millennium Development Targets for water and sanitation (Figure 3)

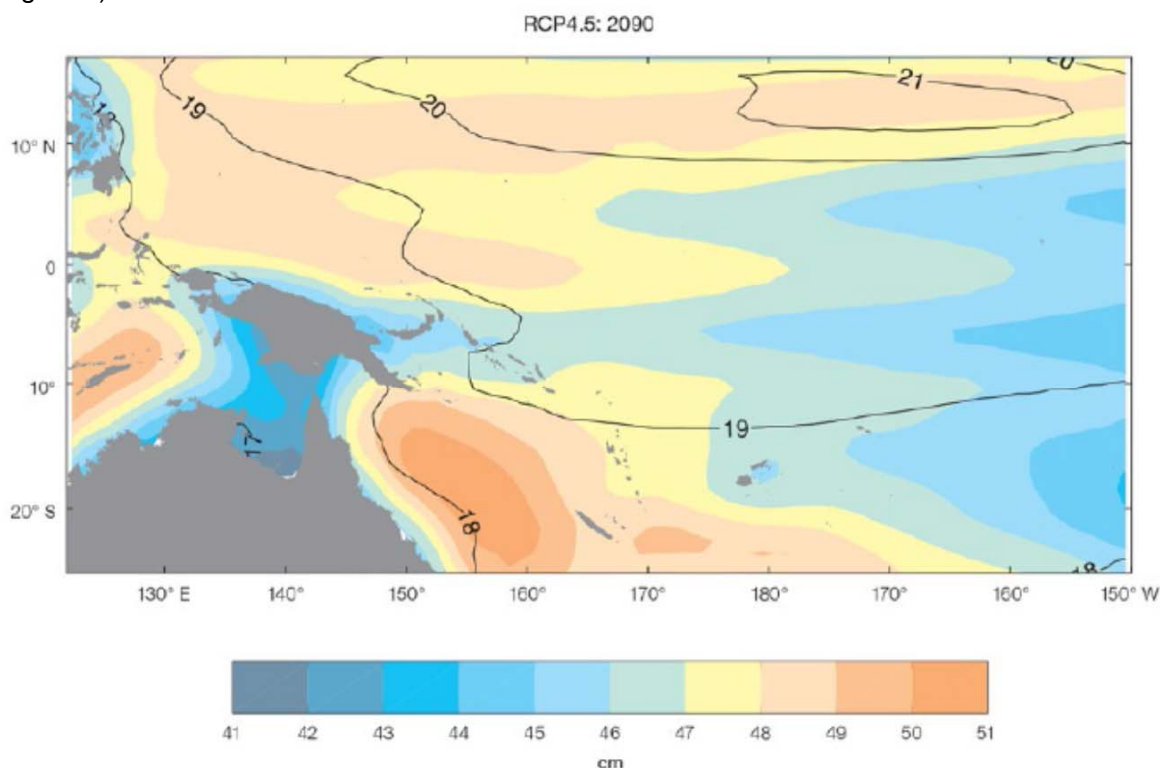


Figure 2. The regional distribution of projected sea-level rise for the period 2081–2100 relative to 1986–2005 from emissions scenario RCP4.5. The uncertainty is indicated by the contours (in centimetres). [BoM & CSIRO (2014). Climate Variability, Extremes and Change in the Western Tropical Pacific: New Science and Updated Country Reports 2014, Pacific-Australia Climate Change Science and Adaptation Planning Program].

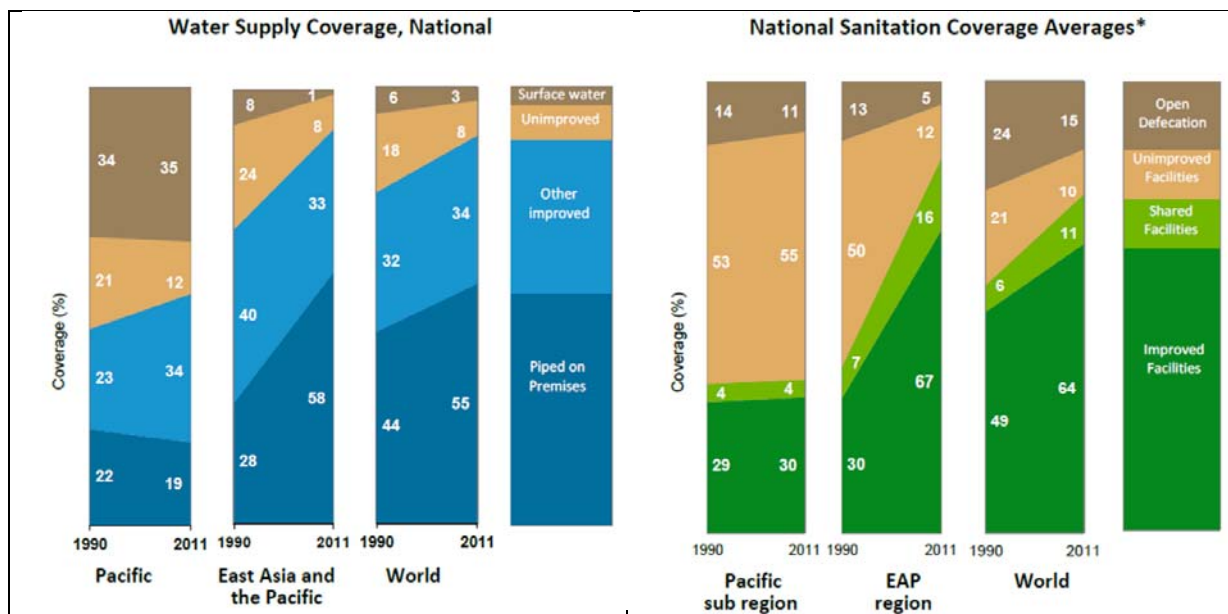


Figure 3. Progress towards meeting the 2015 Millennium Development Targets in water and sanitation in Pacific Island Countries, East Asia and the Pacific and the World (UNICEF). The failure to meet those targets is reflected in alarming health statistics, particularly amongst infants (Figure 4) and the elderly. These emphasise that water and sanitation are a vital issue in Pacific Island Countries.

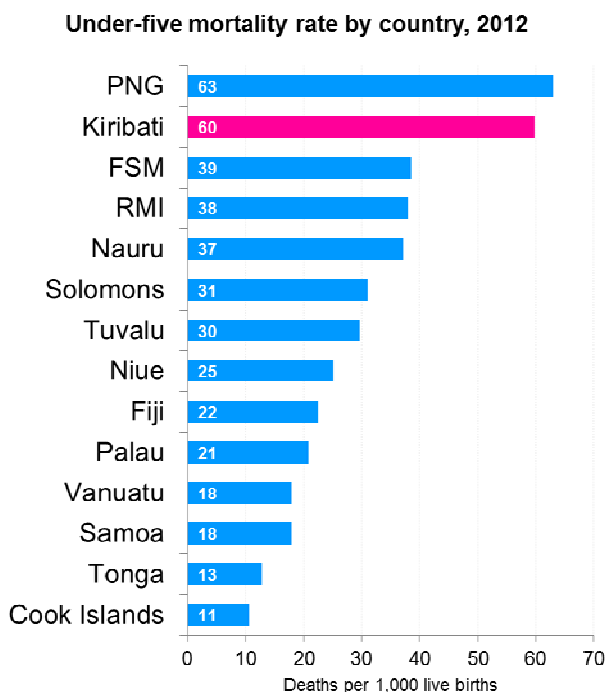


Figure 4. Under five infant mortality rates in Pacific Island Countries (UNICEF). For Australia, the infant death rate is around 4 deaths per 1,000 live births (UNICEF, year?).

**1.2.3.2 Australian Activities in Pacific Island Countries
Threats to Water Security**

An analysis was carried out by Tony Falkland for the Australian Government of the threats to water security in 14 diverse Pacific Island Nations, Cook Islands, Federated States of Micronesia, Fiji, Kiribati, Nauru, Niue, Palau, Papua New Guinea, Republic of the Marshall Islands, Samoa,

Solomon Islands, Tonga, Tuvalu and Vanuatu (Figure 1) and included Timor Leste, to the year 2030. The analysis included projections of changes in future climates and sea-level out to the year 2030.

The study (Falkland, A. 2011-14, Water security and vulnerability to climate change and other impacts in Pacific Island countries and East Timor) concluded that the highest risks to water security out to the year 2030 were;

- increasing water demands due to population growth and urbanisation,
- pollution of water resources,
- saline intrusion into fresh groundwater due to over extraction,
- leakage from urban pipe systems,
- impact of natural hazards,
- poor water governance, management and monitoring,
- inadequately resourced agencies with restricted capacity,
- financially unsustainable water supply systems,
- vandalism and conflicts arising from property rights disputes between land owners and governments.

Crowded urban and peri-urban locations, remote communities and low-lying areas were considered most at risk.

Strategies for reducing the above risks included:

- improved water governance,
- increased assessment and monitoring of water resources,
- designing appropriate water supply systems,
- improving demand management,
- improving drought and flood planning,
- capacity building and training, and
- improving community education, awareness and participation.

1.2.3.4 Water Policy and Planning Development

Faced with the complexity and uncertainty of future climates in the Pacific Barnett (Barnett, J. (2001). *Adapting to Climate Change in Pacific Island Countries: The Problem of Uncertainty*, World Development, 29 (6): 977-993. Barnett, J. (2005). *Titanic states? Impacts and responses to climate change in the Pacific Islands*. Journal of International Affairs, 59 (1): 203–219) concluded that the only rational adaptation strategy in the Pacific is to:

- develop the general capacity of a society to cope with change by building up its institutional structures and human resources while
- maintaining and enhancing the integrity of ecosystems

The building up of institutional structures includes the development of national water and sanitation policy and implementation plans. Previously Australian IHP has assisted the governments of the Republic of Kiribati and the Republic of Nauru to develop national water, sanitation and hygiene policy and implementation plans.

In collaboration with the Applied Geoscience and Technology Division of the Secretariat of the Pacific Community, SPC, under the GEF Funded Pacific Islands Integrated Water Resource Management Program, Australian IHP Committee has assisted the government of Solomon Islands (Figure 1) through its National Intersectoral Water Coordination Committee to develop its 2014 National Water and Sanitation Policy and Implementation Plan.

1.2.3.5 Pacific Regional Program: Practical Climate Resilient Approaches for Food and Water Security and Coastal Zone Management

The overall aim of this program is to strengthen the national capacity of participating Pacific Island Countries to build their climate resilience and manage climate-related risks. The principal aims of the water sector contribution to Component 2, carried out by the Australia IHP Committee are to:

- carry out an initial risk assessment and analysis that identifies where gaps in water resources information represent a significant impediment to the management of current and emerging risks associated with climate variability and climate change; and

- to Identify practical opportunities in which participating countries can be assisted to strengthen their collection, management, analysis, communication and effective use of water resources information in order to achieve improved water security in the face of climate change

The project is supported by the World Bank and coordinated by SPC and examined pilot sites in Kiritimati Atoll in the Republic of Kiribati and Kosrae island in the Federated States of Micronesia.

1. Pilot sites

In terms of climate, geography and geomorphology, these islands are at opposite ends of the spectrum. Kiritimati, a low, limestone atoll, lying on the edge of the equatorial dry zone, with very poor soils, has the lowest mean, and most variable, annual rainfall of any permanently settled atoll in the Pacific. Kosrae, a high volcanic island on the northern edge of Pacific warm pool (PWP) and within the path of the intertropical convergence zone (ITCZ), with highly productive soils has one of the wettest coastal zones in the world with low rainfall variability.

Kiritimati relies heavily on scarce highly vulnerable groundwater lenses overlying seawater for its water sources. Kosrae has abundant rainfall and perennial streams as well as groundwater.

Paradoxically, the high island of Kosrae is much more vulnerable to sea level rise, because of the clustering of its settlements around the coastal fringe and its geographic position in the northwestern equatorial Pacific cyclone zone, than the low atoll of Kiritimati in the central eastern equatorial zone outside the cyclone zone. In Kiritimati the discrete freshwater lenses are at slightly higher elevation than in other atolls.

2. Issues in Common

Despite the vast differences in governance, geography, geology, cultures and climate, the study found that Kiritimati and Kosrae share common issues which increase risk in the water supply and sanitation sector.

1. Inadequate monitoring of water resources with major implications for management and planning
2. Inadequate storage of water resource data
3. Lack of capacity and resources to use data to improve management
4. Lack of capacity and resources to critically assess aid projects in the sector
5. Almost no connection with the local meteorology office
6. Poor communication and cooperation between water agencies.
7. Poor systematic communication between water agencies and island government
8. Decaying infrastructure with inadequate maintenance
9. Lack of resources to treat water
10. Lack of capacity and resources to plan or implement plans
11. Aid projects being implemented in the sector which are not whole island solutions and will not address future development needs.
12. Sub-optimal use of rainwater harvesting
13. Potential to increase the use of renewable energy in water supply systems.
14. Sanitation is scarcely mentioned.

Pilot projects were designed in each site to address these issues, particularly to enhance monitoring and analysis of climate and water parameters, to increase the use of seasonal forecasting, to enable development of safer locations and to engage local communities.

3. Rainfall Harvesting and Storage in Funafuti Tuvalu

Water resources in low-lying coral atolls are amongst the most vulnerable in the world due to the high permeability of the coral sands and the thin fresh groundwater lens, the main storage, which overlies seawater. In some atolls the coral sands are so permeable that no fresh groundwater exists. These atolls must rely on rainwater harvesting or desalination to supply their water needs.

Funafuti atoll (Figure 5), the capital atoll of Tuvalu has no fresh groundwater and rainfall harvesting is the principal source of fresh water.

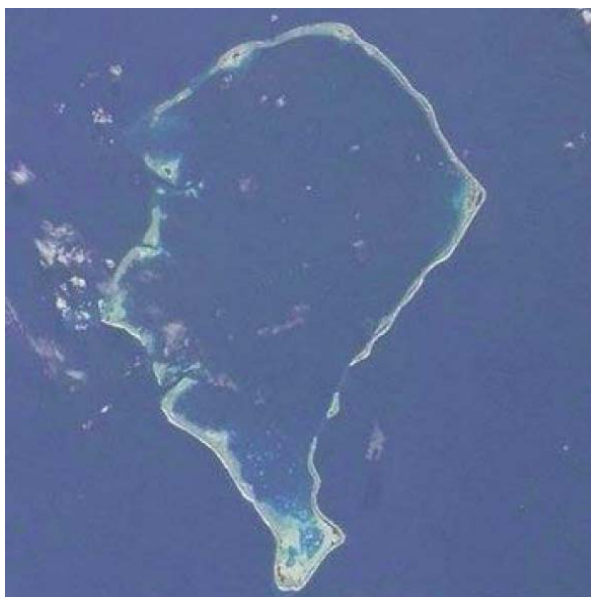


Figure 5. Funafuti atoll, Tuvalu has no fresh groundwater and must rely on rainwater harvesting and desalination for water supply (NASA Shuttle Mission STS104, Jul 2001).

It is extremely vulnerable to drought. In an AusAID funded project through SPC, Australian IHP has carried out an analysis of the risk of failure of rainwater harvesting systems in Funafuti. The study identified that the three principal contributors to the failure of rainwater harvesting in Funafuti are the large demands in large family dwellings, the limited roof areas and rainwater tank storage volumes and inadequate guttering. It was found that there is a critical roof area to rainwater tank capacity ratio that needs to be supplied to reduce the risk of failure. The AusAID project is aimed at decreasing the risk of failure by improving rainwater harvesting infrastructure and its management.

Water Supply Improvements, Kiritimati (Christmas Island), Republic of Kiribati

Kiribati consists of 33 islands scattered across 5 million km² with a population of about 100,000 living in 20 low-lying coral atolls and islands. It is a least developed country with a GDP per capita of about US\$1,300.

Kiritimati is the largest coral atoll in the world with a total area of about 640 km². About 60% of this area is land while the remainder consists of lagoons. Kiritimati comprises 70% of the total land area of Kiribati and is the second most populated island in the nation with a growing population of about 6,000 (2010 Census). The Government of Kiribati has designated Kiritimati as the main potential growth island in Kiribati.. As a result of the government's strategy, Kiritimati population growth forecasts predict an annual growth rate of 8%.



Figure 6. Satellite image of Kiritimati atoll, Kiribati.

Kiritimati is located within the equatorial dry zone of the Pacific Ocean and its climate is dominated by long drought periods associated with La Niña periods and high rainfall periods associated with El Niño events. The mean annual rainfall is just less than 1,000 mm and the coefficient of variation, C_v , of annual rainfall is 0.72, which is very high. The average annual rainfall is lower and more variable than on other populated Pacific Island countries. Most other Pacific Island countries have average annual rainfalls between 1,500 mm and 3,000 mm and C_v 's of annual rainfall between 0.15 and 0.25.

The freshwater resources of Kiritimati consist of groundwater and limited rainwater. The fresh groundwater occurs as 'freshwater lenses' which are fresh groundwater aquifers overlying seawater. These freshwater lenses have formed in favourable locations under the surface of the atoll. The soils are too permeable to support any fresh surface water resources.

The current Kiritimati Improved Water Supply Project, funded by the European Union and managed by the Water and Sanitation Programme of SPC, is focused on water supply improvements for the second largest village of London and a nearby settlement Tennessee. The overall objective of the Project is to improve livelihoods and enable human, social and economic development on Kiritimati Island.

Main activities of this project are:

- Install, rehabilitate and operate monitoring bores for the freshwater lenses used to supply London and Tennessee and revise assessments of sustainable yields.
- Undertake urgent improvement works to the existing water supply system, including rehabilitation of infiltration galleries and solar and wind powered pumps, install flow meters and refurbish water disinfection facilities.
- Undertake detail design work of the proposed water supply upgrade works and construct new facilities (including infiltration galleries, pipeline, storage tanks).
- Provide training to local water supply personnel in water supply system management, operation and maintenance and in vital water monitoring activities.
- Implement consumer education and awareness regarding the wise use of the limited available water resources.

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 (coordinated by Awadesh Prasad, Murray Darling Basin Authority), Tully Basin (coordinated by Jim Williams, CSIRO), Lower

Burdekin River Basin (coordinated by Keith Bristow, CSIRO), Fitzroy River basin (coordinated by Chris Carroll, Queensland Department of Environment Resources and Mines) and the Ord River Basin (coordinated by Jeff Camkin University of Western Australia and Dick Pasfield). Overall coordination in Australia is through Prof. Jeff Camkin, University of Western Australia.

Prof. Jeff Camkin was an invited keynote presenter at the IHES/UNESCO Symposium Restoring Rivers for Future, South Korea (April 2011) and invited member of the Steering Committee for the UNESCO-IHP HELP 2nd International Symposium Building Knowledge Bridges for a Sustainable Water Future in Panama, November 2011.

The HELP Program, and HELP network participants from Australia and other countries, has featured in new modules developed for the Erasmus Mundus MSc in Ecohydrology delivered at the University of Algarve through a collaboration between the International Centre for Coastal Ecohydrology (under the auspices of UNESCO), the UWA and Technical University of Lisbon.

Activity in the Murray Darling HELP Basin has focussed on the development of a Basin plan, the largest ever water reform in the Murray Darling Basin.

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

As President of the WMO Commission for Hydrology Network, Mr Bruce Stewart provided a link between the UNESCO IHP and WMO's Operational Hydrology Programme. Mr Tony Falkland and Prof Ian White are members of the Water Working Group of the Science, Technology and Resources Network of the South Pacific Applied Geoscience Commission. Prof Ian White is a member of the Asian Pacific Association of Hydrology and Water Resources. Mr Trevor Daniell is the past Chairman of the FIGCC and was editor of the FRIEND 2014 Conference papers. Dr Peter Dillon chairs the IAH Commission on Managed Aquifer Recharge. University of Western Australia has entered into a Memorandum of Understanding with the International Centre for Coastal Ecohydrology (under the auspices of UNESCO). Prof. Jeff Camkin, who coordinates HELP in Australia, has designed and delivered new components of the Erasmus Mundus MSc in Ecohydrology course in 2010 to 2014 and further work is being developed under the MoU.

1.2.6 Major activities of BoM

To celebrate National Water Week, the Bureau of Meteorology [released the Australian Groundwater Explorer](#) at Australian Parliament House.

Parliamentary Secretary to the Minister for the Environment, Simon Birmingham, launched the valuable tool which provides a comprehensive picture of Australia's groundwater resources.

National Water Week is a great time to increase community awareness around water issues and how best to use our valuable water resources.

The Australian Government's Improving Water Information Programme, led by the Bureau and supported by water agencies across the country, is helping to improve our national understanding of all water resources, including groundwater.

Explore Australia's Groundwater resources

Now available from the Bureau's website, the [Australian Groundwater Explorer](#) is a web mapping portal for visualising, analysing and downloading Australian groundwater data. It is the first system to make Australian groundwater data publicly available at a national scale.

The Explorer contains bore and bore-log information for over 800 000 sites, as well as contextual datasets, such as surface geology and sedimentary basins.

Interactive maps let you pan and zoom to particular locations, and selected information can be analysed and accessed as tables or graphs. Advanced search functionality allows you to combine multiple scenarios to search for bores based on their attributes, data availability and location.

[Check out the Australian Groundwater Explorer](#)

3D model of Murray Basin

A 3D hydrostratigraphy model has been developed for the Murray Basin in southeastern Australia. The model can be viewed as an interactive PDF in the new [Australian Groundwater Explorer](#), so you can view the data in 3D, including the ability to zoom in and out, pan and turn layers on and off.

The model has nine layers, which represent the aquifers and aquitards in the Murray Basin. Layers for the New South Wales section were produced by the Bureau of Meteorology using hydrostratigraphy logs interpreted by the NSW Office of Water. Victorian layers were provided by the Department of Environment and Primary Industries and South Australian layers by the Department of Environment, Water and Natural Resources.

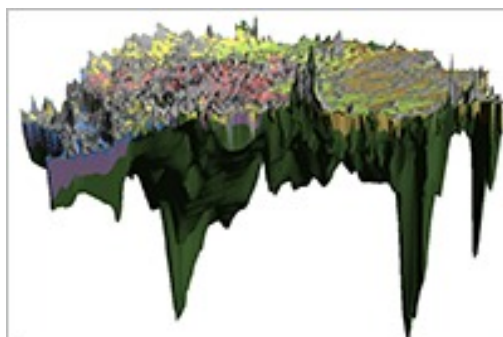
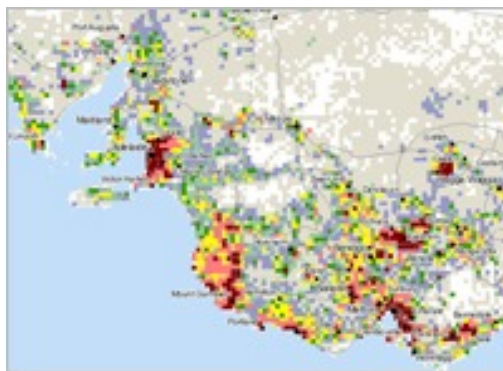
The dataset, including ESRI georasters and geovolumes, is available by email request to groundwater@bom.gov.au

Water data at your fingertips

Water Data Online provides a single access point to nationally consistent, timely data from thousands of water monitoring stations across Australia.

As a water manager, policymaker, researcher or industry professional, you can better understand Australia's water resources by viewing or downloading data and reports. You can now find standardised watercourse level and watercourse discharge data from approximately 3500 water monitoring stations around Australia.

Water Data Online displays information collected by the Bureau of Meteorology from lead State and Territory water agencies under the Water Regulations 2008. Over time, more stations and parameters will become available and linkages will be made from the Geofabric.



Access [Water Data Online](#) now or contact us for more information at waterdatasupport@bom.gov.au

Geofabric made simple

A new video released also released this week shows how the Australian Hydrological Geospatial Framework (Geofabric) is like a digital street directory of Australia's important water features.

The Geofabric lets you visualise how water is moved, used and stored throughout the landscape. Understanding how rivers, lakes and water storages are all connected is vital for the effective management of water resources.

The video shows how the Geofabric works seamlessly across the country. It also demonstrates how you can trace the flow-directed stream network and create customised catchments—widely used by hydrologists to inform environmental management and reporting.

[View the Geofabric video](#)

For more information

Visit the [Bureau's Improving Water Information Programme](#) website
Send feedback to waterinfo@bom.gov.au

Source for information below: <http://www.bom.gov.au/water/about/waterResearch/wirada.shtml>

1.2.7 WIRADA

Water Information Research and Development Alliance

The Water Information Research and Development Alliance (WIRADA) is a partnership between the Bureau of Meteorology and The Commonwealth Scientific and Industrial Research Organisation. WIRADA brings together CSIRO's leading expertise in water and information sciences and the Bureau's operational role in hydrological analysis and prediction to deliver value-added water information products and tools.

The initial \$50 million investment during 2008 to 2013 delivered significant scientific and research innovation required by the Bureau to fulfil its national water information mandate. A snapshot of the [outstanding achievements made by WIRADA previously](#) is available for download. Details on the achievements of WIRADA are also in annual reports under the Key Documents list below.

Further investment in WIRADA is set to continue for the three years from 2013 to 2016. Research priorities are described in the 2013-16 [science plan](#). During this time, we will refine and build on the significant achievements of earlier work in water information systems, water accounting and assessment, and water forecasting and prediction. WIRADA projects

Current Alliance projects (2013-14)

Current projects include:

Informatics - data services
AWRA modelling system development
Flood and short-term water forecasting
Seasonal water forecasting







Previous Alliance projects (2008-2013)

Alliance projects from 2008-2013 cover four broad categories:









- Water information systems
- Foundation data products
- Water accounting and assessment
- Water forecasting and prediction

An overview of the 2008-2013 research program and achievements is available from the WIRADA information sheet (449KB) and achievements brochure. Individual project descriptions can be accessed via the links below.

- 1.2 [Hydrologists workbench \(345KB\)](#)
 - 1.4 [Water data transfer standards \(281KB\)](#)
 - 1.5 [Sustainable water information models \(326KB\)](#)
 - 1.6 Australian Spatial Research Data Commons (Associate Project)
 - 1.9 [Bedding-down the Geofabric](#)
 - 1.10 [Spatial Information Services Stack for the Bureau](#)
 - 1.12 [WaterML2.0 – part 2, leveraging international standards](#)
- Making metadata work:

- 1.8 Describing and transforming adhoc water data
 - 1.11 Tools and Documentation
 - 2.1 [One-second Continental DEM \(363KB\)](#) 
 - 2.2 [Foundation Data Products \(406KB\)](#) 
 - 3 [Australian Water Resources Assessment \(AWRA\) \(508KB\)](#) 
 - 3.2 AWRA system integration
 - 3.3 AWRA model development
 - 3.4 AWRA dynamic land cover and landscape water
 - 3.5 AWRA model-data fusion
 - 4.1 [Water forecasting and prediction – short term \(346KB\)](#) 
 - 4.2 [Water forecasting and prediction – seasonal to long term \(286KB\)](#) 
 - 5 [Improving rainfall forecasts \(391Kb\)](#) 
 - 5.1 Seamless Rainfall Forecasts
 - 5.2 Towards improved short-range NWP precipitation forecasts
 - 5.3 Improving Multi-Week Rainfall Predictions

Key WIRADA Documents

- [Alliance Science Plan 2013-16 \(685KB\)](#) 
- [Annual report 2013-14 \(5.0MB\)](#) 
- [Annual report 2012-13 \(6MB\)](#) 
- [Annual report 2011-12 \(4.7MB\)](#) 
- [Annual report 2010-11 \(4.5MB\)](#) 
- [Annual report 2009-10 \(6.5MB\)](#) 
- [Annual report 2008-09 \(2.1MB\)](#) 
- [WIRADA Implementation Strategy \(2013-2016\) \(61kB\)](#) 

1.2.8 Australian Rainfall and Runoff

Books and Chapters

<http://www.arr.org.au/arr-guideline/books-and-chapters/>

The current and proposed layouts of ARR are:

– 1987 Version (2nd Edition) – 14 Chapters in 1 book; ■– 1997 Version (3rd Edition) – 14 Chapters split over 8 books; ■– 4th Edition – 2015 – 49 Chapters distributed over 9 books;

The Draft Book titles are (as at October 2013):

- BOOK I – SCOPE AND PHILOSOPHY; ■
- – BOOK II – RAINFALL ESTIMATION; ■
- – BOOK III – PEAK FLOW ESTIMATION; ■
- – BOOK IV – CATCHMENT SIMULATION;
- ■– BOOK V – HYDROGRAPH ESTIMATION;
- ■– BOOK VI – FLOW HYDRAULICS; ■
- – BOOK VII – APPLICATION OF CATCHMENT MODELLING SYSTEMS;
- ■– BOOK VIII – LARGE TO EXTREME FLOOD ESTIMATION;
- ■– BOOK IX – RUNOFF IN URBAN AREAS;

ARR Update October 2014

<http://www.arr.org.au/news/arr-update-october-2014/>

ARR Test Catchments EOI – Update

We received a large number of submissions to the Expressions of Interest for involvement in the ARR Test Catchments program. Over 150 EOI's were received from a range of organisations including academics, local government and

private companies. Submissions were sent in from all states and some from overseas. All submissions have been accepted. The state representatives have been busy collecting data for the testing. Thank you to all local and state government agencies that have volunteered their catchments and data. Over 25 catchments have been selected across the country and in a range of climates. We are currently testing all the data necessary to complete the tests is available and road testing the methodology. We expect to role out the testing to all EOI applicants in November.

2014 Stormwater National Awards

Stormwater Australia have announced the finalists for the 2014 Stormwater National Awards for Excellence to be announced 15 Oct. Two ARR funded projects are finalists in the Excellence in Research and Innovation category.

- Analysis of Effective Impervious Area and Pilot Study of Losses in Urban Catchments by Cardno and Engineers Australia Urban Rational Method Review by Cardno and Dr Allan Goyen
- The Urban Rational Method won the NSW/ACT Stormwater Award in the Excellence in Research and Innovation category announced 14 July 2014.

The Urban Rational Method has been the topic of debate on the [ARR LinkedIn](#) page. More information on Rational Method Developments can be also be found on the [Project 13](#) page.

Urban Hydrology

ARR is looking for suitably qualified people to assist in the development of content and as a reference panel for the Urban Hydrology chapter of ARR. If you are interested in participating please submit a brief CV of relevant experience to arr_admin@arr.org.au by COB 31st Oct.

Climate Change Guidelines

ARR will be launching its Interim Climate Change Guidelines at the Engineers Australia Convention 2014 in Melbourne in November. These guidelines were lead by Dr Bryson Bates from CSIRO. This draft discussion paper draws on the most recent climate science, particularly the release of the IPCC Fifth Assessment Report on the Physical Science Basis in September 2013 (IPCC, 2013) as well as the new climate change projections for Australia (CSIRO and BoM, 2014), and outlines an approach to address the risks from climate change in projects and decisions that involve estimation of design flood characteristics. For consistency with the revised IFD design estimates for Australia, the Interim Guideline is intended to be applied to current-day rainfall intensities with a probability of one exceedance per year or annual exceedance probabilities (AEPs) from 50% to 1%.

Workshop at Convention 2014

ARR will be running a workshop on latest updates at the [Engineers Australia Convention 2014](#) in Melbourne in November. The workshop will include a demonstration of the Project 18 Interaction of Coastal Processes and Severe Weather Events software developed by the University of Adelaide.

Revision Project Reports

Source <http://www.arr.org.au/downloads-and-software/revision-project-reports/>

Revision project reports and other information is available for download from this site as it becomes available.

The reports currently available are:

STAGE 3:

- [Project 13 \(Urban Rational Developments\) Stage 3 Report](#)
- [Project 11 Draft Blockage Guidelines](#)

STAGE 2:

[ARR Workshop on Climate Change: Discussion Paper](#)
[ARR Climate Change Research Plan \(summary\)](#)
[Project 2 \(Spatial Pattern of Design Rainfall\) Stage 2 Report](#)
[Project 2 \(Spatial Pattern of Design Rainfall – Short Duration\) Stage 2 Report](#)
[Project 4 \(Continuous Rainfall Sequences at a Point\) Stage 2 Report](#)
[Project 5 \(Regional Flood Methods\) Stage 2 Report](#)
[Project 6 \(Loss Models for Catchment Simulation – Rural Catchments\) Stage 2 Report](#)
[Project 6 \(Loss Models for Catchment Simulation – Urban Catchments\) Stage 2 Report](#)
[Project 7 \(Baseflow for Catchment Simulation\) Stage 2 Report](#)
[Project 10 \(Literature Review on Vehicle Safety\) Stage 2 Report](#)
[Project 11 \(Blockage of Hydraulic Structures\) Stage 2 Report](#)
[Project 15 \(Two Dimensional Modelling of Urban and Rural Floodplains\) Stage 1/2 Report](#)

[Project 15 \(Two Dimensional Simulations in Urban Areas\) Stage 2 Report](#)
[Project 18 \(Interaction of Coastal Processes and Severe Weather Events\) Stage 2 Report](#)
[Monte Carlo Simulation Discussion paper](#)

STAGE 1:

[Project 4 \(Continuous Rainfall Sequences at a Point\) Stage 1 Report](#)
[Project 5 \(Regional Flood Methods\) Stage 1 Report](#)
[Project 7 \(Baseflow for Catchment Simulation\) Stage 1 Report](#)
[Project 10 \(Appropriate Safety Criteria for People\) Stage 1 Report](#)

[Project 11 \(Blockage of Hydraulic Structures\) Stage 1 Report](#)

Chapters

Source <http://www.arr.org.au/downloads-and-software/chapters/>

Drafts of ARR chapters will be made available for [download](#) and review on this website once they are available.

Drafts of the following chapters are currently available for download: [Download Terminology Draft Discussion paper](#)

[Download Book 3 – Chapter 1 – Introduction](#) [Download Book 3 – Chapter 2 – Flood Frequency](#)

[Download Book 5 – Chapter 1 – Introduction](#) [Download Book 5 – Chapter 4 – Baseflow Models](#)

[Download Book 9 – Chapter 6 – Safety Design Criteria](#)

Practice Advice on Flood frequency Analysis can be found [here](#).

The ARR editorial team welcomes comment from industry on the draft chapters. To have your say, [contact us](#)

1.3 Educational and training courses

The National Centre for Groundwater Research and Training (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.

Some of Particular interest are :

New Water Policy and Practice Journal: A platform for the world's emerging water leaders and thinkers **Edited by Susana Neto and Jeff Camkin,**

New Water Policy and Practice Journal has a strong focus on identifying and encouraging new and integrated thinking about water challenges and will feature contributions from both existing and emerging water leaders and thinkers. Supported by Policy Studies Organisation, Washington DC, USA, the Journal will initially be published twice per year, commencing in 2014.

Recent publications of National Water Commission

<http://www.nwc.gov.au/publications>

[Australia's water blueprint: national reform assessment 2014](#)

20 Oct 2014

[Urban water futures 2014](#)

14 Oct 2014

Over the past 10 years, the Australian urban water sector has weathered new extremes in drought and flood and, as a result, has changed significantly.

[Annual report 2013-14](#)

07 Oct 2014

This is the National Water Commission's report to parliament on our performance in 2013–14. It reports on our performance against our outcome, deliverables and key performance indicators as outlined in our Portfolio Budget Statement.

[Australian environmental water management: 2014 review](#)

13 Aug 2014

assesses ongoing performance in achieving the National Water Initiative's integrated environmental water management outcomes.

[National Water Planning Report Card 2013](#)

07 Jul 2014

Provides a summary of the status of water plans across Australia.

[National Partnership agreement assessments](#)

11 Jun 2014

Assesses jurisdictional performance against milestones in the National Partnership agreement on Implementing Water Reform in the Murray-Darling Basin.

[Australian water markets: trends and drivers 2007–08 to 2012–13](#)

26 May 2014

This report documents the main trends and drivers across the water market since 2007–08, focusing on the Murray–Darling Basin (MDB) which represents 94% of the Australian water market.

[A review of Indigenous involvement in water planning, 2013](#)

22 May 2014

Assists in understanding the arrangements that jurisdictions have in place to meet Indigenous water needs and assess their effectiveness.

[National Performance Report 2012–13: urban water utilities](#)

24 Apr 2014

This eighth annual report provides a detailed account of the performance of 81 urban water utilities servicing 18.7 million Australians.

[Integrating groundwater and surface water management in Australia](#)

03 Apr 2014

Examines progress to date and outlines further opportunities for governments to optimise the benefits of integrated management and potentially achieve multiple water management objectives.

[National Performance Report 2012-13: rural water service providers](#)

02 Apr 2014

This report, now in its seventh year, publishes data for 11 rural water service providers across Australia.

[Australian water markets report 2012-13](#)

23 Dec 2013

Informs market participants about market structure, trading activity, prices and policy decisions influencing market performance.

[Current issues influencing Australian water markets](#)

02 Dec 2013

Supplements the Commission's annual Australian water markets report by examining in more depth a number of issues seen as influencing water markets and water market behaviour now and in the future.

[Water management and pathways to sustainable levels of extraction: issues paper](#)

19 Nov 2013

Examines extraction limits in systems at varying levels of development, describes different approaches for improving the sustainability of water management, and investigates factors that affect the likelihood of success.

[Monitoring and evaluation for adaptive water management: issues paper](#)

19 Nov 2013

Assesses the current monitoring, evaluation, reporting and improvement (MERI) arrangements for water plans across all jurisdictions in Australia, including in the Murray–Darling Basin.

1.5 Participation in international scientific meetings

There have been numerous individuals participating in many meetings for IHP, APFRIEND, WMO, SOPAC, HELP.

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/)

Dr Peter Dillon of the CSIRO, Water Recycling and Diversified Supplies, Urban Water Theme, Water for a Healthy Country Flagship Program, CSIRO Land and Water, has been active in Managed Aquifer Recharge across the region and beyond.
www.clw.csiro.au/research/urban/reuse

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 Conference Activities in 2014/15

2.2 Activities Planned for 2014/15

- Transference of the outcomes of update of ARR to the International Community.
- Continuation of assistance to Pacific Island Projects.
- Continuation of involvement in Asian Pacific FRIEND and Global FRIEND
- Continuation of involvement in HELP
- Participation in the IHP Intergovernmental Council of 2014/2015

2.3 Activities envisaged in the long term

No information available at this time.

CHINA

National Report on IHP Related Activities for

22st UNESCO IHP Regional Steering Committee (RSC) Meeting
for Southeast Asia and the Pacific (SEAP)

Contribution to IHP-VIII (2014-2021)

13-14th November 2014
Yogyakarta, Indonesia

Chinese National Committee for the IHP

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1. ACTIVITIES UNDERTAKEN IN THE PERIOD October 2013 – November 2014

1.1 Meetings of the Chinese National Committee for IHP

1.1.1 Decision regarding the composition of the Chinese National Committee

The current IHP national committee consists of **29** distinguished water experts who are active in hydrology and water resources work in China (see **Annex I**).

1.1.2 Status of IHP-VIII activities

China national committee has arranged projects and activities in all themes and almost all focal points of IHP-VIII through national committee members, focal points and working groups around the country..

1.1.3 Decision regarding contribution to/participation in IHP-VIII

During Oct 2013 to Now 2014, there were a couple of informal IHP national committee meetings or discussions. Through some focal points for certain projects, members of IHP and working groups desired to complete the on-going projects in their capacities. Meanwhile, the committee encourages IHP members to continue sharing knowledge and technology, and cooperate in various ways to promote hydrological development. Most activities are carried out among organizations of committee members.

1.2 Activities at national level in the framework of the IHP

1.2.1 National/local scientific and technical meetings

(1) National Hydrology work video conference was held on 28 February 2014, in Beijing. This is an annual work meeting particularly in the field of hydrology. The vice minister of WMR - Mr. Liu Ning, Chairman of China IHP national committee also the director general of the bureau of hydrology of WMR, Mr. Deng Jian, and various committee members of the national IHP committee participated the video conference meeting. Officers of provincial water authorities, provincial bureau of hydrology and bureau of hydrology from each river basin commission took part in the video conference at their own office. The meeting reviewed work achievements, problems and experiences learnt from the past, and discussed about the current situation and demands to hydrological work, and set up objectives for the hydrological work for the year of 2014. According to Vice Minister Liu Ning, the achievement in 2013 was excellent, particularly on hydrological monitoring and forecasting, which has provided solid support to water resources management. Improvements have been made on the development of monitoring instruments and network for middle-small scaled rivers. The regulations on hydrology and management have gained new progress, and general investigations on rivers and lakes have been completed. During the meeting, new challenges faced by hydrology are also identified, particularly on promoting social-needs and social-services on hydrology.



1.2.2 Participation IHP Steering Committees/Working Groups

(1) The 21st UNESCO IHP Regional Steering Committee (RSC) Meeting for Southeast Asia and the Pacific Contribution to IHP-VII (2008-2013) , in conjunction with the International Water Forum on Water Cooperation and 7th World Water Forum of The 2nd Nakdong River International Water Week 2013, Gyeongju City, Gyeongbuk, Republic of Korea, 30 September ~ 5 October, 2013

Organized by national committee for IHP of Korea, representatives from the Chinese IHP national committee participated in The 21st UNESCO IHP Regional Steering Committee (RSC) Meeting for Southeast Asia and the Pacific Contribution to IHP-VII (2008-2013) , in conjunction with the International Water Forum on Water Cooperation and 7th World Water Forum of The 2nd Nakdong River International Water Week 2013, aims to bring together academics, scientists, practitioners from wide range of disciplines involved in water research, leading engineers, researchers from industry and research scholars from Universities to exchange and, share their experiences and research results about all aspects of sustainable water resources management, and discuss practical challenges encountered and the solutions adopted. This conference also seeks to study and understand the existing water resources management strategies adopted in last meeting, and sharing the information with those from other countries. There are several themes involved in the conference concerning sharing of water knowledge in various fields. More than 100 Professional from countries of AP region participated in the conferences and shared their knowledge and experiences on dealing with water issues from different perspective. During the RSC meeting, country reports are presented, discussions have been carried out mainly focusing on how RSC activities contribute to IHP VIII objectives. Each

participants and country described their activities, plans are been made to involve interested countries to participated in actions to contribute to IHP-VIII plan. It was resolved that all countries are encouraged to submit their plans to IHP Jakarta office before the next RSC meeting.

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>. Announcement of web-based training courses and international conferences information are shared with hydrologist at national-wide on this website.

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

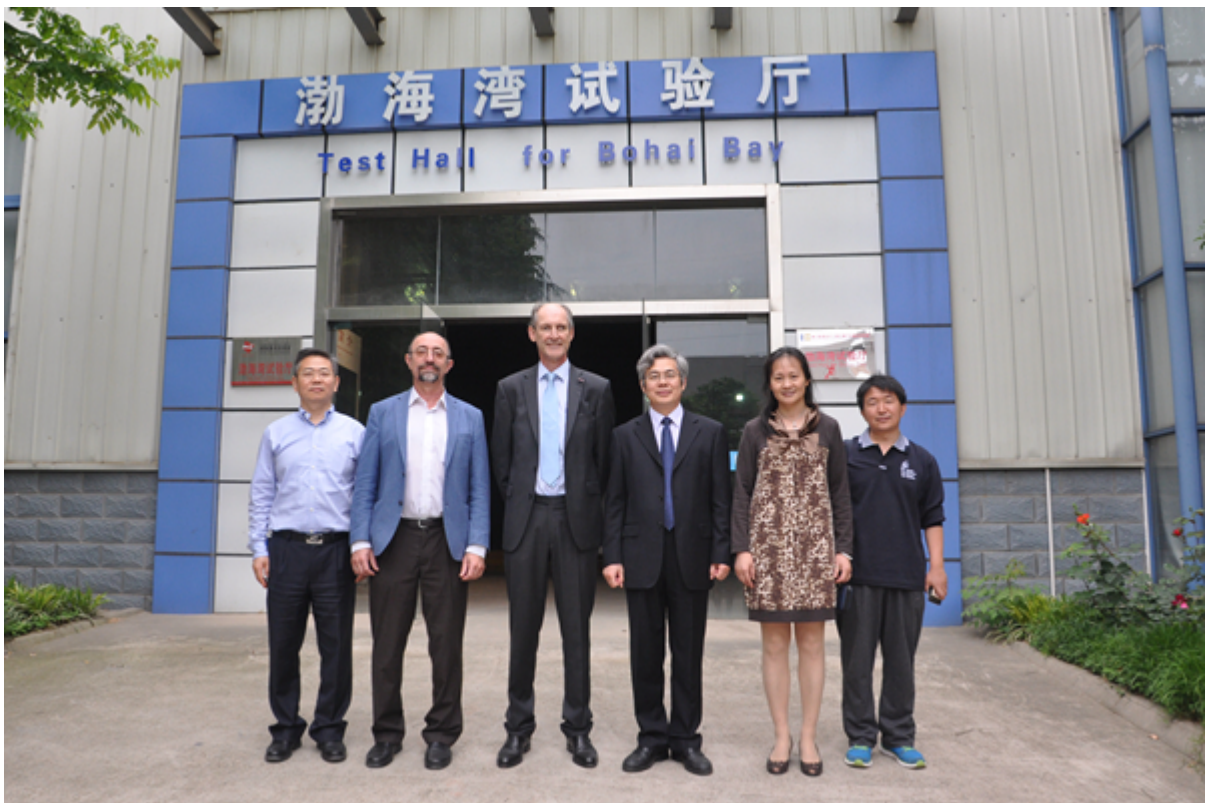
(1)2014 Annual Working Meeting of Chinese National Committee of IAHS Held in Beijing

On Oct. 25, 2014, the 2014 annual working meeting of the Chinese National Committee of International Association of Hydrological Science (IAHS-CNC) was held in Beijing. Prof. Zhang Jianyun, chairman of IAHS-CNC and president of NHRI, presided over the meeting and delivered an address. Vice chairmen of IAHS-CNC Lin Zuoding, Xia Jun, Ren Liliang, Chen xiaohong, Yang Dawen, Xu Zongxue and Liu Zhiyu (also secretary general) attended the meeting. The work of IAHS-CNC in 2014 was summarized; the preparation of the Chinese delegation to the IUGG in Prague in 2015 was introduced; and the compilation of 2014 National Committee Report and other issues were discussed. Over 30 members of IAHS-CNC from various institutions in China also attended the meeting.



(2)Chairman of IAHS and Chairman of EGU Visited NHRI

On the afternoon of May 13, 2014, Dr. H. H. G. Savenije, chairman of IAHS and professor of TU Delft, and Dr. Günter Blöschl, chairman of EGU and professor of Vienna University of Technology, visited NHRI. On behalf of Prof. Zhang Jianyun, president of NHRI, Prof. Liu Heng, deputy president of NHRI, met with the guests at the NHRI Water Experiment Center at Tiexinqiao. A briefing of NHRI was made by the staff of the NHRI International Cooperation Office. The two guests then visited the Eco-hydro Experiment Center, the Baihetan Hydropower Project Lab, the Lower Reaches of the Yangtze River Lab, the Bohai Bay Lab, etc. Experts from the Hydraulic Engineering Department, the River and Harbor Engineering Department, and the Research Center for Climate Change also participated in the event. Prof. Savenije is specialized in watershed hydrology, estuary and delta hydrology, rainfall and runoff analysis, and water resources management, and is currently chief editor for both *Hydrology and Earth System Sciences* and *Physics and Chemistry of the Earth*. Prof. Blöschl is professor of hydrology and water resources and director of Institute of Hydraulic Engineering and Water Resources Management of Vienna University of Technology, and is currently chairman of Austria National Committee of IAHS and member of Advisory Committee of *International Journal of River Basin Management*, a journal of IAHR.



(3) Delegation from Korea National Committee for the 7th World Water Forum Visits IWHR

A delegation of the Korea National Committee for the 2015 World Water Forum headed by the Executive Director Mr. Sungjoon LEE visited IWHR on December 4, 2013. Issues concerning the 7th World Water Forum and bilateral cooperation were discussed. IWHR President Kuang Shangfu and Vice President Jia Jinsheng received the delegation at IWHR headquarters.

President Kuang congratulated upon the Korea's success in bidding for hosting the 7th World Water Forum. Kuang said appreciated the great importance the Korean government had attached to this grand event and expressed his confidence about the success of the 2015 World Water Forum. Later, President Kuang also reviewed the long-term cooperation and exchanges between IWHR and the Korean counterparts and IWHR's experiences in previous World Water Forums, especially since the 3rd edition. Dr. Sungjoon Lee appreciated the warm reception of IWHR. Dr. Lee made a brief introduction to the preparation of the 2015 Forum in respect of the themes, core value, timeline, forum components, process development, etc. He specially denoted the core value of the forum -- "Implementation" by quoting a Korean old saying "A bunch of beads cannot be a treasure until it is strung". Dr. Lee said that it was necessary to transform the concepts and strategies of the previous forums into action. Lastly, Dr. Lee extended his gratitude to Vice President Jia Jinsheng for his efforts in facilitating the forum as an ISC (International Steering Committee) member.



1.2.5 Other initiatives

NIL.

1.3 Education and training course

1.3.1 Contribution to IHP courses

NIL.

1.3.2 Organization of specific courses

NIL.

1.3.3 Participation in IHP courses

No participation to IHP Courses during October 2013 to November 2014 basically due to lack of financial support.

No observation of how many have actually participated in (or have received) the distance learning via web-courses. But the web-based distance learning notices received from UNESCO Jakarta office have been widely distributed through IHP China website and emails from IHP China secretariat.

1.4 Publication

....

1.5 Participation in meetings abroad

(1) June 18-21 2014, delegation of China participated in the 21st intergovernmental council meeting of UNESCO IHP held in Paris. Led by the chief engineer of the bureau of hydrology, Ministry of Water Resources, the delegation of China participated in the 21st IGC meeting in Paris. The delegation participated in actively discussions of all issues launched during the meeting. During the meeting, delegate from China has also been elected as the chairperson of the committee of communication of outreach of IHP, and has jointly developed the strategic implementation report with the committee members.

(2)Committee Member Xia Jun wins International Hydrology Prize

On April 24 and at the 2014 Dooge-Nash International Symposium of Hydrological Sciences



held in Dublin, Ireland, Mr. Hubert Savenije, president of the International Association of Hydrological Sciences declared that the International Hydrology Prize-Volker Medal, jointly issued by the International Association of Hydrological Sciences (IAHS), the United Nations Educational, Scientific and Cultural Organization (UNESCO) and the World Meteorological Organization (WMO), was awarded to Chinese scientist Xia Jun, director of the Water Resources Commission of the China Society of Natural Resources, China national committee member for UNESCO IHP, in recognition of his outstanding contributions to the field of international hydrological sciences.

Obtaining his doctoral degree in 1985, Mr. Xia Jun is the first home-grown Chinese PhD hydrologist and expert in water resources. For a long time he has been engaged in researches on the orientation of systematic hydrology and the sustainable utilization of water resources. The National 973 Program's key projects he presided over have yielded systematic results centering on such scientific issues as non-linear water circulation, the diverse coupling of water systems and the uncertainties of the impacts of global climate changes. These scientific results have also won high recognition from the international academic community. In 2007 Xia Jun was elected vice president of IAHS, followed by his election as vice president of the International Water Resources Association (IWRA). In both posts, Xia has taken the leading role and been directly involved in a number of internationally important hydrological programs and strategic researches on global water security. By so doing he has made enormous contributions to enlarging China's international influence.

(3) Minister Chen Lei presented at 2014 Singapore International Water Week

On June 1 to 4, 2014, Minister Chen Lei presented at 2014 Singapore International Water Week. With the theme of "Shaping our Cities and Environment for a Livable and Sustainable Future", the event attracted water leaders from more than 40 countries and organizations and nearly 20000 people participated in the Water Week. Chen Lei delivered a speech at the Water Leaders Summit and also presented at the 22nd UNSGAB meeting and other high-level workshops. During the event, HE Chen Lei met with Wu Hongbo, Under-Secretary-General for Economic and Social Affairs, United Nations, the new leader of UNSGAB, Minister for the Environment of Denmark, Minister for Infrastructure and Environment of the Netherlands and Minister of Bulgaria Ministry of Regional Development.

(4) Delegate from China participated in the 11th Kovacs Colloquium jointly organized by UNESCO IHP and IAHS during 16-17 June 2014, Paris. The theme of the 11th Kovacs colloquium was "Hydrological Sciences and Water Security: Past, Present and Future", Dr. Huang Yan from China presented the topic of "Integrated water resources management using engineering measures" using the case of Changjiang River in China as an example and showed how engineering measures benefit integrated water management, which has maximize water utilization and how to manage those engineering measures without causing too much negative impact the water environment and eco-system.



1.6 Other activities at a regional or international level

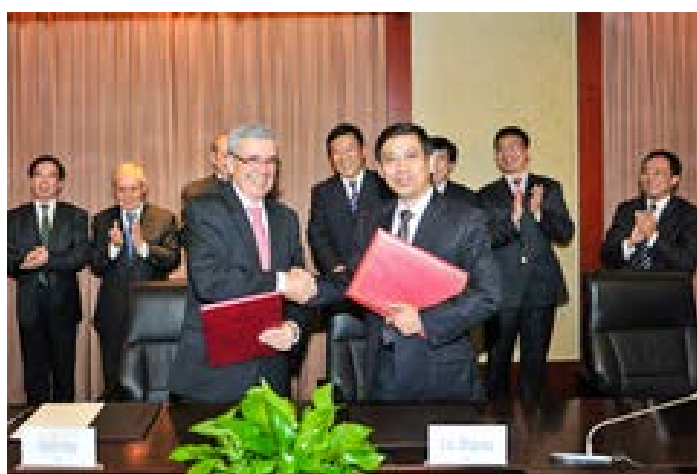
(1) Middle route of China's south-north water diversion channel is put into operation and use

The middle route of China's south-north water diversion project came into

service in November 2014. The total length of the route's main line is 1,432 kilometers and will run across the municipalities of Beijing and Tianjin and the provinces of Hebei and Henan. It is expected to handle 9.5 billion cubic meters of water annually. The massive south-north water diversion project is designed to take water from China's largest river, the Yangtze, to the country's arid northern regions. Water will flow northward via three routes - an eastern route, a middle route and a western route. The project started with the construction of the eastern route in 2002. The construction of the middle route followed in 2003.

(2) Chinese authorities receive WWC delegation

28 September 2014, President Braga, Vice-President Altinbilek, and Bureau member J. Delli-Priscoli were received by Minister Chen Lei in Beijing last week in a step to renew the



Council's ongoing cooperation with the Ministry of Water Resources of China. An extension of the Memorandum of Understanding concluded between the two organizations in 2009 was signed on Tuesday, 23 September, issuing in a new era of fruitful cooperation between the partners. In addition, the Ministry hosted a regional consultation on Wednesday 24 September with representatives from the China

Development Bank, the China Water Investment Corporation, the Asian Infrastructure Investment Bank, the World Bank, the Asian Development Bank and other actors, providing important insights into financing mechanisms for water and sanitation provision in China. The outcomes of this consultation will contribute to the report of the High Level Panel on Water Infrastructure for a Water-Secure World, which will be launched at the 7th World Water Forum.

(3) CWRC Are Awarded Important Contribution Prize by World Water Council

October 2014, during the 53rd council meeting of the World Water Council in Marseille, France, President of the World Water Council-Mr. Benedito Braga awarded an important contribution certificate of merit to Changjiang Water Resources Commission (CWRC). As the member of the World Water Council, CWRC was recognized as the important contribution for over 5 years of continuous active involvement in the achievement of the World Water Council's strategy and missions.

(4)The 2nd Hydrology, Ocean and Atmosphere Conference held in Beijing

The 2nd Hydrology, Ocean and Atmosphere Conference (HOAC 2014) was held on June 13-15, 2014 in Beijing, China. This Conference covered issues on Hydrology, Ocean and Atmosphere. It dedicated to creating a stage for exchanging the latest research results and sharing the advanced research methods. Distinguished invited speakers and many scholars and experts from

all over the world attended this conference.

(5) Qingdao hosts International Conference on Desalination and Water Reuse

The 2014 Qingdao International Conference on Desalination and Water Reuse was held in Qingdao on June 10. The 2014 Qingdao International Conference on Desalination and Water Reuse kicked off on June 10 in Qingdao, east China's Shandong province. Themed "Desalination: Innovation Driven and Green Development," the three-day event attracted over 700 experts from 300 enterprises in 20 countries and regions. Co-sponsored by the China Association for Science and Technology and the Qingdao municipal people's government, Qingdao has hosted the international conference eight times. This year's event consists of 13 sessions on nine subjects, including innovation and development of seawater desalination technology, environment protection and international cooperation.



1.6.1 Institutional relations / co-operation / exchanges

No observations.

1.6.2 Completed and ongoing scientific projects

NIL.

2 FUTURE ACTIVITIES

2.1 Activities planned to until December 2014

For IHP China, the National Committee will:

- Continue paying high attention for regional (and international) cooperation under IHP framework and encourage cross-cutting cooperation with other international programme.

-
- Contribute to the implementation of IHP VIII strategic plan particularly on ecosystem of water circle and environment protection. Integrated river basin management remains important particularly on management of inter-basin water diversion project. Exchange might be possible to be made with other nations who are interested on such work.

2.2 Activities foreseen for 2014-2015

Projects related to IHP-VIII 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, initiatives for IHP-VIII themes will be encouraged by the National Committee. Cooperation among the Southeast Asia and the Pacific will be top priority. In summary, the activities will include (but not only) as below:

- Annual IHP national committee meeting to be held in spring 2015. The objective is to strengthen participation from members and cooperation between them encourage contributions to IHP VIII strategy plan. During the meeting, activities and issues regarding IHP work at national level will be presented and discussed; initiative of participation & supporting IHP activities shall be proposed and discussed.
- Continue to implement collaborative researches project with IRTCES on erosion and sedimentation.
- Continue researching and collaboration on climate change impact on the hydrological cycle and water resources following the theme of IHP Phase VIII, particularly at bilateral level on some case studies in upper Yangtze River under Sino-Swiss cooperation project.
- Encourage and initiate project following the new themes of IHP phase VIII focusing on water scarcity and environmental issues.
- Cooperate with regional IHP national committees to develop a development strategy on Small Hydropower.
- Implement rainfall monitoring network for small rivers for the purpose of early warning, to facilitate national planning on water resources management and flash flood (mudflow) early warning.
- Participate in national rural drinking water safety evaluation and planning, continue developing water quality protection technology.
- Providing training course for participates from developing countries on hydrological monitoring and flood forecasting technology, i.e. to train water engineers from Ecuador.
- Develop and promote integrated water resources management method specially on multiple reservoir operation and optimization.
- Other activities that will be organized at national/local (or basin-wide) levels by the committee members.

2.3 Activities envisaged for the long term

China IHP National Committee will continue contributions to IHP actives, especially, may host RSC meeting/workshops/conferences, or join co-team for regional and international cooperation. In the phase of IHP-VIII, working groups will be established for more cooperation activities. The committee will also promote and encourage young scientists to be actively involved in IHP

work at national and international level.

Furthermore, it has to be noted that as UNESCO IHP China is a committee without firm management and organizational mechanism, it is difficult to gain driving forces to facilitate or promote IHP work. Thus, the secretariat will propose to the committee to promote IHP to gain more public attention and attract more participation from scientists and professionals from research institutions, in addition to the governmental organizations. In this regard, the most effective way is to establish some joint studies or research project so that people can cooperate under IHP framework / umbrella, which however require resources from either national level (which is rather difficult), or international funds (for which the possibility shall be discussed during the RSC meeting).

Annex I, Name list of the China national committee for UNESCO IHP

No.	Name	Position	Organization	Post in the organization
1	Deng Jian	Chairman	Bureau of Hydrology, Ministry of Water Resources (MWR)	Director
2	Liu ChangMing	Vice Chairman	Beijing Normal University	Academia
3	Liu ZhiGuang	Vice Chairman	Bureau of international cooperation and technology and Science, MWR	Deputy director
4	Jiang Jianjun	Vice Chairman	Bureau of geology and environment, Ministry of Land Natural Resources	Director
5	Liu Heng	Vice Chairman	Nanjing Hydraulic research institute of MWR	Deputy Director
6	Zhang Changkuan	Vice Chairman	Hohai University	Former chancellor
7	Wang Hao	Committee Member	China Institute of Water Resources and Hydropower Research	Department head, Academia
8	Wang Dianwu	Committee Member	Bureau of Hydrology of Liaoning province, MWR	Director
9	Hu HePing	Committee Member	Thinghua University	Vice chancellor
10	Guo Shenglian	Committee Member	Wuhan University	Deputy Provincial Governor
11	Wang Jun	Committee Member	Bureau of Hydrology, Changjiang Water Resources Commission, MWR	Director
12	Yang HanXia	Committee Member	Bureau of hydrology, Yellow River Commission, MWR	Director
13	Sheng Rong	Committee Member	China National commission for UNESCO	Department head
14	Lu Guihua	Committee Member	Water Authority of Jiansu province	Deputy director
15	Hu ChunHong	Committee Member	IRTCES under the auspices of UNESCO	Deputy director
16	Ni WeiXin	Committee Member	Nanjing Hydro-Automatic system research institute	Department head
17	Xia Jun	Committee Member	Department of Geology, China Institute of Water Resources and Hydropower Research	Director
18	Ren Liliang	Committee Member	Hehai University	Director
19	Yang ZhongShan	Committee Member	Hydrological center of Beijing city	Director
20	Ni GuangHeng	Committee Member	Thinhua university	Department head
21	Xu ZhongXue	Committee Member	Beijing Normal University	Deputy director
22	Cao ShengLei	Committee Member	Civil engineering department, ShanDong University	Director
23	Yu Zhijian	Committee Member	Bureau of Water diversion, Hubei province	Director
24	Tian TingShan	Committee Member	Chinese Institute of Geological Sciences Environmental Monitoring	Deputy director
25	Shi JianSheng	Committee Member	Department of Hydrology, Chinese Institute of Geology	Department head
26	Zhu Xiaoyuan	Secretary	Bureau of Hydrology, MWR	Department head
27	Jin Hai	Deputy Secretary	Bureau of international cooperation and technology and Science, MWR	Department head
28	Zou Ying	Deputy Secretary	Department of Hydrology, Nanjing Hydraulic research institute of MWR	Department head
29	Huang Yan	Deputy Secretary	Changjiang Institute of Survey, Planning, Design and Research	Deputy Chief Engineer

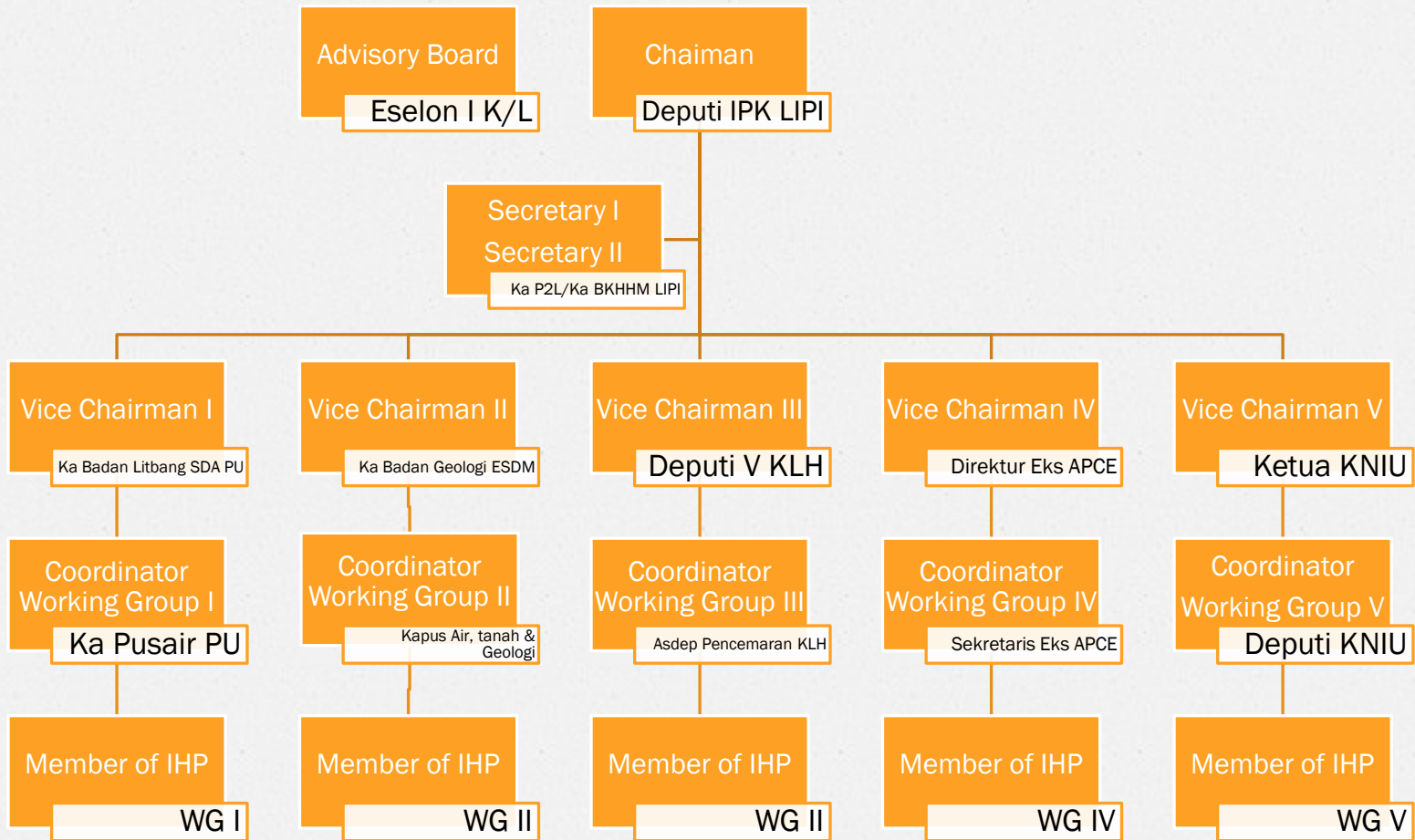
Country Report

IHP INDONESIA

22nd RSC Meeting of IHP

Yogyakarta, November 13-14, 2014

New IHP Structure



Research Program

- Promote research on ecohydrology in two demonstration sites contributing to sustainable water management and climate change:
 - Ecohydrology demonstration site : “Study on the implementation of Ecohydrology approach and avoided deforestation in Peatland Rewetting and conservation in Ex-Mega Rice Project location”
 - Ecohydrology demonstration site : “Water quality and sediment control of the cascade reservoirs along Citarum River Basin using ecohydrology concept”

Training and Capacity Building

- Establish web-based knowledge platform for the collaboration and exchange of scientific, technical and policy relevant information and technical book series in Asia Pacific Ecohydrology
- Develop guidelines/tools in efficient incorporation of Ecohydrology in Basin Management Plans

ACTIVITIES

- 2009:
 - SWITCH in ASIA (Collaboration with UNESCO Jakarta Office and RC Limnology LIPI)
- 2011:
 - World Water Day (Collaboration with UNESCO Jakarta Office and RC Limnology LIPI)
 - National Seminar on Ecohydrology (Collaboration with RC Limnology)

- 2012
 - Designing of APCE Building
 - Public Communication (Saguling Reservoir area, West Java)
 - Meeting with ILEC in Kyoto (preparing the WLC in Indonesia)
 - Public Awareness (Ciamis, West Jawa)
 - RSC -20 in Malaysia
- 2013
 - IFAS Training Course (Collaboration with ICHARM and UNESCO Jakarta Office)
 - Public Awareness (Ciamis)
 - APCE Building
 - RSC -21 in Korea

- 2014
 - Training Workshop on Lake Management (Collaboration with ILEC Japan)
 - Public Communication (Saguling Reservoir, Ciamis, West Jawa)
 - IHP Council Meeting in UNESCO, Paris
 - Canberra Meeting
 - Delegation of WLC 15 in Perugia
 - Ecohydrology Training Course, ICE 2014, RSC-22 in Yogyakarta

- 2015
 - Peatland Rewetting (Collaboration with UNESCO Jakarta Office)
 - Saguling Demosite (Collaboration with UNESCO Jakarta Office)
 - Road to WLC-16, Bali (Collaboration with Ministry of Environment and Forestry and Ministry of Public Work)
 - Strengthening the Networking with Universities (In Collaboration with UNESCO Jakarta Office)
 - Participate in WWF in Korea
 - Public Awareness

The Way Forward

- Getting more support from the Government (Relationship, Institutionally, Financially)
- Strengthening the networking with the center under UNESCO, Universities, other institutions
- Develop demosite in selected and specific purpose: Small Island Demosite, Karstic Ecohydrology Demosite, Peatland ecohydrology Demosite....

SOME ACTIVITIES

- *Culture & values*
- *Local wisdom*
- *Harmony : God, man, environment*
- *Modern Sciences*

IFAS TRAINING COURSE

- A technical course was organized based on the framework of the Flood Forecasting and Warning System which was conducted in 10 countries (Australia, Cambodia, China, Indonesia, Lao People's Democratic Republic, Malaysia, the Philippines, the Republic of Korea, Thailand and Vietnam).
- This Integrated Flood Analysis System (IFAS) course was realized in collaboration with the International Centre for Water Hazard and Risk Management (ICHARM), the UNESCO Jakarta Office and LIPI.



Flooding events in Indonesia

IFAS course activities





Demo Site for Community-Based Water Management

- The objective is to act as a field station for the implementation of ecohydrology concepts in the field.
- Expected to be significant in socializing the sustainable management of water resources in accordance with the concept of ecohydrology.
- It will also serve as a natural laboratory for the future development of ecohydrology, especially as a tropical Indonesian concern.
- Directed to a location demo site representing the concept of sustainable water resources management in several different groups, namely an ecohydrology demo site for the community-based management of water resources.



**Discussing with Islamic
Leaders community**



Artificial constructed wetland

Capacity building of community leaders

As a Way of paradigm shift to Increase in community awareness and participation



Best practice enlightenment

A Way of Heartware Concept Implementation



Cultural Landscape and Subak System in Bali

- Subak is the name of the water management (irrigation) system for paddy fields on Bali island, Indonesia, developed more than 1,000 years ago.
- Traditional ecologically sustainable irrigation system has constantly adjusted to changing situations.
- The result is an intricate system which is strongly interlinked with Bali's natural, social, cultural and religious environment.
- Land conversion rate : 2000 ha/year
- Need of capacity building in sustainable water management of the subak system by introducing ecohydrology concept



**Rice Field in Jatiluwih
world heritage site**

**Subak system : Pura,
paddy field and water**



Meeting with Pekaseh of Subak in Bali



Main Issues of Peatland areas

- Increasing pressures for land development (e.g. agriculture, infrastructure) have affected peatlands in Indonesia over the past 20 years.
- land conversion, especially for agricultural practices, that have been managed in an unsustainable manner.
- significant loss of ecological support services eg. flood mitigation, prevention of saline water intrusion, sediment and toxic removal, groundwater recharge, micro-climate regulation etc.
- The land conversions have direct negative physical impacts on peatland ecosystems and its associated biodiversity.
- Low clean water services for the people in peatland areas



**IPAG 60 : from peatwater
to clean water**



**Clean water produced by
local people with IPAG60**

Promote research on sustainable water resources management in aride small islands

- Location : TTU distric, NTT province
- Problem : lack of water supply and management
- Contacts : local government, NGO, local people, University

Local government and local people communication



Water ponds



Traditional House in TTU, NTT



IHP Indonesia Collaboration

- APCE - UNESCO
- Unesco Jakarta
- ICHARM
- ANU & University of Canberra, Australia
- University of Queensland Australia
- Kyoto University
- ILEC, Japan

Contribution to IHP VIII

- **Mainly for the themes : IV, V and VI**
- **Theme IV**
- Theme IV Focal Area IV.4
 - **Project Title: Sustainable water management for developing resilience cities**
 - Description: water management, resilience cities, sustainable management
 - Timeline: 3 years

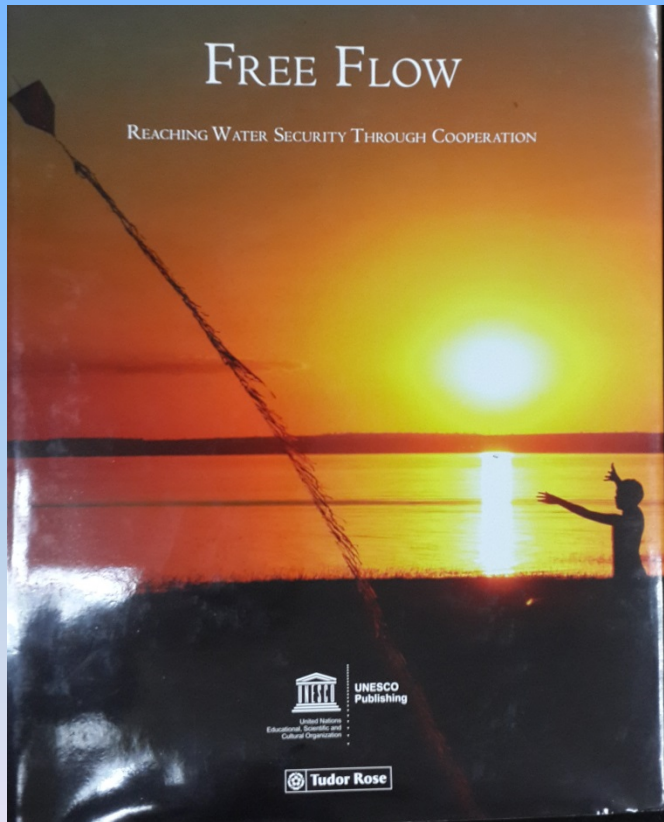
Theme V

- Theme V Focal Area V.3
 - **Project Title: Ecohydrology for water security in urban and rural areas**
 - Description: poverty, ecohydrology concept, water security, urban and rural areas
 - Timeline: 3 years
- Theme V Focal Area V.3
 - **Project Title: Development of appropriate technologies for water security in marginal areas**
 - Description: water security, marginal area (peatland, coastal and small islands, flooding area, water polluted areas), appropriate technology
 - Timeline: 3 years

Theme VI

- Theme VI Focal Area VI.3 and VI.4
 - **Project Title:** Water education for children, youth, and local people by promoting awareness of water issues through informal water education
 - Description: water education, informal education, public awareness, local people and wisdom
 - Timeline: 3 years
- Theme VI Focal Area VI.5
 - **Project Title: Strengthening water management capacity for local communities**
 - Description: low capacity, local communities, water management, capacity building
 - Timeline: 3 years

Publication : Contribution to Free Flow



Managing water: from local wisdom to modern science

Ignasius D. A. Sutapa, Executive Secretary, Asia Pacific Centre for Ecohydrology

The Asia Pacific Centre for Ecohydrology (APCE) is a category II centre of the United Nations Educational, Scientific and Cultural Organization (UNESCO). It focuses on ecological approaches to water resources management, to provide sustainable water for the people by harnessing science and technology, education and culture. APCE is committed to contributing towards overcoming current and important issues of national, regional and global interest, such as poverty, climate change adaptation and disaster risk reduction.

Several activities have been planned to help achieve this objective. These activities benefit from the results of past and current research activities conducted by the Indonesian Institute of Sciences (LIPI) and its partners.

- APCE has and develops expertise and experience in:
- relationships between ecological pattern and hydrological process
 - disturbance and dynamics in natural and anthropogenic ecology and hydrology
 - ecohydrological approaches to biodiversity conservation, environmental management and ecological restoration

- integrating hydrology with ecological planning, design and architecture
- transdisciplinary studies of regional sustainability from the perspectives of ecohydrology, ecology or both.

Some recent activities are detailed below.

Integrated Flood Analysis System course

The Asia and Pacific region has various climate characteristics that put it at risk from hydrometeorological hazards which are often associated with extreme events. Some countries in the region are vulnerable to floods, and the annual flood losses are too high for any government to bear.

A technical course was organized based on the framework of the Flood Forecasting and Warning System which was conducted in 10 countries (Australia, Cambodia, China, Indonesia, Lao People's Democratic Republic, Malaysia, the Philippines, the Republic of Korea, Thailand and Vietnam). This Integrated Flood



THANK YOU...

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. Japanese National Committee for IHP of UNESCO is expected to solve complex global challenges through following activities with a cross-cutting approach in collaboration with all the studies including social and human sciences, in addition to changing value. The following summary includes the activities of Japanese National Committee for IHP of UNESCO undertaken during April 2013 to October 2014.

1. ACTIVITIES UNDERTAKEN IN THE PERIOD APRIL 2013 – OCTOBER 2014

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 2014.

	Name	Position	E-mail
Chair *	TAKARA Kaoru	Prof., DPRI, Kyoto Univ.	takara.kaoru.7v@kyoto-u.ac.jp
*	UEMATSU Mitsuo	Director and Prof., CICAORI, Univ. of Tokyo.	uematsu@aori.u-tokyo.ac.jp
*	KURODA Reiko	Prof. Tokyo Univ. of Science	rkuroda@rs.tus.ac.jp
	ISHIZAKA Joji	Prof., HyARC, Nagoya Univ.	jiishizak@hyarc.nagoya-u.ac.jp
	OKI Taikan	Prof., IIS, Univ. of Tokyo	taikan@iis.u-tokyo.ac.jp
	KAZAMA Futaba	Prof., Yamanashi Univ.	futaba@yamanashi.ac.jp
	KAWAMURA Akira	Prof., Tokyo Metropolitan Univ.	kawamura@tmu.ac.jp
	SUZUKI Atsushi	Vice Director, ICHARM, PWRI	At-suzuki@pwri.go.jp
	TACHIKAWA Yasuto	Prof., Kyoto Univ.	tachikawa@hywr.kuciv.kyoto-u.ac.jp
	TANIGUCHI Makoto	Prof., RIHN	makoto@chikyu.ac.jp
	TSUJIMURA Maki	Prof., Univ. of Tsukuba	mksuji@geoenv.tsukuba.ac.jp
	NAKAYAMA Mikiyasu	Prof., Univ. of Tokyo	nakayama@k.u-tokyo.ac.jp
	HARUYAMA Shigeo	Prof., Mie Univ.	haruyama@bio.mie-u.ac.jp
	HORI Tomoharu	Prof., WRRRC, DPRI, Kyoto Univ.	horitomoharu.3w@kyoto-u.ac.jp
	WATANABE Tsugihiko	Prof., Kyoto Univ	nabe@kais.kyoto-u.ac.jp

Notes:

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

Secretariat of the Japanese National Committee for IHP, UNESCO:

c/o Mr. NODA Takao

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: "Natcom Japan" <jpnatcom@mext.go.jp>

TEL: +81-(0)3-6734-2585 / FAX: +81-(0)3-6734-3679, <http://hywr.kuciv.kyoto-u.ac.jp/ihp/japan/>

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]

There are number of activities led by Prof. Koike (Univ. of Tokyo) and others as:

in Asia

- International Coordination Group (ICG) Meetings on the Global Earth Observation System of Systems (GEOSS) and Asian Water Cycle Initiative (AWCI) (GEOSS/AWCI/ICG)
 - 10th GEOSS/AWCI/ICG Meeting, Tokyo, Japan, 26-30 May 2014

in Africa

- The GEOSS JOINT Asia-Africa Water Cycle Symposium, Tokyo, Japan, 25-27 November, 2013
- Interaction between hydrological cycle and physical/biochemical oceanography by cooperation between IHP and IOC [JAMSTEC, The Univ. of Tokyo, Kyoto Univ.]

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

- Climate change research under the MEXT SOSEI program “Program for Risk Information on Climate Change” is intensively conducted from 2012 to 2016

- GWES (Groundwater in Emergency Situations).

Great Eastern Japan Earthquake and Tsunami showed the importance of groundwater use in emergency situation during disasters.

- UNESCO Chair on Sustainable Groundwater Management in Mongolia at the Institute of Geo-ecology, Mongolian Academy of Sciences and the University of Tsukuba, Japan.

The chair activity has been continued actively focusing on the monitoring of the groundwater and the surface water interaction and the consultant on the sustainable groundwater resources governance in Ulaanbaatar, capital city of Mongolia.

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.

Interdisciplinary research and education at Ph.D. level is implemented at Kyoto University for extreme weather and water conditions [Takara, Tachikawa and others].

- Improving the predictability of hydrological extremes in ungaged or poorly gaged basins using new measurement technology and promoting the local use of satellite information for improved river basin management in partnership with GEOSS.

- Collaborative joint research for hydrologic prediction between Yangon Technological University has been launched since 2014. [Kyoto Univ.]

- Best practices on water risk management

* ICHARM started a UNESCO funded project “Strategic Strengthening of Flood Warning and Management Capacity of Pakistan” in response to the unprecedented Indus river flood disaster (2012-2014) and completed in June 2014.

* Flood forecasting and management [ICHARM, PWRI, IFNet, JMA and universities] under the MEXT SOSEI Program from 2012 to 2017, changes of water-related disasters and water resources under global warming were investigated.

- Committee on Hydrosience and Hydraulic Engineering, JSCE, launched the subcommittee on flood risk management in 2013, which is in charge of field survey of actual flood cases (the subcommittee is chaired by Hori). The subcommittee conducted the field survey in five large flood and geo-hazards which occurred in 2013.

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)]

UNESCO-GRAPHIC organized several international activities including symposiums and training courses to evaluate the effects of climate change and human activities on groundwater resources. Many case studies are synthesized by books including “Groundwater System Responses to Changing Climate (eds.: Taniguchi and Holman)” and “Climate Change Effects on Groundwater Resources: A Global Synthesis of Findings and Recommendations (eds.: Treidel et al.)”, from Taylor and Francis.

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.]
DPRI initiated the Japan Egypt-Hydro Network (JF-HydroNet) with the coordination with three Egyptian Institutions under the umbrella of GCOE-ARS project at Kyoto Univ. for a joint research and education project on the water resources and environmental problems of the Nile Delta of Egypt [Prof. Tetsuya Sumi, WRRRC, Kyoto Univ.].
- Valorization of Bio-resources in Semi- arid and Arid Land for Regional Development [Univ. Tsukuba]
Univ. Tsukuba has performed an international collaboration research on the relationship between the bio-resources and surface water/ groundwater resources in semi-arid regions in Tunisia funded by SATREPS (Science and Technology Research Partnership for Sustainable Development) of the Japan International Cooperation Agency (JICA) and the Japan Science and Technology Agency (JST).

THEME 2: Strengthening Water Governance for Sustainability

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

To share the knowledge of hydrologic modeling techniques and enhance the understanding of hydrologic predictions, CommonMP (Common Modeling Platform for water-material circulation analysis) was developed at the National Institute for Land and Infrastructure Management [NILIM].

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

- Research on “virtual water”
Developed inventories of the virtual water/water footprint of industrial commodities [The University of Tokyo]
Dispatched an expert for the ISO/TC207/SC5/WG8 Waterfootprint and supported developing the community draft [The University of Tokyo]
- Relative impact evaluation in water resources dynamics and social systems with large development in river basins [Kyoto Univ.]
- Promoted UNESCO’s “IWRM Guidelines at river basin level (IWRM Guidelines)” by NARBO (Network of Asian River Basin Organizations) through technical workshop of the 2nd Asia-Pacific Water Summit in May, 2013
- Implementation of NARBO IWRM training programme by using IWRM Guidelines as a main text book in November 2012, and November 2013 in Sri Lanka and May 2014 in Philippines
- Preparation for Educational material of IWRM guidelines for UNESCO by Japan Water Agency, secretariat of NARBO.
- “The United States Water Law – an Introduction – by J.W.Johnson (CRC Press)” was translated into Japanese by a researchers group in Disaster Prevention Research Institute, Kyoto University, and was published by Nippon Hyoron Sha Co. Ltd. in 2013. The translation helps especially practitioners to understand and to know comparatively the legislation system for water governance.
- International Environment Leaders Training Program funded by Ministry of Education, Culture, Sports, Science and Technology (MEXT) [Univ. Tsukuba, Kyoto Univ., Univ. Tokyo, Kumamot Univ., et al.]

THEME 3: Ecohydrology for Sustainability

FA 3.1 – Ecological measures to protect and remediate catchments process

- Participation in ecohydrology research development
- Disaster Prevention Research Institute (DPRI), Kyoto University hosted the 23rd IHP Training course entitled of “Ecohydrology for River Basin Management under Climate Change” on Dec. 2-13, 2013. Organizer invited

Prof. M. Zalewski, European Regional Centre for Ecohydrology, UNESCO, I. D. A. Sutapa, Asia Pacific Centre for Ecohydrology, UNESCO and S. Khan, Regional Science Bureau for Asia and the Pacific, UNESCO to made invited lectures. The training course participants are 24 trainees in total. 14 trainees from foreign countries consist of five students supported by UNESCO, seven students supported by MEXT (Official Development Assistance Grants for UNESCO Activities) and two students supported by JSPS Mega-Delta Project. Their background is quite diverse. They are six from universities and the other eight are working at national weather/hydrological/water resources/environmental institutes. Other ten trainees are from Kyoto University including eight graduate school (master or Ph. D.) students and two visiting researchers supported by GCOE-ARS. Home countries of all trainees are also diverse from eastern Asia to Middle East (Mongolia, China(2), Malaysia, Vietnam(2), Lao PDR, Thailand, Indonesia, Papua New Guinea, Vanuatu, Myanmar (4), Sri Lanka, India, Nepal, Uzbekistan, Iran, Libya and Egypt(3)).

- Ecohydrology workshop and Steering Committee for IHP-VIII [Takemon]

A workshop on “Ecohydrology for Sustainable Development “ and Steering Committee Meeting for IHP-VIII were held at UNESCO Headquarters in Paris on 20-21 May 2014. Dr. Takemon (Water Resources Research Center, DPRI, Kyoto Univ.) attended the meeting and joined the discussion. As a result of discussion the committee proposed six target subjects in Ecohydrology for IHP-VIII: 1)Ecohydrologic technologies- green infrastructure, 2)Ecosystem services quantification and evaluation, 3)Ecohydrologic dynamics from basin scale to global scale, 4)Environmental flow regime science and management, 5)Hazards function and adaptation, and 6) Governance, morality and traditional knowledge.

FA 3.2 – 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.]
- A research project on the impact of the forest thinning on the groundwater recharge funded by CREST Program of the Japan Science and Technology Agency (JST). [Univ. Tsukuba, Kyoto Univ., Univ. Tokyo, Kyushu Univ., ...]

THEME 4: Water and Life Support Systems

FA 4.1 – Achieving sustainable urban water management

- Hydrogeological and sociological survey on development processes of East-Asian cities co-existing with floods [Kyoto Univ.]

FA 4.2 – 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/Kyoto University Training Courses: The 22nd and 23rd Training Courses have been conducted by Nagoya University and Kyoto University, respectively, with collaboration of Japan Aerospace Exploration Agency (JAXA) and National Institute of Information and Communications Technology (NICT), etc.
- Kyoto University implemented Global COE Program “Global Centre for Education and Research on Human Security Engineering for Asian Mega Cities” supported by MEXT and JSPS (2008-2013) [Shimizu, Hori.
- Kyoto University implemented Global COE Program “Sustainability/Survivability Science for a Resilient Society Adaptable to Extreme Weather Conditions” supported by MEXT and JSPS (2009-2014) [Takara].
- Kyoto University is implementing a Leading Graduate Schools Program “Inter-Graduate School Program for Sustainable Development and Survival Societies” (2011-2018) [Takara, Hori, Tachikawa].
- Wisdom of Water (Suntory) Corporate Sponsored Research Program, Organization for Interdisciplinary Research Project, The University of Tokyo, 2008-2013. Special lectures of water education in elementary school for approximately 20 times for more than 1000 students in 5 years, special courses of water education for fresh students in The University of Tokyo, publishing educational materials on water for elementary school students, more than 10 times of press release for mass media on water issues, and on mass-media approximately 40 times

- 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.
- Six short-term training courses have been conducted about Early Warning System, June 2012-August 2014 [ICHARM].

Other regional and cross-cutting themes activities include:

(1) Catalogue of Rivers: The Catalogue of Rivers for Southeast Asia and the Pacific, Vol. 6 was published. This volume contains seven rivers from seven countries with the inclusion of first time contributions from Korea (D.P.R.), Mongolia and Myanmar, and brings the total number of rivers catalogued in the region, including those in volumes I to VI, to 121. The information of previous five volumes locates at: <http://hywr.kuciv.kyoto-u.ac.jp/ihp/japan/riverCatalogue.html>

(2) Asian Pacific FRIEND: With the dissemination of information from the SEAP region it is hoped that there will be better understanding and co-operation on matters related to water resources within each country as well as regionally. Of particular importance was the establishment of the Asian Pacific FRIEND, a UNESCO-IHP regional collaborative project, and the Asian Pacific Water Archive (APWA) that archives and makes available hydrometeorological and related data for Asian Pacific FRIEND projects and other IHP related activities in the region. Japan has been contributing to Asian Pacific FRIEND since its first Technical Sub-Committee (TSC) meeting in Kuala Lumpur in May 1997.

(3) Hydrology for Environment, Life and Policy (HELP):

No activities during this period.

(4) International Flood Initiative (IFI), International Sediment Initiative (ISI) and International Programme on Landslides (IPL):

- Contribution to IFI as secretariat

ICHARM has been serving as the secretariat of the International Flood Initiative (IFI), a joint initiative with international organizations such as UNESCO (IHP), WMO, UN/ISDR, UNU, IAHS and IAHR. ICHARM manages the IFI website (<http://www.ifi-home.info/>) and compiles inputs, materials and tools provided by member agencies, while also providing its own outputs. ICHARM launched the IFI flagship project to support benchmarking flood risk reduction at the side event of Special Thematic Session on Water and Disasters during the High-Level Expert Panel on Water and Disasters (HELP/UNSGAB) convened by the UN Secretary-General H.E. Mr. Ban Ki-moon at the UN Headquarters in March 2013. The flagship project was included into IHP-VIII under Theme 1 Water-related disasters and hydrological change at IHP-VIII implementation workshop held in Nairobi in September 2013. ICHARM organized the IFI plenary session at the 6th International Conference on Flood Management (ICFM6), Sao Paulo, Brazil on 16 September 2014.

- Kyoto University hosted the 12th International Symposium on River Sedimentation (ISRS2013) on 3-5 September 2013 with coordination with World Association for Sedimentation and Erosion Research (WASER) and International Research and Training Center on Erosion and Sedimentation (IRTCES). During the symposium, organizer invited Professor Manfred Spreafico (Univ. of Berne, Switzerland), the leader of ISI, and organized the Workshop on the International Sediment Advancements (WISA).

(5) UNESCO Chair on Sustainable Groundwater Management in Mongolia: The UNESCO Chair Program performed a field research campaign and a training lecture for engineers and policy makers on surface water/groundwater resources in Tuul River Watershed, Ulaanbaatar under a collaboration between the Institute of Geology, Mongolian Academy of Sciences and the University of Tsukuba. UNESCO has proposed this Chair should go into the 3rd Phase Activity in September 2014, and we are processing the formal procedure to launch the 3rd Phase of Chair from 2015.

1.2 Activities at national level in the framework of the IHP

1.2.1 National/local scientific and technical meetings

(1) IHP Training Course Task Forth Meetings in Nagoya, and Kyoto and Working Group Meetings in Tokyo (Prof. Uyeda, Prof. Nakamura, Prof. Takara, Prof. Ishizuka and Prof. Sumi) were held several times to discuss the organization of the Training Courses, the plan for the 23rd and 24th Training Course, future direction, and the reviews.

(2) The 28th IHP National Committee meeting was held at MEXT on 7 May 2012 to discuss various issues relating to the 20th Session of IHP Intergovernmental Council (June 2012) and IHP-VIII (2014-2021).

(4) The Japanese National Committee for IHP, UNESCO and the Japanese National Committee for IAHS, the Science Council of Japan organized a Special Session on “Issues and Perspectives for Water Education in the Graduate Level and Career Paths” in the Japanese Geophysical Union (JpGU) Meeting at Makuhari, Chiba, Japan on 21st May, 2013.

(5) The 29th IHP National Committee meeting was held at MEXT on 4 June 2014 to discuss various issues relating to the 22nd Session of IHP Intergovernmental Council (June 2014), IHP-VIII (2014-2021), etc.

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 21th RSC was held in Gyeongju, Republic of Korea in conjunction with UNESCO-IHP and the 2nd Nakdong River International Water Week/International Water Forum 2013 (Na-Ri IWW/IWF 2013), Geongju, Republic of Korea, 30 September - 4 October 2013. [Takara, Chikamori, Tachikawa, Kobayashi]

(2) The 8th Steering Committee meeting of IWRM Guidelines at River Basin Level Initiative at UNESCO Jakarta office on 20th March 2013. [Mr.Otsuki, a steering committee member]

1.2.3 Research/applied projects supported or sponsored

- MEXT Sosei Program “Climate Change Risk Information” 2012-2016 [ICHARM, PWRI, IFNet, Kyoto Univ., Univ. Tokyo and others]

- Global COE Program “Sustainability/Survivability Science for a Resilient Society Adaptable to Extreme Weather Conditions” 2009-2014 sponsored by MEXT-JSPS [PL: Prof. Kaoru Takara]

- JSPS-Asian Core Program, " Research and Education Center for the Risk Based Asian Oriented Integrated Watershed Management," 2011-2015 [PI: Prof. Yoshihisa Shimizu].

- Program for Leading Graduate Schools “Inter-Graduate School Program for Sustainable Development and Survivable Societies” 2011-2018 sponsored by MEXT-JSPS [PC: Prof. Kaoru Takara]

- Grant-in-Aid for ODA UNESCO activities, 2013 sponsored by MEXT [Kyoto University]

- Precise Impact Assessments on Climate Change” supported by the SOUSEI Program of the Ministry of Education, Culture, Sports, Science, and Technology (MEXT). [T. Oki, The Univ. of Tokyo]

- Research Project “Integrated Study Project on Hydro-Meteorological Prediction and Adaptation to Climate Change in Thailand (IMPAC-T)” supported the Science and Technology Research Partnership for Sustainable Development, JST-JICA, Japan. [T. Oki, The Univ. of Tokyo]

- Research Project "Developing an Integrated Water Cycle Model for Sustainability Assessment of World Water Resources" supported by Grant-in-Aid for Scientific Research of The Japan Society for the Promotion of Science. [T. Oki, The Univ. of Tokyo]

- Research Project “A tracer simulator of fallout radionuclides for safe and sustainable water use” Core Research for Evolutional Science and Technology (CREST), the Japan Science and Technology Agency (JST). [T. Oki, The University of Tokyo]

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), including the Sub-Committee on IRDR (Integrated Research on Disaster Reduction) of ICSU (International Science Union).

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

(3) Nagoya University and Kyoto 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), the International Association for Hydro-Environment Engineering and Research (IAHR), the Asia Pacific Association of Hydrology and Water Resources (APHW), Asia Oceania Geosciences Society (AOGS) and the International Consortium on Landslides (ICL).
 - (7) Contribute as one of coordinating lead authors with Dr. Blanca Jimenez-Cisneros, Director of the Division of Water Sciences, Secretary of the International Hydrological Programme (IHP), UNESCO, for the Chapter 3 “Freshwater Resources” of the 5th Assessment Report (AR5) of the Working Group II of the Intergovernmental Panel on Climate Change (IPCC). [Ok]

1.2.5 Other initiatives

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 former chairman of the Japanese National Committee for UNESCO-IHP, was assigned as the first Director of ICHARM. In its inception, ICHARM has been playing core roles in 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. On 1 October 2014, Dr. Toshio Koike, professor of the University of Tokyo, was assigned as the second Director of ICHARM while the former director assumed the Advisor at ICHARM.

On 23 July 2013, the Ambassador of Japan to UNESCO, H.E. Mr Isao Kiso and the Director-General of UNESCO, Irina Bokova, signed an agreement for the renewal of ICHARM at the UNESCO Headquarters in Paris. The agreement, which entered into force upon its signature, grants ICHARM the status of an international centre under the auspices of UNESCO (Category 2) for a second six-year term.

It is important to cooperate with existing UNESCO water Centers such as IHE in the Netherlands, HidroEX in Brazil, IRTCES in China, HTC in Malaysia and RCUWM in Iran, etc. The outline of ICHARM is as follows.

- 1) Mission: The mission of the Centre is to serve as the Global Centre of Excellence for Water Hazard and Risk Management by, inter alia, observing and analyzing natural and social phenomena, developing methodologies and tools, building capacities, creating knowledge networks, and disseminating lessons and information in order to help governments and all stakeholders manage risks of water-related hazards at global, national, and community levels. The hazards to be addressed include floods, droughts, landslides, debris flows, tsunamis, storm surges, water contamination, and snow and ice disasters. The Centre envisions a Center of Excellence housing a group of leading people, superior facilities, and a knowledge base which enables conducting i) innovative research, ii) effective capacity building, and iii) efficient information networking. Based on these three pillars, ICHARM will globally serve as a knowledge hub for best national/local practices and an advisor in policy making.
- 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.

Based on the renewed agreement between the UNESCO and the Government of Japan on ICHARM, the Governing Board was established. The first Governing Board meeting was held on February 25, 2014, and examined and adopted the “Rule of Procedure”, “ICHARM Long-term (around 10 years) and Mid-term (around 5 years) Programmes” and the “ICHARM Work Plan (From April 2014 to March 2016)” that describes the detail of activity plan. Also reviewed is the “ICHARM Activity Report” dated from October 2010 to March 2014 (including the plan for February and March 2014). Following members are designated as the Governing Board Members from February 25, 2014 to the next board meeting;

Takashi Shiraishi, President, National Graduate Institute for Policy Studies (GRIPS)
Johannes Cullmann, Chairperson, International Hydrological Programme Intergovernmental Council
Margareta Wahlström, Special Representative of the Secretary-General for Disaster Risk Reduction (UNISDR)
Akihiko Tanaka, President, Japan International Cooperation Agency (JICA)
Toshiyuki Adachi, Vice Minister for Engineering Affairs, Ministry of Land, Infrastructure, Transport and
Tourism (MLIT)
Taketo Uomoto (Chairperson), Chief Executive, Public Works Research Institute (PWRI)
Irina Bokova, Director-General, United Nations Educational, Scientific and Cultural Organization (UNESCO)
See other information at: <http://www.icharm.pwri.go.jp/html/about/index.html>

The events related to the ICHARM are summarized as below:

- (1) 45th Session of the UNESCAP/WMO Typhoon Committee session on 29 January- 1 February 2013 in Hong Kong, China
- (2) Seminar on Sediment Hydraulics and River Management on 13-14 February 2013 in Dhaka, Bangladesh, with cooperation from the Bangladesh Water Development Board
- (3) UN General Assembly Special Session on Water and Disaster on 6 March 2013 in New York, USA, as a member of the High-Level Expert Panel on Water and Disaster (HELP/UNSGAB)
- (4) The High-Level Meeting on National Drought Policy organized by the World Meteorological Organization (WMO), the Food and Agriculture Organization (FAO) and the United Nations Convention to Combat Desertification (UNCCD) on 11-15 March 2013 in Geneva, Switzerland
- (5) ADB –TA-7276-Reg. Final project report submitted to ADB on 12 March 2013, which completed the entire implementation of the project
- (6) ICHARM Special Session “closing gap between research and practice in water resources and disaster management” during the Conference on Sri Lanka-Japan Collaborative Research on 29-31 March 2013 at the University of Peradeniya in Sri Lanka.
- (7) Signing Memorandum of Understanding to promote research exchange and technical cooperation with the Iran Water and Power Company (IWPC), on 12 April 2013
- (8) ICHARM Researcher, Dr. Takahiro Sayama was awarded the 2013 Young Scientists’ Prize, officially known as the Commendation for Science and Technology by the Minister of Education, Culture, Sports, Science and Technology (MEXT), Japan on 18 April 2013
- (9) The Focus Area Session on water risks and resilience organized by ICHARM prior to the 2nd Asia-Pacific Water Summit held on 19-20 May 2013 in Chiang Mai, Thailand
- (10) A workshop “Capacity Development for Integrated Flood Risk Management in Pakistan” from 28 May to 6 June 2013 at ICHARM, as part of a flood management project organized by UNESCO
- (11) Field survey for floods and droughts on the “Program for Risk Information on Climate Change”, called SOUSEI program by MEXT in Pampanga River Basin, the Philippines on 16-22 June 2013
- (12) International conference on “Regulation of Hydraulic Structures for Flood Management, Islamabad” organized by the Pakistan Water Partnership in collaboration with the International Centre for Integrated Mountain Development (ICIMOD), the Japan International Cooperation Agency (JICA) and UNESCO on 24-26 and 28-29 June 2013 in Islamabad, Pakistan
- (13) ICHARM’s Rainfall-Runoff-Inundation (RRI) Model was awarded the 15th Infrastructure Technology Development Award presented by Minister of Land, Infrastructure, Transport and Tourism (MLIT), Japan on 5 July 2013
- (14) Signing Memorandum of Understanding for potential research collaboration among the State Hydrological Institute (SHI) in St. Petersburg, Russia and the Civil Engineering Research Institute for Cold Region (CERI) on 5 August 2013 in St. Petersburg, Russia
- (15) ICHARM Research Specialist, Dr. Hideyuki Kamimera was awarded from the Ministry of Natural Resources and Environment (MONRE) of Vietnam on 16 August 2013
- (16) IFAS Training Workshop at the Flood Forecasting Division (FFD) of Pakistan Meteorological Department (PMD) on 22-26 August 2013 in Islamabad, Pakistan
- (17) IFAS Workshop hosted by JICA and the ASEAN Coordinating Centre for Humanitarian Assistance on Disaster Management (AHA Centre) in Jakarta, Indonesia on 9-12 September 2013
- (18) Field Survey on damage by a deep-seated landslide and following collapse of a natural dam occurred in Negeli Lima Village of Maluku Province, Indonesia on 10 September 2013
- (19) UNESCO Strategic and High-Level Meeting on Water Security and Cooperation on 11-13 September 2013 in Nairobi, Kenya
- (20) Field survey for flood and drought risk assessment on the “Program for Risk Information on Climate Change”, called SOUSEI program by MEXT in the Solo River Basin, Indonesia on 16-21 September 2013

- (21) The Budapest Water Summit “the Role of Water and Sanitation in the Global Sustainable Development Agenda” on 8-11 October 2013 in Budapest, Hungary
- (22) IFAS Training organized by the Asian Development Bank and the Japan Aerospace Exploration Agency (JAXA) on 8-11 October 2013 in Manila, the Philippines
- (23) The Second United Nations Office for Disaster Risk Reduction (UNISDR) Asia Partnership Meeting on 5-7 November 2013 in Bangkok, Thailand
- (24) The 29th meeting of ISO/TC 113 (Hydrometry) on 11-15 November 2013 at Comision Nacional del Agua (CONAGUA) in Mexico City, Mexico
- (25) The 14th Governing Council Meeting of Asia-Pacific Water Forum and the Consultation Workshop on Asian Water Information System on 25-27 November 2013 at ADB in Manila, the Philippines
- (26) The first joint team meeting of Sentinel Asia Step3, which promote the effective use of satellite observation data from space agencies, following step 1 (2006-2007) and step 2 (2008-2012), as a chair of the Flood Working Group) along 82 participants from 51 organizations of 15 countries in Asia-Pacific region on 27-29 November 2013 in Bangkok, Thailand
- (27) The 8th UNESCAP/WMO Typhoon Committee Integrated Workshop on 2-7 December 2013 in Macau, China
- (28) Field Survey and Discussion meeting with the Malaysia Meteorological Department (MMMD) and Drainage and Irrigation Department (DID) in Kuala Lumpur, Malaysia on 10-13 March 2014
- (29) 46th Session of the UNESCAP/WMO Typhoon Committee session on 10-13 February 2014 in Bangkok, Thailand
- (30) The 9th USGS-Japan Workshop on Hydrology and Water Resources on 18-20 February 2014 in Lakewood, USA
- (31) The intermediate meeting of Joint Coordinating Committee (JCC) on the “Research and Development for Reducing Geo-Hazard Damage in Malaysia Caused by landslide and Flood” which is one of the study programs of Science and Technology Research partnership for Sustainable Development (SATREPS) conducted by JST and JICA on 6 March 2014 in Kuala Lumpur, Malaysia
- (32) Special event of “Taking Stock of the International Year of Water Cooperation (IYWC) and Advancing the Global Water Agenda after Post-2015” on 11 March 2014 in Trusteeship Council Chamber, UN Headquarters, New York
- (33) Field Survey for research project on pre-recovery planning in the Pampanga River Basin of the Philippines on 13-15 March 2014
- (34) The international dialogue on “Safe Connected Communities against Floods through Remote Sensing & GIS Tools” and the steering committee for the UNESCO project “Strategic Strengthening of Flood Warning and Management Capacity of Pakistan” on 12-19 March 2014 in Lahore, Pakistan
- (35) The UN-Water “Water for Life” during World Water Day celebrations 2014 water and energy on 20-21 March 2014 in Tokyo, Japan
- (36) The First United Nations Office for Disaster Risk Reduction (UNISDR) Asia Partnership Meeting on 22-24 April 2014 in Bangkok, Thailand
- (37) The third meeting for the High-Level Experts and Leaders Panel on Water and Disasters (HELP) on 27-28 May 2014 in Rotterdam, the Netherlands.
- (38) The Central Asia Climate Knowledge Forum: Moving towards Regional Climate Resilience on 13-15 May 2014 in Almaty, Kazakhstan
- (39) The 7th Global Earth Observation System of Systems (GEOSS) Asia-Pacific Symposium on 26-28 May 2014, in Tokyo, Japan
- (40) Introduction of Auto IFAS at the headquarter of Philippine Atmospheric Geophysical & Astronomical Services Administration (PAGASA) in the Philippines on 4-6 June 2014
- (41) Side Event of the 6th Asian Ministerial Conference on Disaster Risk Reduction on 23 June 2014 in Bangkok, Thailand
- (42) ICHARM’s acoustic Doppler current profiler (aDcp) was awarded the 16th Infrastructure Technology Development Award presented by Minister of Land, Infrastructure, Transport and Tourism (MLIT), Japan on 30 July 2014
- (43) Signing Memorandum of Understanding for potential research collaboration with Regional Centre on Urban Water Management (RCUWM) in Tehran, Iran in the presence of the ambassador of the Islamic Republic of Iran and Chief Executive of PWRI on 1 September 2014 in Tsukuba, Japan
- (44) ICHARM’s IFI plenary session during at the 6th International Conference on Flood Management (ICFM6) on 16 September 2014 in Sao Paulo, Brazil
- (45) Field survey for research project on observation of large-scale inundation area on 11-18 September 2014 in the Jamuna River, Bangladesh

- (46) ICHARM international symposium “together with the people coping with increasing water-related disasters in the world” collaborated with the National Graduate Institute for Policy Studies (GRIPS) on 30 September 2014 in Tokyo, Japan
- (47) The Coordinator Meeting of the 7th World Water Forum on 24 October 2014 in Marseille, France (participated as the coordinator of the design group of the theme 1.3, ‘Adapting to Change: Managing Risk and Uncertainty for Resilience and Disaster Preparedness,’ in the theme process and a design group member of the main focus 3, ‘Water and Natural Disaster,’ in the science and technology process and proposed a session of the UNESCO IHP RSC in the main focus 3).

1.3 Educational and training courses

1.3.1 Contribution to IHP courses

The UNESCO IHP Japan Training Courses (TC) were initiated as UNESCO IHP Nagoya Training Course by Nagoya University in 1991 and have been held every year since then. Topics of the course were relevant to fit the IHP-VII themes: Water Resources for Sustainable Development, Hydrology and Water Resources under Vulnerable Environment, and Water Interactions (Systems at Risk and Social Challenges). The host or convener body is the Hydrospheric Atmospheric Research Center (HyARC), Nagoya University. After the 19th TC, the Disaster Prevention Research Institute (DPRI), Kyoto University joined as a convener body. After that, HyARC and DPRI took the convener role alternatively. This made the TC have wider scope including water resources and disaster prevention. About ten participants from East and Southeast Asian countries selected by UNESCO Jakarta Office took lectures and practices every year in the training course.

The 22nd was with a title of “Precipitation Measurement from Space and its Applications” under a collaboration of Japan Aerospace Exploration Agency and National Institute of Information and Communications Technology, the 23rd was with a title of “Ecohydrology for River Basin Management under Climate Change” organized by DPRI. The 24th will be with a title of “Forest Hydrology-Conservation of Forest, Soil, and Water Resource” organized by HyARC, Nagoya University.

An important development of TC is information dissemination on website. The broadcasting of the lectures to universities in Asia via Internet was successfully performed with help of Keio University and collaboration with EST (Engineering, Science, and Technology) programme. When the visiting participants and some graduate school students join the TC's, the number is limited as only 10-20. The lectures are now available via internet, and many participants at remote sites can join the TC's. The lectures are also opened to graduate school students in the host universities such as Nagoya University and Kyoto University. TC is a good opportunity for graduate school students, and conveners of TC encourage graduate students to join the TC's.

1.3.2 Organization of specific courses

ICHARM also has been conducting a one-year master's program, “Water-related Disaster Management Course of Disaster Management Policy Program,” since 2007 in collaboration with JICA and the National Graduate Research Institute for Policy Studies (GRIPS). 19 students in the class of 2011 graduated on 14 September 2012, 12 students in the class of 2012 graduate on 17 September 2013, and 12 students in the class of 2013 graduate on 12 September 2014 with a master's degree in disaster management. The class of 2013 started the program on 4 October 2014 with 13 students. The doctoral program in disaster management started in October 2010 in collaboration with GRIPS. One student in the class of 2010 graduated on 17 September 2013, one student in the class of 2011 on 12 September 2014 with a doctoral degree. Two students in the class of 2012, three students in the class of 2013 and two students in the class of 2014 participated from four countries.

ICHARM has been providing a short-term training course with JICA as Capacity Development for Flood Risk Management.

This training program was launched in FY2012 and designed to provide opportunity for meteorologists, river administrators and disaster management officers in flood-vulnerable developing countries to learn the use of the Integrated Flood Analysis System (IFAS), developed and upgraded by ICHARM. The other important purposes are to learn about disaster management and evacuation plans and flood response cases in Japan, and to develop an action plan for local flood management of flood-vulnerable areas in the participants' countries. These training activities aim to enhance individual flood-coping capacities and eventually to contribute to flood damage mitigation in the countries.

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) UNESCO-IHE and ICHARM renewed the Memorandum of Understanding on 23 May 2014 and continue to promote the formal operation between two centres.
- (2) Prof. Tomoharu Hori (Kyoto Univ.) is active as a member of IHE Governing Board.

1.5 Publications

- (1) The textbook for the 23rd IHP Training Course in 2013, “Ecohydrology for River Basin Management under Climate Change”, Nagoya University, Kyoto University and UNESCO.
- (2) IAHS Red Book on “Floods: From Risk to Opportunity”, Ali Chavoshian, Kuniyoshi Takeuchi, , Xialtao Cheng (Eds.), IAHS, 357, March, 2013, 470 p .
- (3) Proceedings of the International Symposium on Answers to Asian Aquatic Problems (AAA+2013), Tokyo Metropolitan University, Tokyo, November 2013.
- (4) The 23rd IHP Training course textbook, Ecohydrology under Climate Change, Water Resources Research Center, DPRI, Kyoto Univ., December 2013.
- (5) Morphometric Property and Flood Equation, Shigeko Haruyama and KayThwe Hlaing, Terrapub publisher, Tokyo, 2013,196 p
- (6) Coastal geomorphology and Vulnerability of disaster –towards disaster risk reduction-, Shigeko Haruyama (Eds), Terrapub publisher, Tokyo, 2013,180 p
- (7) Takara, K. (2013): Coping with extreme weather and water-related disasters, *Free Flow*, A UNESCO Publication for the International Year of Water Cooperation, Tudor Rose, UK, pp. 103-106.
- (8) Executive Summary of World Water Development Report 2014 in Japanese, MLIT (Ministry of Land, Infrastructure, Transport and Tourism) in support of UNESCO

1.6 Participation in international scientific meetings

1.6.1 Meetings hosted by the country

- (1) ISRS2013 (The 12th International Symposium on River Sedimentation, Kyoto Japan, Sept. 2-5, 2013)
- (2) IGU 2013 Kyoto Regional Conference, organized by IGU Commission Biogeography and Biodiversity, Kyoto International Conference Center, Kyoto, Japan, 4-9 August 2013.
- (3) World Water Day main celebrations, organized by UNU and UNIDO on behalf of UN-Water, supported by MLIT, MOE, MOFA and others, Tokyo, Japan, 20-21 March 2014
- (4) NSF “Climate Change” Symposium Cosmos Club, Washington, DC, USA, February 22, 2013. [Oki]
- (5) Science Council in Asia, Bangkok, Thailand, May 7, 2013. [Oki]
- (6) Asia Pacific Water Summit, Chiang Mai, Thailand, May 18, 2013. [Oki]
- (7) Integrated water resources management for the 21st century Science Forum, Budapest Water Summit, 9 October 2013, Budapest, Hungary. [Oki]
- (8) Integrated water resources management for the 21st century Science Forum, Budapest Water Summit, 9 October 2013, Budapest, Hungary. [Oki]
- (9) JST-NSERC Workshop on Sustainable Water Use, 21 October 2013 Fujisoft Akiba Plaza, Tokyo, Japan. [Oki]
- (10) In commemoration of the 2014 UN World Water Day: Asia Pacific Regional Symposium “Water - Energy Nexus in Asia”, 20 March 2014, UNU, Japan. [Oki]
- (11) In commemoration of the 2014 UN World Water Day: Asia Pacific Regional Symposium “Water - Energy Nexus in Asia”, 20 March 2014, UNU, Japan. [Oki]
- (12) The International Symposium on Answers to Asian Aquatic Problems (AAA+2013) was held in Tokyo Metropolitan University, Japan on 16 November 2013 with more than 100 participants gathered from 8 different nations throughout the world.
- (13) Joint Assembly of IAHS (International Association of Hydrological Sciences), IAPSO (International Association of the Physical Sciences of the Oceans) and IASPEI (International Association of Seismology and Physics of the Earth’s Interior), Gothenburg, Sweden, 22nd – 26th July, 2013. [Takara, Taniguchi, Tsujimura, etc.]
- (14) IGU 2013 Kyoto Regional Conference, organized by IGU Commission Hazard and Risk, Kyoto International Conference Center, Kyoto, Japan, 4-9 August 2013. [Haruyama, Takara].
- (15) (Japan Geoscience Union) meetings on May 2013 [Haruyama].
- (16) IHDP committee meeting was held in Makuhari, Chiba Japan on 23 May 2013 at the occasion of JpGU (Japan Geoscience Union) meetings on May 2013 [Haruyama].
- (17) IHDP committee meeting was held in Yokohama, Kanagawa, Japan on 2 May 2014 at the occasion of JpGU (Japan Geoscience Union) meetings on 28 April-2 May 2014 [Haruyama].

1.6.2 Participation in meetings abroad

- (1) The 6th International Conference on Water Resources and Environment Research (ICWRER), Koblenz, Germany, 3-7 June 2013.
- (2) IAHS/IASPEI/IAPSO joint Assembly – Knowledge for the Future: Gothenburg, Sweden on 22-20 July, 2013
- (3) 2nd Asia Pacific Water Summit (Focus Area Session: IWRM Process Water Secured World organized by UNESCO)[NARBO supported and attended]
- (4) The 81st ICOLD Annual meeting at Seattle, USA, on 12-16 August 2013 [Sumi (Kyoto Univ.)]
- (5) The 6th installment of the International Perspectives on Water Resources & the Environment conference, Swissotel, Izmir, Turkey, January 8th, 2013. [Oki]
- (6) Soil Systems and Critical Zone Processes – Integrating Life Support Functions across Disciplines Monte Verita (Ascona- Switzerland) 14-18, April 2013. [Oki]
- (7) Integrated hydrological-water resources modeling in the Anthropocene PhD Defense Symposium for Yoshi Wada, Utrecht, November 8th, 2013. [Oki]
- (8) The International Seminar on Infrastructure Development in Cluster Island in Eastern Part of Indonesia, Baubau, Indonesia on 19 January, 2013.
- (9) The 6th International Conference of Asia Pacific Association of Hydrology and Water Resources “Climate Change and Water Security – APHW2013”, Seoul, Korea, 19-21 August 2013 [Takara].
- (10) The 3rd International MAHASRI/HyARC Workshop on Asian Monsoon and Water Cycle, Danang, Vietnam on 28-30 August 2013.
- (11) IAHS Statistical Hydrology Workshop (STAHY 2013), Kos Island, Greece on 17-19 October 2013.
- (12) The 2nd International Symposium on Vietnam Water Cooperation Initiative for Liable Cities (VACI 2013), Hanoi, Vietnam on 16 December 2013.
- (13) The 35th Hydrology and Water Resources Symposium, Perth, Australia on 24-27 February 2014.
- (14) General Assembly of EGU (European Geosciences Union), Vienna, Austria, 27 April - 2 May 2014. [Sayama, Tsujimura]
- (15) The 3rd Istanbul Water Forum was held in Istanbul, Turkey, 27-29 May 2014 [Takara].
- (16) IGU 2014 organized by IGU Commission Hazard and Risk, Jagiellonian University, Krakow, Poland, 18-23 August 2014. [Haruyama].
- (17) 11th Annual Meeting of Asia Oceania Geosciences Society (AOGS2014) in Sapporo, Japan, 28 July – 2 August 2014.
- (18) IAEA/UNESCO Technical Meeting on Groundwater Contamination following the Fukushima Nuclear Accident, IAEA Headquarters, Vienna, 8 – 10 September 2014 (Tsujimura).

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 2014

- (1) The 24th IHP Training Course with the theme “Forest Hydrology–Conservation of Forest, Soil, and Water Resource” will be held in Nagoya, 24 November to 7 December 2014.
- (2) The 22nd Session of the IHP Regional Steering Committee (RSC) for Southeast Asia and the Pacific will be held at Yogyakarta, Indonesia on 10-14 November 2014.
- (3) FRIEND-Water2014: 7th Global FRIEND-Water Conference, Montpellier, France, 7-10 October 2014.

2.2 Activities foreseen for 2015 - 2016

- (1) Groundwater-surface water interaction research in arid/semi-arid regions (Mongolia, Tunisia, China) in collaboration with Alliance for Research on North Africa and Japan-China Center on Hydrological Cycle Research, University of Tsukuba.
- (2) ICWRER2016, International Conference on Water Resources and Environment Research 2016 will be held in Kyoto, Japan, 13-17 June 2016.

2.3 Activities envisaged in the long term

- (1) Participation in IHP-VIII projects and RSC activities.
- (2) Information dissemination through a web page of the National Committee.
<http://hywr.kuciv.kyoto-u.ac.jp/ihp/japan/index.html>

(3) Activities relating to “Sustainability Science” that is a key promotion by the Japanese Commission for UNESCO



United Nations
Educational, Scientific and
Cultural Organization



MALAYSIA COUNTRY REPORT 2014

of the
**NATIONAL COMMITTEE FOR
MALAYSIA INTERNATIONAL HYDROLOGICAL PROGRAMME**

22nd MEETING OF IHP REGIONAL STEERING COMMITTEE
FOR SOUTH EAST ASIA AND THE PACIFIC
YOGYAKARTA, INDONESIA
13-14 NOV 2014

[ACTIVITIES UNDERTAKEN FOR THE PERIOD OF OCT 2013 – OCT 2014]

NATIONAL REPORT ON IHP RELATED ACTIVITIES

Report Format

Name of the Centre		UNESCO - International Hydrological Programmes Malaysia
Name of Chairman		Dato' Sri Ir. Hj. Ahmad Husaini Sulaiman
Name of Secretary		Dato' Ir Haji Hanapi bin Mohamad Noor
Name and title of contact person (for cooperation)		Mr. Muhammad Al-Muzammil Chu Ahmad (Assistant Secretary)
E-mail		ihp@water.gov.my / muzammil@water.gov.my
Address		Water Resource and Hydrology Division, Dept. of Irrigation and Drainage Malaysia, KM 7 Jalan Ampang, 68000 Kuala Lumpur.
Website		
Location of centre		city/town : <u>Kuala Lumpur</u> country : <u>Malaysia</u>
Geographic orientation *		global regional
Year of establishment		1975
Themes	Focal Areas ♦	<input checked="" type="checkbox"/> groundwater <input checked="" type="checkbox"/> urban water <input checked="" type="checkbox"/> arid / semi-arid zones <input checked="" type="checkbox"/> humid tropics <input checked="" type="checkbox"/> droughts and floods <input checked="" type="checkbox"/> sediment transport and management <input checked="" type="checkbox"/> water and environment <input checked="" type="checkbox"/> ecohydrology <input checked="" type="checkbox"/> water law and policy <input checked="" type="checkbox"/> transboundary river basins/ aquifers <input checked="" type="checkbox"/> IWRM <input checked="" type="checkbox"/> global and climate change <input checked="" type="checkbox"/> mathematical modelling <input checked="" type="checkbox"/> social and cultural dimensions of water <input checked="" type="checkbox"/> water education <input checked="" type="checkbox"/> other: <u>stormwater management,</u> <input checked="" type="checkbox"/> <u>water hazard.</u>
	Scope of Activities ♦	<input type="checkbox"/> vocational training <input type="checkbox"/> postgraduate education <input type="checkbox"/> continuing education <input checked="" type="checkbox"/> research <input checked="" type="checkbox"/> institutional capacity-building <input type="checkbox"/> advising/ consulting <input type="checkbox"/> software development <input type="checkbox"/> other: (please specify) <hr style="width: 20%; margin-left: 0;"/>
Support bodies 1		The Government of Malaysia
Hosting organization 2		Department of Irrigation and Drainage Malaysia/ Ministry of Natural Resources and Environment
Sources of financial support 3		The Government of Malaysia/ UNESCO

Existing networks and cooperation 4	UNESCO/ICHARM/RCUWM/RSC for Southeast Asia and The Pasific/ Partner of the GWP/ IWA/ APAC Water-related Centre Category II/MyWP/Malaysian Stormwater Organization / AWGWRM
Governance	<input checked="" type="checkbox"/> director and governing board <input type="checkbox"/> other: Frequency of meetings: twice every year(s) <input type="checkbox"/> Existence of UNESCO presence at meetings (UNESCO Jakarta Office)
Institutional affiliation of director	IWA/IAHS/Partner of the GWP/Malaysia Nuclear Agency/MyWP/ Board of Engineers Malaysia
Number of staff and types of staff	total number of staff (full-time, or equivalent) : 10 persons number of staff who are water experts: 3 persons. number of visiting scientists and postgraduate students: 1 person.
Annual turnover budget in USD	Operational = USD 150,000.00 Programmes and Activities = USD 250,000.00

* check on appropriate box

◆ check all that apply

1 please specify bodies that cover the operational costs of the centre, and other essential costs such as salaries and utility bills, and that provide institutional support to ensure centre's sustainability

2 if different from support bodies

3 please specify sources of main budgetary and extrabudgetary funds to implement projects

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

1. ACTIVITIES UNDERTAKEN IN THE PERIOD OCTOBER 2013 – OCTOBER 2014

1.1 Meetings of the IHP National Committee

1.1.1 Decisions regarding the composition of the IHP National Committee

NATIONAL COMMITTEE

The Malaysia International Hydrological Programme is the National Programme Committee and UNESCO's state member for international scientific cooperative programme in water research, water resources management education and programme.

Primary Objectives are:

- to act as a Member States for IHP, cooperating professional and scientific organizations and individual experts can upgrade their knowledge of the water cycle thereby increasing their capacity to better manage and develop their water resources
- to develop techniques, methodologies and approaches to better define hydrological phenomena
- to improve water resources management
- to act as a catalyst to stimulate cooperation and dialogue in water science and management
- to assess the sustainable development of vulnerable water resources
- to serve as a platform for increasing awareness of global water issues

EXCO MEETING - MEETINGS OF THE IHP NATIONAL COMMITTEE

The programme structure of the Malaysia National Committee for IHP consists of a Chairman, Secretary, Assistant Secretary, 8 Executive Committees and 3 Working Committees from various research institutes, universities and sectorial-departments. These EXCO members consist of representatives from the Department of Irrigation and Drainage Malaysia (DID), UNESCO-Humid Tropics Centre Kuala Lumpur (HTC KL), National Commission of UNESCO Malaysia (Nat Com), Ministry of Science and Innovation (MoSTI), University of Technology Malaysia(UTM), National Hydraulic Research Institute Malaysia (NAHRIM), Department of Meteorology (MMD), Mineral and Geoscience Department Malaysia (MGD), Malaysian Nuclear Agency (Nuclear Malaysia), National University of Malaysia (UKM).

The Malaysia National Committee for IHP is on the threshold of restructuring its activities based on considerations:

- i. Aligning the programme based on the IHP Programme Phase VIII
- ii. Obtaining better participation from key stakeholders.

The present composition of the National Committee:

Chairman : Dato' Sri Ir Hj Ahmad Husaini Sulaiman
Secretary : Dato Ir. Hj Hanapi Mohamad Noor
Assistant Secretary: Mr. Muhammad Al-Muzammil Chu Ahmad

EXCO Members:

The nominated officers representing the various department and government agencies as EXCO members are as follows: -

1. Dato' Nordin Hamdan
- Department of Irrigation and Drainage Malaysia
2. Mr. Mohd Sallehuddin bin Hassan
- National Commission for UNESCO Malaysia
3. Prof. Nor Aieni Hj. Mokhtar
- Ministry of Science, Technology and Innovation
4. Dr Mohamed Roseli Zainal Abidin
- Humid Tropics Center Kuala Lumpur
5. Prof. Nabsiah Abdul Wahid
- University of Science Malaysia
6. Mrs. Rogayah Kadari
- Ministry of Energy, Green Technology and Water
7. Dato Prof. Dr. Mazlin Mokhtar
- National University of Malaysia
8. Dr Wan Zakaria Wan Mohd Tahir
- Nuclear Agency Malaysia
9. Prof. Zulkifli Yusof
- Universiti Teknologi Malaysia

The committee holds coordination meetings on a quarterly basis but sometime hold additional technical meetings as needed especially for the planning and implementation of events, seminars and workshops organized under of the respective committees. The EXCO schedule meetings is normally presided by the Chairman of the Malaysia Committee for IHP.

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

EXCO MEETINGS : YEAR 2014

Two EXCO meetings were held in 2014 as the date given below :-

- 25th Apr 2014 in Kuala Lumpur
- 10th Oct 2014 in Kuala Lumpur

ANNUAL GENERAL MEETING

Since 2010, the AGM has been replaced with the bi-annual meeting (namely EXCO Meeting). When there is a need for the election of new EXCO members, an election process will take place during this meeting.

IHP MALAYSIA PARTNERSHIPS

To implement its programmes, the UNESCO IHP Malaysia collaborates with an extensive range of public and private partners, in particular with other intergovernmental agencies, practitioner and NGO's programmes.

The partners of UNESCO Malaysia water related and research institution from various government departments, universities and research institutions. Meetings were periodically held to discuss and implement programs and projects in line with the IHP—VII (2008-2013) UNESCO strategic plan. More projects related to IHP-VII themes are to be supported by Ministry of Natural Resources and Environment and Ministry of Science and Innovation through IHP National Committee.

STANDING COMMITTEE

UNESCO-IHP Malaysia plans its activities through its Committee and they are carried out by the three standing committees which are:

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

SECRETARIAT OF THE UNESCO-MALAYSIA NATIONAL COMMITTEE FOR IHP

The Secretariat provides information and facilities needed to perform the programme activities and daily responsibilities.

Mr. Muhammad Al-Muzammil Chu Ahmad
Secretariat UNESCO-IHP Malaysia
Water Resources Management and Hydrology Division,
Department of Irrigation and Drainage Malaysia
KM 7 Jalan Ampang
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1.1.2 Status of IHP-VII activities

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

1. A series of workshops and meetings were carried out throughout 2014 following the completion of the Study on the Review of the National Water Resources Study (2000-2050) and Formulation of National Water Resources Policy. A committee was formed under the Ministry of Natural Resources and Environment to coordinate and monitors the implementation of the Strategic Action Plan developed under this policy. Five working groups were formed and IHP Malaysia is involved in working group for capacity building awareness.
2. A program of Public Discourse has been successfully carried out in conjunction with the World Water Day 2014, themed: "Water and Energy". This discourse was structured with one keynote presentation by Tan Sri Ir Shahrizaila bin Abdullah, a Senior Fellow from the Academy Science of Malaysia, with the topic on Water and Energy Nexus followed by discussion from three prominent panelists. More than 100 participants took part in the public discourse and matters discussed varied from water resources and energy accounting, climate change, public awareness, capacity building and also the importance of water and energy nexus.
3. IWRM : A contribution to IHP VII Theme 5: Water Education and Training: under the flag of the UNESCO-IHP Malaysia, consisting of stakeholders related to water has taken place in the annual World Water Day since year 1994. Its main objective is to conduct campaign through training, educating and dialogue, and seminar programmes to augment public participation. For 2014, an exhibition activity was carried with participation from 8 government agencies and 2 private sector related to water. A pledge making program was also carried out and as to date over 400 people had make a pledge towards saving water and protect the environment.

1.2 Activities at national level in the framework of the IHP

1.2.1 National/local scientific and technical meetings

- Standing Committees of Science Meetings (under Ministry of Science, Technology & Innovation)
- IWRM Training for Government Officials :
 - Training Course on Integrated Water Resources Management was carried out in 20-22 May 2014, at the DID National Human Resources Development Centre Kota Bharu
 - Training Course On Water Resource Policy, Legislation and Institutional arrangement from March, Kuching, Sarawak

- Malaysia IHP Strategic Planning Meetings (yearly)

1.2.2 Participation in IHP Steering Committees/Working Groups

- Participation of IHP Malaysia was at the last 21st RSC Regional Steering Committee Meeting for Southeast Asia and the Pacific - UNESCO IHP, which was held in Gyeongju City, Republic of Korea, in conjunction with the International Water Forum on Water Cooperation and 7th World Water Forum of The 2nd Nakdong River International Water Week 2013 (Na-Ri IWW/IWF 2013).

1.2.3 Research/applied projects supported or sponsored

2014

- Data book Urban Eco Hydrology for Resilient Environment (UCOREN), Penchala River
- R&D Component, Upscaling Water Security to meet local, regional dan global challenges

2013

- Impact studies of Waste Trap and Solid Waste Management in Putrajaya
- Upscaling Of MSMA Eco-Hydrology At Catchment Level in Sg. Langat – Construction
- Retrofitting Green Roof System At Block A5-1, DID Headquarters

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

- UNESCO Jakarta Office
- Malaysian National Commission for UNESCO
- Humid Tropics Center Malaysia
- University of Science Malaysia
- National Hydraulic Research Institute Malaysia
- UNITEN Malaysia
- Universiti Kebangsaan Malaysia
- Putrajaya Corporation

1.2.5 Other Initiatives

Joint projects related to hydrology, water resources and environmental education carried out by various agencies such as:

- Regional Center of Education (University of Science Malaysia)
- Cooperation on Research and Education with Universiti Kuala Lumpur (UniKL)

- Cooperation on Water Resources Research with Universiti Tenaga Nasional (UNITEN)
- Cooperation on Environmental Sustainability with Universiti Teknologi Malaysia

1.3 Educational and Training Courses

1.3.1 Contribution to IHP courses : Technical Talk

A total of six (6) Technical Talks was carried out from the last quarter of 2013 until October 2014. The topics covered were as follows :-

- a) Mapping the Carbon Landscape : Technological and policy application in tropical peatlands catchments by Dr. Rory Padfields (UTM)
- b) Introduction to Water Footprint by Dr. Zainura Zainoon Noor (UTM)
- c) The Federal Constitution and Water Resource Management in Malaysia by Dr. Sarah Aziz (UKM)
- d) Groundwater Development and protection in Malaysia by Dr. Saim Suratman (NAHRIM)
- e) Climate Change Impacts : Ensuring Malaysia Competiveness and Relevance by Dr. Gary Theseira (Ministry of Natural Resources and Environment, NRE, Malaysia)
- f) Climate change impacts on sea level rise in Malaysia by Ir Hj Radzi Abd. Hamid (NAHRIM)

1.3.2 Other Forums

IHP Malaysia also participated in the following program: -

- Short course on Ecohydrology In River Basin Management from 2-14 Dec 2013 at Kyoto University, Japan.
- Malaysia Water Resources Management (MYWRM) Forum 2014 from 9-10 Jun 2014 at Siantan Hall, Putrajaya Corporation.
- Forum for formulating Climate resilience for water sector at Pullman Hotel, Putrajaya from the 27-28 October 2014

1.3.3 Organization of Specific Courses

- Four National Water Watch Programme for Young Leaders were carried out last year and another three had been organised in 2014. The details are as follows :-
 - a) North Zone National Program held at Temenggor Lake Banding, Perak on the 21 – 23 January 2014 with participation of 50 student and 7 teachers with activities related to Hydroelectric Power Generation, Biodiversity, Lake Ecosystem, Aquaculture and forest and water ecosystem;
 - b) South Zone Malaysia National Program held at Gunung Pulai, Johor on the 22nd – 24th April 2014 with participation of 60 secondary school students and 40 university student. 8 modules were presented and amongst others are water resources, river and human, hydrological cycle, climate change; and

- c) Central Zone National Program held at Putrajaya on the 19th - 21st August 2014 with participation of 100 students and 5 teachers. 11 modules were presented and amongst others are wetland ecosystem, water resources, river and human, hydrological cycle, climate change

1.3.4 Participation in IHP courses
(Courses/Seminars attended by IHP Malaysia & members)

2014

Mr. Alifnur Iskandar b Mohamad Sani

Course on Land and Water Management

From 1st Oct - 15 Dec 2014

Location : Cairo Egypt

Organizer: The Egyptian International Centre for Agriculture (EICA)

Objectives : To enhance the participants knowledge and skill in the field of Land and Water management.

Mr. Shahar Mohd Salleh

IHP Training Course on "Forest Hydrology – Conservation of Forest, Soil and Water Resource" from 23 Nov-7 Dec 2014 at Nagoya University, Japan.

2013

Mrs. Vasukey Palani

IHP Training course on Ecohydrology In River Basin Management from 2-14 Dec 2013 at Kyoto University, Japan.

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

A number of Malaysian students are currently pursuing post-graduate studies at master's and PhD levels at this institute.

Joint projects for research and education in collaboration with UNESCO IHE and Universiti Kuala Lumpur through IHP Malaysia. This joint project aims to bring water engineering syllabus, including water resources and civil engineering structures of IHE to be taught in Malaysia through memorandum of agreement set forth.

1.5 Publications

- Monthly Updates of IHP activities
- Publication and production of CD on the Guide to Hydrological Practices of Design Flood Discharges in Malaysia by Committee on Standardization of Hydrological Practices, IHP Malaysia.

- Environmental Education For Sustainable Development (EEfSD) For Everyone Series (by Prof. Nabsiah Abdul Wahid, University of Science Malaysia) :
 - Application of Simple and Effective Domestic Water Management for Household Consumers
 - Family Recreational Activity: Learning River Water Quality Estimation Using Biological Indicator

1.6 Participation in International Scientific Meetings

1.6.3 Meetings hosted by the country

- Position Paper Meeting on the Water-Energy Nexus as a follow-up from the World Water Day 2014 Public Discourse.

1.6.4 Participation in meetings abroad

- Participation of IHP Malaysia in the 21st Regional Steering Committee Meeting for Southeast Asia and the Pacific - UNESCO IHP, which was held in Gyeongju City, Republic of Korea, in conjunction with the International Water Forum on Water Cooperation and 7th World Water Forum of The 2nd Nakdong River International Water Week 2013 (Na-Ri IWW/IWF 2013).

1.7 Other activities at Regional Level

1.7.3 Institutional relations/cooperation

- 13th IAHR/IWA International Conference on Urban Drainage (ICUD) 2014
- National World Water Day 2014 celebration at Putrajaya Corporation.
- Secretariat for AWARE 2014 Conference Kuala Lumpur in conjunction with "World Water Day" 18-19 Mar 2014
- Malaysia UNESCO Cooperative Programme (MUCP)
- World Water Day celebrations for 2012, 2013 and 2014
- Malaysia UNESCO Day, Nov 2013
- Putrajaya Lake and Wetland Explorace 2013 for university students
- Public Outreach Programme by National University Malaysia
- National Exhibition for World Water Day (yearly)
- Best Hydrology and Water Referees Thesis Award (Gold, Silver & Bronze medals)
- Water Watch Programme For Young Leaders (regional and National levels)
- Water Treatment Plants open day (nationwide) co-op with Water Supply Department & National Water Management Commission

1.7.4 Completed and ongoing scientific projects

Please refer 1.2.3

2 FUTURE ACTIVITIES

2.3 Activities planned until December 2014

- National Water Watch Programme For Young Leaders
- IHP Technical Talks
- Meeting for the preparation on the Workshop for ASEAN IWRM Country Strategy Guideline
- Development of Position Paper by IHP Malaysia on Water-Energy Nexus in conjunction with World Water Day 2014 through a consultant study.
- Developing Malaysia National Standard on Quality Assurance for Hydrological Instrumentation.
- Participation in IHP-RSC Meeting, Asian Pacific FRIEND and Catalogue of Rivers
- Participation in Training course in 2014 at Nagoya University
- Participation in programme at the International Center for Water-related hazards and risk management (ICHARM)
- Workshop for National Water Resource Policy : Strategic Action Plan (in collaboration with DID)

2.4 Activities foreseen for 2015-2016

- IHP Malaysia will be the coordinator for Malaysia's participation to the 7th World Water Forum 2015.
- Participation in IHP-RSC meeting Asian Pacific FRIEND and Catalogue of Rivers
- Cooperation between Universiti Kuala Lumpur (UNIKL) and IHP Malaysia to develop courses for higher learning in hydrology and water resources fields
- Participation in IHP-Training course at Nagoya University
- On Job Training (OJT) IHP Training Course: "The Tank Model"
- Implementation of projects related to IHP-VIII.
- Organizing Water Foot-Print Course.

2.5 Activities envisaged in the long term

- Cooperation between The Regional Centre of Expertise on Education for Sustainable Development (RCEs) Penang and IHP Malaysia for Regional Sejahtera ESD Network (RSEN) and other activities
- Activities on public participations at national level to promote awareness through education and training on water-related hazards. These include impacts from climate change, flood and drought hazard, debris control, water and food security.
- Participation in IHP-VIII projects and RSC activities.
- Information dissemination through a web page of the National Committee.
- Participation in IHP-RSC activities and IHP Inter Governmental Council meetings in Paris.
- Malaysia IHP commitment to IHP Phase VIII (2014-2019)
- Scientific Researches by Malaysia IHP Standing Committee
- Collaboration with many other agencies for the purpose of scientific researches and public outreach programmes.



The 22nd Meeting of the International Hydrological Programme of UNESCO (IHP) Regional Steering Committee (RSC) for South Asia and Pacific

Mr. B. Gantulga, Head of the Mongolian National Committee For IHP
Yogyakarta, Indonesia, 10-14 November 2013

CONTENT

1. Brief introduction of the Mongolian National Committee for IHP
2. Outline of Mongolian Water Sector
3. Measures taken under the IHP-VIII

Institutional settings





Introduction of Mongolian National IHP Committee

- Policy Implementation Department, MEGD
- Head of Ecological Research Center, Institute of Geo-Ecology, Mongolian Institute of Science (MAS)
- Groundwater researcher, Institute of Geo-Ecology, MAS
- Director of the Institute of Meteorology and Hydrology
- Researcher, Water Research Center, NUM,
- Fresh water officer, WWF office in Mongolia
- Private institute “Prestige Group”



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International
Hydrological
Programme

General Country Information



Capital: Ulaanbaatar city

Territory: 1,564,100 sq.km

Population: 2,921,287 as of 2013

Administration unit: 21 provinces

Mean annual precipitation: 250 mm

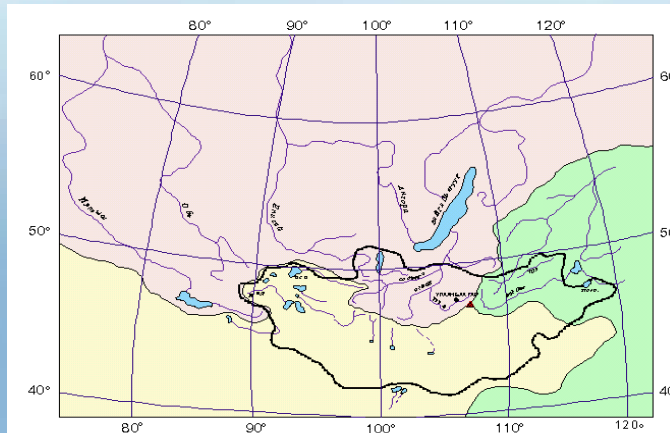
Natural zone: Mountain, Steppe,
Forest, Desert

Total Water Resources in Mongolia

Total water resources are 608.29 cub.km, of which:

- Rivers 34.6 cub.km
- Lakes 500 cub.km
- Glaciers 62.9 cub.km
- Ground water 10.8 cub.km

Territory of Mongolia belongs to 3 drainage basins:

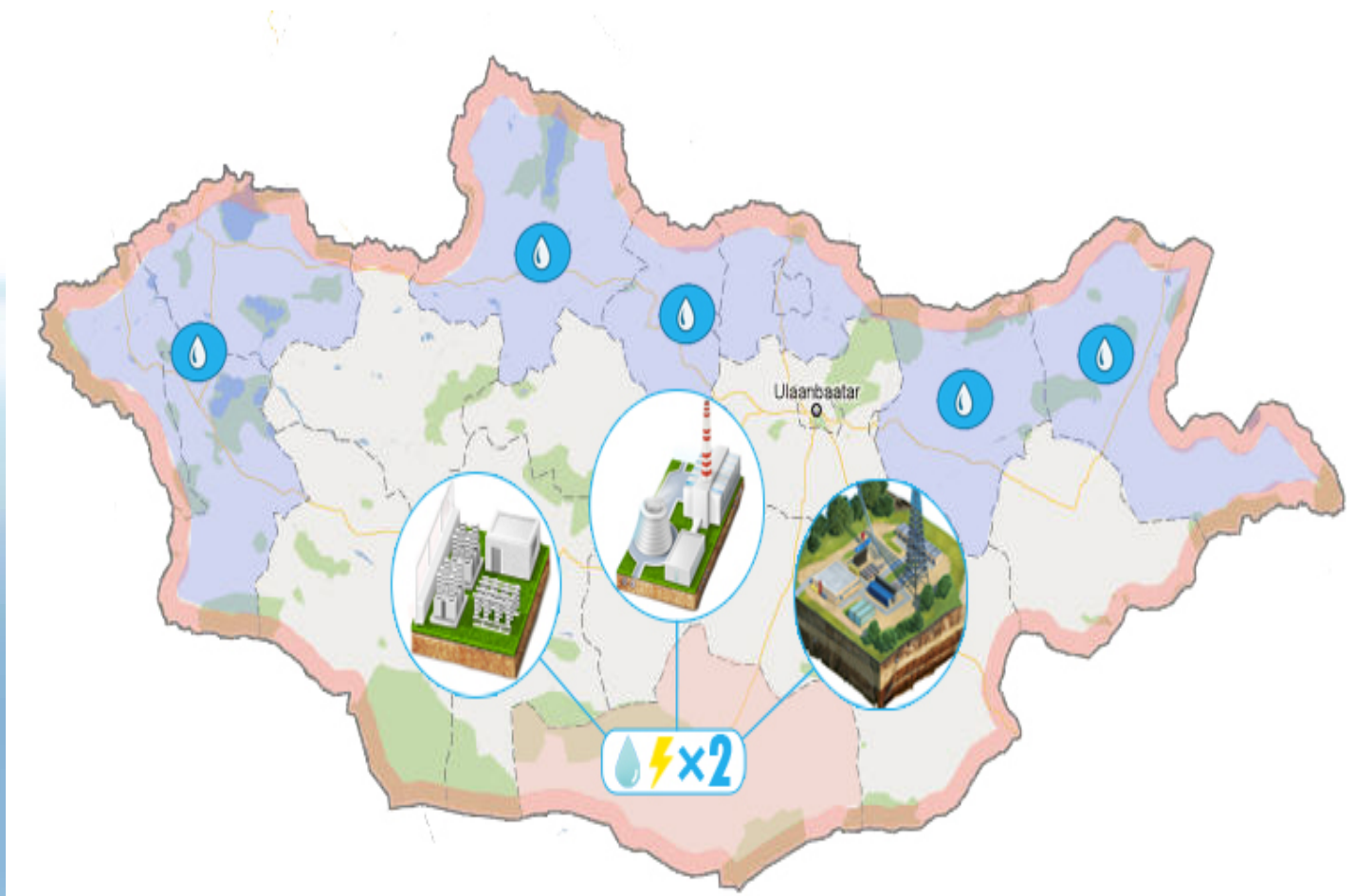


Northern Arctic ocean
basin

Pacific ocean basin

Central Asian internal basin

Scarce Water Resources



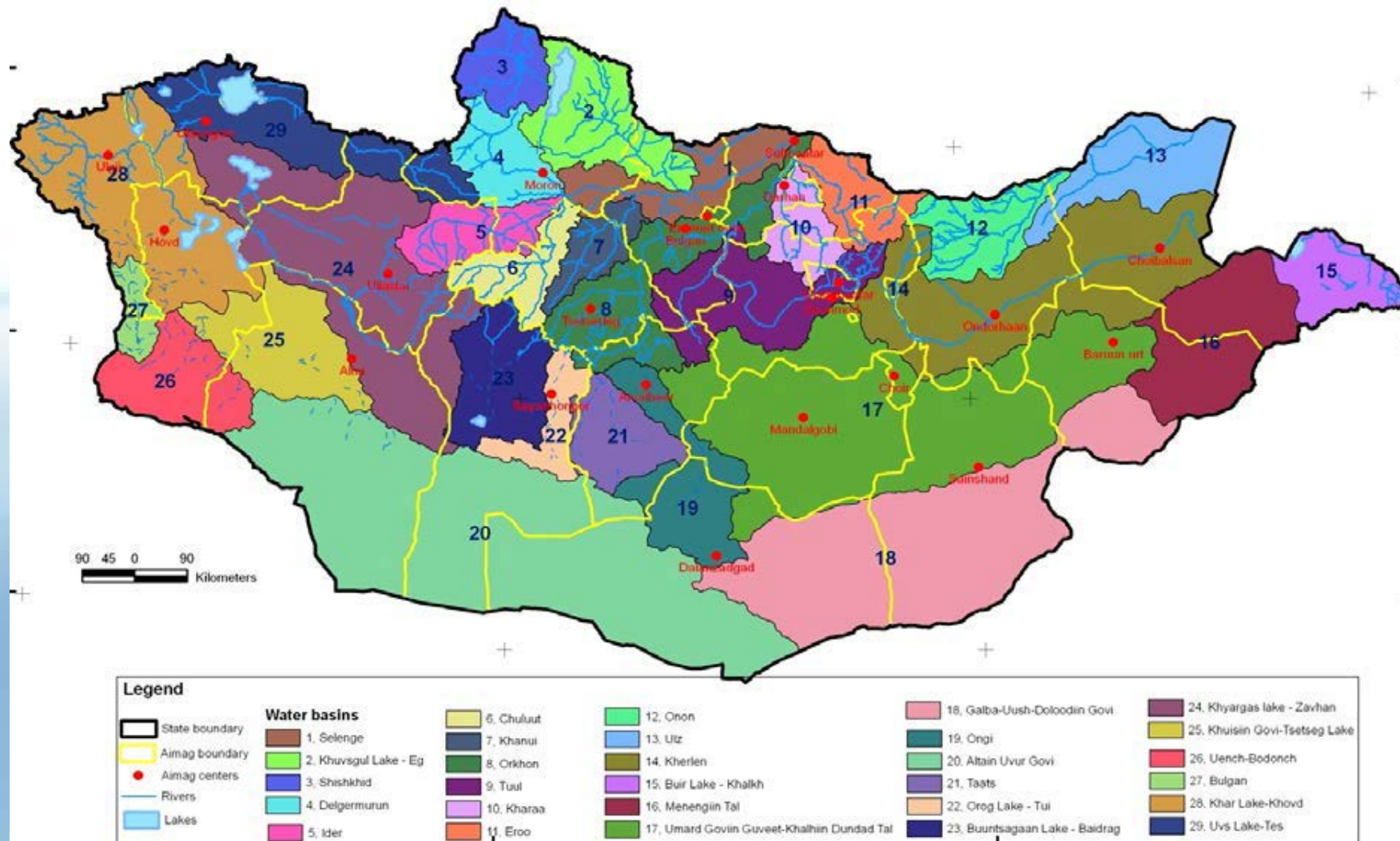


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River Basin Management



Legal Structure

- **Law on Environment Protection**
- **Law on Natural Resource Usage Fee**
- **Law on Water**
- **Law on Water Pollution Fee**
- **Law on Use of Water Supply and Sewage System in Urban and Settlement Areas**
- **Law to Prohibit Mineral Exploration and Mining Operations at Headwaters of Rivers, Protected Zones of Water Reservoirs**
- **2010 Water National Programme**
- **2012-2016 Government Action Program**
- **Integrated Water Resources Management national plan 2013**

Challenges

✓ **High Demand**

- **Mining**
- **Industry**
- **Energy**
- **Urban**

✓ **Uneven distribution of Water Resources**

✓ **Lack of Large Water Accumulation Facilities / Dams, Reservoirs**

✓ **Poor water supply and sanitation condition both in urban and rural areas**

- **Water quality in Gobi region (minerals, arsenic content)**
- **Waste water Treatment / Recycling**



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Measures taken under the IHP-VIII

Theme 1: Water-related Disasters and Hydrological Change:

✓ Desertification

- International Projects on combating Desertification

Theme 2: Groundwater in a changing environment

✓ Protect water resources

- In 2009, Protection zones for headwaters of rivers and water reservoir areas
 - *Mineral Exploration and Mining Operations are ceased in 70% of water resource areas and 30% of total area*
- As of 2012, 99 areas with total territory of 27.2 mill.ha in 166 soums of 19 Provinces included in the Special Protection Area
 - *17.4% →→ 30%*

Measures taken under the IHP-VIII

Theme 3: Addressing Water Scarcity and Quality:

- ✓ **Improve the structure and organization of the water management sector**
 - 29 River Basin Authorities
 - River Basin Council
- ✓ **Increase water Resource**
 - Polluters pay principle
 - Law on Natural Resource Use Fee
 - Law on Water Pollution Fee



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Hydrological
Programme

Measures taken under the IHP-VIII

Theme 4: Urban water management in the city of the future



Improve surface water usage:

- Tuul River Reservoir / Orkhon Gobi Project
- Water treatment and recycling

Theme 5: Ecohydrology, engineering harmony for a sustainable World



Introduce modern technology for efficient and economical use of water resource / Green Procurement

Theme 6: Education – Key to Water Security



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Thank you for your attention.

NATIONAL REPORT ON IHP RELATED ACTIVITIES

MYANMAR

1. ACTIVITIES UNDERTAKEN IN THE PERIOD November 2013 – October 2014

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: Minister for Transport

Vice Chairman: Deputy Minister for Transport

Secretary: Director General of Department of Meteorology and Hydrology

Members: Representatives from departments and committees concerned are as follows;

1. Deputy Minister for the Ministry of Science and Technology
2. Deputy Minister for the Ministry of Agriculture and Irrigation
3. Director General of 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 members of departments and committees. The MNC-IHP normally held one session each for the National Committee (NC) and Working Committee (WC) during 2008-2013. Activities related to the themes of IHP-VII are implemented by the members of the working committees. The WC prepared the (30) research papers and shared the knowledge and experiences to the other national committee members during 2008-2013. The session could not be hold during 2008 to 2013. 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-VIII Activities

- Monitoring Water Quality of Rivers in Myanmar
- Monitoring the changes of Water resources in Myanmar
- Monitoring the low flow characteristics
- Assessment of the climate change impact on the flood events
- Developing the flood hazard map in order to reduce loss of lives and properties due to flood disaster
- Implementing the hydrological disaster risk management activities 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, 15th, 17th, 18th, 19th, 20th and 21st Regional Steering Committee Meetings for Southeast Asia and Pacific during 2005 to 2013.

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 collaborates with EANET's activities.

Myanmar is collaborating with ADPC and RIMES (Regional Integrated Multi-Hazard Warning System for Africa and Asia) in Hydrometeorology, Seismology and Climate Change sectors.

Flood Forecasting Method using HBV model hosted by ADPC cooperated with Norwegian University of Science and Technology at Nay Pyi Taw, 20 – 31 October, 2014.

Flood Forecasting Method RRI Model organized by ADB and ICHARM support technical aids. The training will be held in February, 2014.

1.2.5 Other Initiatives

-Developing the Flood Hazard Map for Mandalay, Bhamo and Katha.

1.3 Educational and Training Courses

1.3.1 Contribution to IHP courses

- Training on Hydrological Grate I was held on October, 2014 at Mandalay, Myanmar.

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 Meeting hosted by the country

- Monsoon Forum was held on 13 November 2013 at Nay Pyi Taw, Myanmar. This meeting was organized by FAO and DMH. It was supported by UNESCAP and technical assistance from WMO and RIMES.
- The Workshop on Application of Remote Sensing and GIS for Disaster Management from 18 to 22 November 2013 Organized by Japanese Aerospace Exploration Agency-JAXA, Asia Institute of Technology and DMH was held at Nay Pyi Taw, Myanmar.

- Training on Acoustic Discharge Measurement 2nd Training on 27 January - 1 February, 2014 at Yangon, Myanmar.
- The Job Training for Hydrology on 19 March - 28 March, 2014 at Nay Pyi Taw, Myanmar.

1.5.2 Participation in meetings abroad

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

- Debriefing of Warsaw Cop 19 Outcomes and discussions on SEAN-CC activities, Vietnam, 3 – 4, March, 2014.
- Workshop on Recovering Climate Heritage in the Indian Ocean Rim Countries and Islands, Mozambique, 21 -24, April, 2014.
- RIMES Council Meeting, Thailand, 29 – 30, May, 2014.
- 36th Sub-Committee on Meteorology and Geophysics (SCMG-36) Meeting, Lao, 1 – 3, September, 2014.

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 2014

-

2.2 Activities foreseen for 2014-2015

- The MNC-IHP will try to implement the water related activities in line with the themes of IHP
- IHP national committee will continue to encourage scientific and technical symposia and workshops
- The members of MNC-IHP will attend the 20th Regional Steering Committee for Southeast Asia and the Pacific.
- The members of MNC-IHP will participate in the international and national activities of IHP.
- Hydrological Division will upgrade the flood early warning system and flood monitoring system.
- Remote Sensing and GIS Division will produce the flood risk maps and flood assessment maps in order to reduce the loss of life and properties.

**22nd IHP REGIONAL STEERING COMMITTEE MEETING FOR
SOUTH EAST ASIA AND THE PACIFIC
YOGYAKARTA, INDONESIA
(13 November 2014 – 14 November 2014)**

NATIONAL REPORT OF NEW ZEALAND

1. Activities undertaken in the period October 2013– October 2014

1.1 Meetings of the IHP National Committee

1.1.1 Composition of the IHP National Committee

UNESCO New Zealand has been restructured and existing arrangements for sub commissioners (including IHP National Committee) have been dissolved with no replacement structure to date. Mr. Dennis D Jamieson and MS Srinivasan have continued to maintain a watching brief of developments and act as ‘de facto’ Chairman and Secretary respectively as per their previous roles in the IHP National Committee during the reporting period. Discussions with UNESCO NZ indicate that the potential loss in continuity with IHP was not their intention.

1.1.2 Status of IHP activities

The following projects continue to be funded:

- Information on New Zealand’s Freshwaters: Water Resources Archive;
- Land Use Intensification: Sustainable Management of Water Quality and Quantity;
- Reducing the Impacts of Weather Related Hazards;
- 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) continues a policy of “free” data access for most users.

1.1.3 Decisions regarding contribution to participation in IHP-VIII

Components of the New Zealand hydrological research programme have increasingly good alignment with IHP-VIII themes in eco-hydrology and IWRM. This is fostered by collaborative process that integrate social science and cultural perspectives into programmes of biophysical science.

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).

1.2.2 Participation in IHP Steering Committees Working Groups

New Zealand was unable to attend the 2013 RSC meeting due to unavailability of personnel.

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

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. Regular exchanges between the organisations continue.

Links with other International and Regional organisations

Regular contact is maintained 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.

1.2.5 Other initiatives

Diatom invasion - Didymosphenia geminata

The diatom *Didymosphenia geminata* 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 is a major focus of Eco hydrology projects as methods are sought for control.

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

See <http://www.niwa.co.nz/climate/publications>

The "Island Climate Update" (ICU) monthly bulletin

The ICU, produced by NIWA's National Climate Centre 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.

<http://www.niwa.co.nz/climate/publications>

“Freshwater and estuaries update” bulletin

This is published to cover developments in the freshwater to estuaries zone. Estuaries are increasingly incorporated in joint programme given the direct connection to freshwater issues in NZ.

<http://www.niwa.co.nz/freshwater-and-estuaries/freshwater-and-estuaries-update>

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 2013.

1.5.2 Participation in meetings abroad

A wide range of science conferences and events were attended. Alignment with IHP activities is a common theme of topics, given alignment with IHP-VIII.

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, especially with the Pacific Island countries. For example NIWA is working with agencies in many countries on updating hydrological information and database management systems. Many useful 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 Science system in NZ is focusing on “National Science Challenges”. Final projects are currently being confirmed.

2. Future Activities

2.1 Activities foreseen until December 2014

NZ Hydrological Society Annual Symposium. With NZ Freshwater Society

2.2 Activities planned for 2015

Scientific activities planned at the national level are within the context of the research programme funded by NZ government. 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.

NIWA Courses

A range of training courses will be offered by NIWA. For a full list of courses refer to the NIWA web site. 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 “Fresh Water and estuaries Update” (web) publication.

**22nd Meeting of IHP Regional Steering Committee for the Southeast Asia
and the Pacific
10-14 November, 2014
Yogyakarta, Indonesia**

**COUNTRY REPORT ON PAPUA NEW GUINEA INTERNATIONAL
HYDROLOGICAL PROGRAM ACTIVITIES: 2011-2014**

Prepared & presented by:
Joseph Jure
for
Papua New Guinea IHP National Committee

1.0 INTRODUCTION

The Department of Environment and Conservation participated in the activities of the International Hydrological Program Decade (IHPD) 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 and regional programs such as the Asia Pacific FRIEND.

The current membership of the PNG IHP National Committee is maintained at eight (8), and drawn from various government agencies and institutions of higher learning, including now climate change development and national disaster reduction agencies. Over the period 2011-2014, PNG experienced very little participation in IHP and UNESCO activities. This resulted from unexpected political developments leading to our physical displacement and change in the administrative structure.

The new government formed after 2012 general election has driven this key policy initiative known as the Alatu Accord. It includes policy initiatives on “**Green Policy on Sustainable Development and Renewable Energy**”. Among the three key policies, were free education, improved health services and infrastructure development. The latter is our main concern, which has impeded on the natural environment while driving this policy. The government also envisages economic growth on one hand but on the other hand expects integration of sound environment management principles so that the environment is not degraded. Furthermore, these principles are also consistent with the national development policies and United Nations Millennium Development Goals, particularly on environmental sustainability. The climate change adaptation uses water as the main influencing medium in preparing strategies for water related disasters and climate change, which consequently contributed to human livelihood.

As a result of many natural resource developments taking place during our short history the government has called on all line agencies to improve water and environment monitoring networks that has catered for development needs, climate change analysis and adaptation, promoting prudent environment management and monitoring food security.

2.0 ACTIVITIES ORGANIZED BY THE NATIONAL COMMITTEE

Significant water events organized at national levels were;

- (a) World Water Day commemoration was held in March 2014,
- (b) World Environment Day commemoration was held in June 2014,
- (c) Regular Climate Change Adaptation Technical Working Group meetings, and
- (d) Ad hoc Early Warning System on coastal and inland floods sub-committee meetings.

- (e) WASH Sanitation Committee Meetings
- (f) Hydropower Project Steering Committee Meetings

3.0 OTHER HYDROLOGICAL AND WATER RELATED ACTIVITIES CONDUCTED BY INDIVIDUAL WATER AGENCIES

3.1 Flood Projection and Monitoring

Five provinces have been identified for basic flood projection and monitoring, which are in the northern part of PNG for climate change adaptation programs.

In addition, early warning systems were proposed especially for the locations mentioned above. Office of Climate Change & Development and the Department of Environment & Conservation are coordinating agencies for this program, while PNG National Weather Service will be the executing agency.

3.2 Hydropower Development for Clean and Green Energy

New hydropower schemes proposed are encouraged to be climate compatible. This clean energy agenda will be driven by a policy shift, which will require proponents to abide by the legislations promoting clean energy through environment regulation and climate change policy.

New hydropower scheme being planned are;

- (a) Small urban town electricity schemes - 5MW power supply for small urban town being funded by Asian Development Bank (ADB).
- (b) Purari River hydro scheme (Gulf Province) –2500MW proposed electricity output has the potential to supply electricity in the southern part of Papua New Guinea and further south to North Queensland in Australia.
- (c) Laloki River hydro scheme (Central Province) – the 10-20 MW of electricity supply is an additional power to be supplied to Port Moresby.
- (d) Divune River hydro scheme (Oro Province) – 10 MW to supply electricity to Popodetta township and parts of Northern Province.
- (e) Tagari River hydro scheme (Tari, Hela) – MoU established between Hela Provincial Government and Israeli firm to develop this. Will supply electricity to Liquefied Natural Gas (LNG) sites in Hela Province and Tari township.

3.3 Water Sanitation and Hygiene (WaSH) Strategy

The WaSH technical committee is working on a policy document which is being spearheaded by the National Department of Health. A draft was completed and it is before Cabinet for approval. Once the cabinet (National Executive Council) approves it will become a working policy where all relevant sectors will integrate the policy into

their respective sector planning and budgeting processes. The core focus is to include hygiene and rural water supply & sanitation activities into the sector programs. This policy is being supported by a recommendation to establish a WASH Authority, an entity that will be mandated to take on the WaSH roles and responsibilities in PNG. This policy submission is currently being prepared.

3.4 Palm Oil Effluent Audit

Public perception on palm oil effluent degrading the water quality is becoming prevalent as oil palm development is becoming aggressive. Because of this perception an international consulting firm was engaged in August 2012 to conduct an audit of all processing mills to determine the levels of the oil palm effluent, the treated waste quality and the receiving water bodies. The reports further provided some of the answers to the key issues raised, so that harmonious relationship between development, environmental resources and improved livelihood is maintained at all times.

After the audit the Department of Environment & Conservation and stakeholders have produced the revised **Oil Palm Processing Code of Practice (CoP)** in 2013. As this CoP is established against pronounced best international practices , all companies/developers operating in Papua New Guinea have to meet the required standards and comply with the revised code of practice.

3.6 Water Use Permits

The Department of Environment & Conservation operating under Environment Act 2000 monitor, enforce and set environmental standards. Water use for industrial purposes in particular is regulated under this legislation. Over the last decade there was an increase in volume of water permitted for extraction. Also, the volume of waste water discharged has risen prompting DEC to tighten its enforcement and compliance measures. Funding and capacity have been a concern and this has hindered compliance monitoring activities.

4.0 PARTICIPATION IN REGIONAL PROGRAMS

4.1 Research and publications

- (a) Contributed to the AP River Catalogues Volume VI but late for inclusion, perhaps due to quality issues.

4.2 Trainings

Joseph Jure attended Water Resources Management Capacity Building seminar, Changsha, China from 6-26 June 2014. This training program was conducted by

Hydrochina Zhongnan Engineering Cooperation Limited and was supported by Department of Commerce of People's Republic of China and the Embassy of China (PNG). A certificate of participation was attained after 3 weeks intensive training.

4.3 Meetings

Maino Virobo attended the 19th International Hydrological Program Regional Steering Committee Meeting and International Symposium on Extremes "Meteorological, Hydrological and Tsunami Disasters: Social Adaptation and Future", Kyoto, Japan from 24-28 October 2011.

4.4 GEF Assistance

GEF funded Biodiversity Conservation program being implemented in Papua New Guinea focusing on Watershed Management in particular development of Catchment Management Plan for Varirata National Park and Sirinumu Dam in Central Province. The procurement process was completed and consultants were contracted to do baseline studies.

5.0 FUTURE TASKS

- Attend the 22nd IHP RSC Meeting in Yogyakarta, Indonesia from 10-14 November 2014
- Anticipating a candidate from PNG to participate in the upcoming UNESCO IHP training courses.
- Continue engagement with stakeholders on climate change adaptation and disaster risk reduction - climate, disaster, hydropower development, rural water supply & sanitation and hygiene.
- Continue providing hydrological and environmental assistance for development needs and environment management, that is, Tagari river hydropower scheme, Tari, Hela Province.
- Continue to promote sustainable land use practices and principles in areas of resource development. (permits and discharge waste water)
- Streamline palm oil processing industry. Principles of sustainable development & environment management.
- Contribute to regional activities as and when required.

6.0 CONCLUDING REMARKS

Once again, I take this opportunity to thank UNESCO Office Jarkarta in meeting all the costs to enable me participate in the 22nd Asia Pacific IHP RSC meeting and most importantly attend the international symposium.

NATIONAL REPORT ON IHP RELATED ACTIVITIES

PHILIPPINES

**22nd Regional Steering Committee Meeting
UNESCO International Hydrological Programme
(UNESCO IHP)
for Southeast Asia and the Pacific
held at Yogyakarta, Indonesia
10-14 November 2014**

NOVEMBER 2014

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

1. ACTIVITIES UNDERTAKEN IN THE PERIOD JANUARY 2013 – OCTOBER 2014

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 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:

Leonor Cleofas, MWSS
Virgilio Basa, NAMRIA
Antonio Morano, DPWH-BRS
Resito David, DPWH-FCSEC
Virgilio Rivera, MWCI
Lennie Santos-Borja, LLDA
Rodora Gamboa, PWP

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 & I.C.E.
Roberto S. Soriano, UP I.C.E.
Romualdo Beltran, NPC
Samuel Contreras, BSWM
Emiterio Hernandez, LLDA
Milo Landicho, NIA
Rosa Perez, PAGASA

Program Sub-Committee members::

Peter Paul Castro, UP- NHRC & I.C.E. Dept.
Maria Antonia Tanchuling, UP- En.E. Program
Susan Abano, NWRB
Margarette Bautista, PAGASA
Isidora Camaya, NIA
Efren Carandang, NAMRIA
Maristel Espiritu, LLDA
George Estioko, NWRB
Myrna Lansangam, LWUA
Nicanor Mendoza, DENR-EMB
Jesusa Roque, NWRB
Teresita Sandoval, BSWM

Status of IHP-VII activities

In response to the questionnaire from the UNESCO-IHP Paris office, the following had 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

National Academy of Science and Technology, Philippines (NAST PHL), *36th Annual Scientific Meeting Theme: Infrastructure, Information, and Innovation (I3) for National Development, Competitiveness, and Resiliency*, 9-10 July 2014, Philippine International Convention Center, | Manila, Philippines.

Plenary Session 2: Can We Mitigate Flooding in Metro Manila and in other Philippine Locations?

Speaker 1: Assistant Secretary Maria Catalina E. Cabral, Department of Public Works and Highways (DPWH), *Flood Risk Management Towards Resilient Communities - DPWH Approach*.

Speaker 2: Undersecretary Alex Ramon Q. Cabanilla, Council Chairman III (Vice Chairman), *Managing Floods in the Metropolitan Manila Development Authority (MMDA)*.

National Academy of Science and Technology, Philippines (NAST PHL), *Roundtable Discussion on Water Supply and Wastewater (Sewerage) Disposal*, Hyatt Hotel, Manila, Philippines, 2 April 2014.

Speakers:

Ms. Rolyn Q. Zambales, Director IV, Office of Project Development Service, Department of the Interior and Local Government (DILG), *Water Supply and Wastewater (Sewerage) Disposal Program of the Department of the Interior and Local Government*.

Mr. Andres F. Ibarra, Administrator, Local Water Utilities Administration (LWUA), *Water Supply and Wastewater (Sewerage) Disposal Program of the Local Water Utilities Administration*

Mr. Robert N. Baffrey, Manager, Wastewater Department, Manila Water Company, Inc. (MWCI), *Water Supply and Wastewater (Sewerage) Disposal Program of Manila Water Company, Inc.*

Mr. Joela C. Dela Cruz, Head, Contracts Management Program Management Division, Maynilad Water Services, Inc. (MWSI), *Water Supply and Wastewater (Sewerage) Disposal Program of Maynilad Water Services, Inc.*

Mr. Gerardo Esquivel, Administrator, Metropolitan Waterworks and Sewerage System (MWSS), *Water Supply and Wastewater (Sewerage) Disposal Program of the Metropolitan Waterworks and Sewerage System*.

National Academy of Science and Technology, Philippines (NAST PHL), *Roundtable Discussion on Irrigation Development and Rehabilitation*, Traders Hotel, Manila, Philippines, 8 April 2014.

Objectives:

1. To gather a forum of major stakeholders in irrigation development and rehabilitation, state-of-the-art in irrigation systems technologies, and the R&D program in irrigation and related multipurpose uses of water.
2. To assess the status of issues, problems and needs of the national irrigation sector and synthesize a consensus among the stakeholders with respect to priority targets, strategies, programs and funding requirements.

Speakers:

Engr. Diosdado M. Manalus Chief, Water Resources Development Section, Bureau of Soils and Water Management (BSWM), *State of the Art Irrigation Systems Technologies: The Philippine Experience and Challenges of Climate Change (Water Catchment, Impoundment and Distribution)*.

Prof. Armando N. Espino, Jr. , Director, Water Resources Management Centet (WRMC), Central Luzon State University (CLSU), *Role of the Academe on Irrigation Development*.

Engr. Dexter G. Patrocinio, Project Manager, Balog-Balog Multipurpose Irrigation Project, National Irrigation Administration (NIA), *NIA-BBMP General Briefer*.

National Water Resources Board (NWRB) in collaboration with the Department of Energy (DOE) and Partners (Maynilad Water Services Inc (MWSI), Philippine Water Partnership (PWP) and PASSHYDRO), *Water and Energy Forum*, Maynilad Room, 2nd Flr. UP College of Engineering, Diliman, Quezon City, 20 March 2014 - one of the activities lined-up for a week-long celebration of the World Water Day 2014. The forum aimed to raise awareness of the inter-linkages between water and energy; promote better understanding on renewable energy; and new technologies in hydropower.

Philippine Water Partnership (PWP), *Forum on National Water Legislation and Implementation*, submitted as GWP-SEA Activity Completion Report under Strategic Goal No. 2, Sequoia Hotel, Quezon City. Philippines, 19 December 2013.

Topics:

Updates on National Water Resources Management Office (NWRMO)

Updates on other water-related bills

Issues and challenges on the promotion of IWRM

Climate-related disaster response

Water and Climate Program (WCP) proposals for 2014-2016 implementation

The forum aims to provide a venue for sharing with PWP members the status of legislation and implementation in the water sector. We expect at least thirty (30) PWP members coming from the academe, private sector, non-government agencies, local government units and national government agencies including government-owned and controlled corporations as well as other concerned agencies/organizations.

Philippine Water Partnership (PWP), *Writershop on the Formulation of Terms of Reference (TOR) for Mainstreaming Climate Change Adaptation and Mitigation in Philippine River Basin Master Plans*. Timberland Resort, San Mateo, Rizal, Philippines, 11-12 September 2014. The writershop will be attended by the members of the Technical Working Group and Steering Committee on Integrated River Basin Master Plan Formulation who attended the Training on Climate Proofing for Development. Representatives will also be invited from the Climate Change Commission (CCC); Department of the Interior and Local Government (DILG); Housing and Land Use Regulatory Board (HLURB); National Economic and Development Authority (NEDA); Philippine Atmospheric, Geophysical and Astronomical Services Administration (PAGASA); and the Office of Civil Defense – Department of National Defense (OCD-DND). About 30 participants will attend the writershop.

Expected Outputs:

Appreciation of the DENR Integrated River Basin Management Framework

Understanding of the different levels of planning relevant to the River Basin

Revised Terms of Reference (TOR) with Annotated Outline for climate change responsive

Integrated River Basin Master Plan Formulation

Estimated cost and duration for the updating of existing Integrated River Basin

Master Plans following the Revised TOR and outline

3rd Engineering Research and Development for Technology (ERDT) Congress, National Science and Technology Week. *Theme: Science and Technology for Disaster Preparedness and Resiliency*. SMX Convention Center, Pasay City Philippines, during the National Science and Technology Week, 25 July 2014.

Speakers:

Climate Change Commission Vice Chairperson and Executive Director Mary Anne Lucille

Sering,

UP College of Social Work and Community Development Professor Dr. Emmanuel M. Luna,

UP College of Engineering Associate Professor and DREAM Project Leader Dr. Enrico C. Paringit,
ERDT Visiting Professor from the University of Twente Dr. Norman Kerle,
UP Marine Science Institute Associate Professor Dr. Cesar L. Villanoy,
PHILVOCS (Volcanology & Seismology) Director Dr. Renato U. Solidum, Jr.,
UP Los Baños Associate Professor Nelio C. Altoveros,
Albay Governor Joey S. Salceda, and
UP Diliman Vice Chancellor for Academic Affairs Dr. Benito M. Pacheco.

2014 UP Asian Center. *Lecture on Environmental Concern: Flooding and Flood Control*. Speaker: Leonardo Q. Liongson, Academician, National Academy of Science and Technology (NAST=PHL) and Professor, Institute of Civil Engineering, UP Diliman, GT Toyota Cultural Center, UP Diliman Campus, Quezon City, Philippines, 7 May 2014.

1.2.2 Participation in IHP Steering Committees/Working Groups

Country Representative, 21st Regional Steering Committee Meeting of the UNESCO International Hydrological Programme for Southeast Asia and Pacific (UNESCO-IHP SEAP) and to present a technical paper in the 2nd Nakdong River International Water Week / International Water Forum 2013 (Na-Ri IWW/IWF 2013) - "Water Cooperation and 7th World Water Forum", 30 September - 4 October 2013. Gyeongju, Republic of Korea.

Country Representative, 22nd Regional Steering Committee Meeting of the UNESCO International Hydrological Programme for Southeast Asia and Pacific (UNESCO-IHP SEAP) and the International Conference on Ecohydrology (ICE 2014) - "Ecohydrology Approaches Facing the Global water Environment Challenges", Yogyakarta, Indonesia, 10-14 November 2014.

1.2.3 Research/applied projects supported or sponsored

National Academy of Science and Technology (NAST) Philippines

Liongson L. Q. (2013). *Risk reduction and management in escalating water hazards: How fare the poor?* - *NAST Bulletin 5*, Star Science, The Philippine Star, 12 December 2013.

National Academy of Science and Technology Philippines, ISSN 0115-8848, Trans. Nat. Acad. Sci. Tech. Philippines, Vol. 36, Issue No.1 (2014), July 2014 ISSN 0115-8848 (ed. L. Q. Liongson), Abstract of Papers presented during the 36th NAST Annual Scientific Meeting on Infrastructure, Information, and Innovation (I 3) for National Development, Competitiveness, and Resiliency, 09-10 July 2014.

University of the Philippines - Diliman, Institute of Civil Engineering (UP-ICE) and National Hydraulic Research Center (NHRC)

Liongson L. Q. (2013). *Flood Management for Adaptation to Climate Change and Population Growth*, Team Energy Professorial Chair, Institute of Civil Engineering, College of Engineering, University of the Philippines, Diliman, July 11.

Liongson L. Q. (2013). *Flood management for adaptation to climate change and population growth: The lesson of recent major floods in the Philippines*, Proceedings of the 2nd Nakdong River International

Water Week / International Water Forum 2013 (Na-Ri IWW/IWF 2013), 30 September - 4 October 2013, Gyeongju, Republic of Korea.

Tabios, G. Q. III (2013). *Development of Analysis and Modeling Tools as part of Decision-Support System for Managing the Environmental Quality of Manila Bay/Laguna Lake Watershed System*, MOA between Dept of Environmental and Natural Resources and Univ of the Philippines, Diliman, Quezon City, Project duration July 2013 to June 2015.

Tabios, G. Q. III (2013). *Flood Risk Management in Pampanga River Basin of Bulacan and Pampanga Provinces*, MOA between Dept of Public Highways- World Bank and the Univ of the Philippines, Diliman, Quezon City, Project duration October 2013 to December 2014.

Tabios, G. Q. III (2013). *Multiple Reservoir System Optimization and Reliability Analysis*, Dean Marino Mena Professorial Chair in Engineering, Institute of Civil Engineering, College of Engineering, University of the Philippines, Diliman, July 11.

Tabios, G. Q. III (2013). *Urban Flood Management Issues and Challenges: Case of Pasig-Marikina River Basin in Metro Manila, Philippines*, Chapter 6 in "Flood Risk: The Holistic Perspective, Moving Beyond Integrated Urban Flood Management" by Zoran Vojinovic & Jingmin Huang, IWA Publishing, Netherlands, December (ISBN: 9781780405322).

Tabios, G. Q. III (2013). *Modeling and Simulation-Optimization Studies as Science-Based, Decision Support Tool for Water Resources Management*, Outstanding Young Scientist, Annual Meeting and Scientific Conference, Manila Hotel, July 10.

Tabios, G. Q. III (2014). *Towards Modeling the Water Quality of Manila Bay*, Angel Alejandrino Professorial Chair Lecture, Presented at Maynilad Room, Melchor Hall, Univ of the Philippines, Diliman, Quezon City, August 28.

Tabios, G.Q. III (2014). *Reliability Analysis of Angat Reservoir Operations with Climate Change and Future Reservoir Sedimentation*, In Proc of the Nakdong River International Water Week 2014, Gyeongju City, Gyeongbuk Province, Korea, October 20-22.

Cruz, E.C. (2013) *Engineering Analysis for Mangrove Replanting-Towards a Sustainable Community-engaged Coastal Protection Program in the Philippines*, Proceedings of the Sustainable Buildings Manila 2013 Conference, SEA Regional Sustainable Buildings Manila Conference (SB-13 Manila), 25-27 November 2013, Eastwood Richmond Hotel, Quezon City, Organized by UP Diliman, Mapua Institute of Technology, Confederation of Filipino Consultants (COFILCO) and Philippines GBC.

Cruz, E.C. (2014) *A Methodology for the Engineering Design and Analysis of Foreshore Basin for Beach Erosion Protection*, Philippine Engineering Journal, Volume XXXV, Number 1: June 2014, pp. 1-12 (accepted 13 June 2014).

Ang, M. R. C. O., Gonzalez, R. M., and Castro, P. P. M. (2013) *Multiple Data Fusion for Rainfall Estimation Using a NARX-based Recurrent Neural Network – the Development of the REINN Model*, 35th International Symposium on Remote Sensing of Environment (ISRSE35), 22-26 April 2013, Beijing, China (published online: 18 March 2014 by IOP Science).

Herrera, E.C., Nadaoka, K., Blanco, A.C., and Hernandez, E. (2013). *Hydrodynamics and Water Quality Characteristics of a Tropical, Tidally-affected Lake (Laguna de Bay, Philippines) from Field Observations and Numerical Simulations*, The Laguna Lake Water and Flood Management Imperative:

Towards the Sustainable Resiliency and Adaptive Development of the Laguna Lake Basin, 3-4 October, PICC, Pasay City.

Blanco, A.C., Fortes, M.D., Herrera, E.C., Nadaoka, K., San Diego-McGlone, M., Pacheco, B., Villanoy, C., Siringan, F. (2013). *Development of an Integrated Decision Support System for Sustainable Coastal Resource Use and Conservation*, International Symposium on Coastal Cities, Marine Resources and Climate Change in the Coral Triangle, 3-4 July 2013, Jakarta, Indonesia.

University of the Philippines - Diliman, Department of Geodetic Engineering (UP-GE Dept) and Remote Sensing & Image Processing Laboratory

The DREAM Program

- *LiDAR Applications: Progress, Prospects & Challenges*, March 15, 2013, Cocoon Hotel, Scout Rallos Quezon City, Philippines.
- *LAStools Tutorial*, May 28, 2013, National Engineering Center, University of the Philippines.

The DREAM Program is a research and development project supported by DOST. It uses state-of-the-art technology in particular LiDAR to create high resolution up-to-date detailed maps of 17 major river basins. The DREAM Program is geared towards the generation of information related to floods and disasters as well as other applications of this detailed information for various industry sectors, government agencies, academe, and other stakeholders. The Workshop was a venue to understand the acquisition strategy, the characteristics of the data and prospects for research and science applications.

University of the Philippines - Diliman (UPD), Office of the Vice-Chancellor for Research & Development (OVCRD):

Contact: UPD Vice Chancellor for Academic Affairs, Dr. Benito M. Pacheco, Professor of Civil Engineering

- Philippine recommended focal point for DRH program of UNESCO-MEXT-Kyoto University.

Enhancing Risk Analysis Capacities for Flood, Tropical Cyclone Severe Wind and Earthquake for Greater Metro Manila Area or the Risk Analysis Project: Development of Vulnerability Curves of Key Building Types in the Greater Metro Manila Area, Philippines, Institute of Civil Engineering, College of Engineering, University of the Philippines Diliman (UPD) - DOST-PAGASA, DOST-PHIVOLCS, 29 November 2011 - February 2013.

Disaster Risk Management Using Sensors, Networks and Computing: Early Warning System for Landslides, Slope Failures and Debris Flow: Project 1: DYNASLOPE: Development of Dynamic Model for Landslides, Slope Failures & Debris Flows - Year 4 with extension (Year 5), Institute of Civil Engineering, College of Engineering, University of the Philippines Diliman (UPD) - DOST, 1 June 2011 to 31 May 2013.

Nationwide Disaster Risk Exposure and Assessment for Mitigation (DREAM) Program, Geodetic Engineering, College of Engineering, University of the Philippines Diliman (UPD) - DOST, 20 December 2011 to 19 December 2013.

Modeling of Flashflood Events by Integrated GIS and Hydrological Simulations - Year 2, Geodetic Engineering, College of Engineering, University of the Philippines Diliman (UPD) - DOST, 1 April 2012 to 31 March 2013.

Disaster Plans of Selected Filipino Families, College of Home Economics, University of the Philippines Diliman (UPD) - Creative Work and Research Grant, OVPA, 1 February 2012 to 31 January 2013.

Establishment of the Flood Information Network (FloodNET), National Institute of Geological Sciences, College of Science, University of the Philippines Diliman (UPD) - DOST-GIA, 1 May 2012 to 30 April 2013.

Department of Science and Technology (DOST) and University of the Philippines - Diliman (UPD).

Nationwide Operational Assessment of Hazards (Project NOAH)

Executive mission: to put in place a responsive program for:

- (a) Flood mitigation, specifically targeting a 6 hour flood early warning system for communities along 18 major river systems;
- (b) Improving communications for weather and other hazards

Activities:

- (a) Integrated Flood Early Warning System Rollout 2012
 - Target: July 2012 - Marikina River Basin, Bicol River Basin, Cagayan de Oro River Basin, Iligan River Basin, Pampanga River Basin, Agno River Basin, Infanta, Lucena;
 - Target: December 2012 - Jalaur River Basin, Ilog-Hilabangan River Basin, Panay River Basin, Davao River Basin, Magasawang Tubig River Basin (Mindoro), Agus River Basin, Tagum-Libuganon River Basin, Tagoloan River Basin, Buayan-Malungun River Basin;
 - Target: June 2013 - Agusan River Basin, Cagayan River Basin, Mindanao River Basin;
 - Target: December 2013 - Other vulnerable river basins
- (b) Airborne LIDAR survey: GPS, IMU, Laser Rangefinder
- (c) Precision watershed surveying for modeling of watersheds and flood zones
- (d) Accomplishments - Purchase, Inspection and Delivery of LiDAR Equipment, Training Lease of Aircrafts
- (e) Advanced Works
 - Establishment/Relocation of GCPs for base stations
 - At least two base stations are needed for LiDAR Survey
 - Reconnaissance and Preparation for LiDAR survey
 - Flood Plain Extent Delineation
 - Development of tools for DEM correction
 - Mobile Lidar Processing
 - Integration of Satellite, Terrestrial and Bathymetric Data
 - Automated 6-Hour prediction of Water Level in Montalban
 - Marikina Watershed Modeling
 - Rapid Flood Simulation for Flood Events

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

No additional information is available.

1.2.5 Other Initiatives

National Water Resources Board (NWRB)

Reforms in the Water Sector - Philippine Development Plan (2011-2016)

Strategy: Practice IWRM in the Water Sector,

- Whole Water Cycle Management and River Basin Approach

The Integrated Water Resources Management (IWRM) Plan Framework

- Working together to for all secure sustainable water

- Philippine IWRM Plan Framework (2007) Sustainable Outcome

(a) Effective Protection and Regulation for Water Security and Ecosystem Health

(b) Sustainable Water Resources and Responsive Services for Present and Future Needs

(c) Improved Effectiveness, Accountability, and Synergy among Water Related Institutions and Stakeholders

(d) Adaptive and Proactive Response to Future Challenges

On-going Programs:

- Groundwater Resource Vulnerability

- Assessment using Isotope Techniques in Regions 2 and 10 (MGB/NWRB/PNRI- IAEA Funding)

- Inventory of water users in Region 2 -(IAEA)

- Groundwater Management Plan in Metro Iloilo including establishment of monitoring network (Government Funding)

- Preparation of Localized Customer Service Codes in CPC grantees

- Improvement of the water allocation system using Climate Change Impact Model intended for groundwater regulation that considers climate change scenarios

- Data collection and sampling of the groundwater data in Manila Bay Coastal Province (DENR-MBCO)

- Amendment of the Water Code (PD 1067) to be responsive to current issues and challenges and operationalize IWRM.

Proposed Programs:

- Establishment of an Integrated 3D GIS Based Water Resources Management Information System in the Provinces of Pampanga and

- Bulacan (KOICA funding, 2013-2014)

- Science-based Management Strategies for Sustainable Groundwater Resource Development in Metro Manila (Submitted to NEDA/JICA)

National Initiatives

- Legislative :Proposed Water Regulatory Commission and Water Reform Act
- Executive: Creation of a National Water Resources Management Office to address institutional fragmentation and improved science-based decision making.

Metropolitan Waterworks and Sewerage System (MWSS)

Water Supply Projects

- Angat Dam and Dyke Strengthening Project 2013 - 2016 National Government
Remediation and strengthening of the Angat Dam and Dyke in order to ensure its stability should the West Valley fault moves
- New Centennial Water Supply Project 2013 - 2017 PPP
Construction of a new water source in order to meet the increasing water demand. Also intended to provide a redundant dam for Metro Manila's domestic water supply.
- Sumag River Diversion Works 2012 – 2013 MWSS' Concessionaires
Construction of a diversion tunnel to supplement the water coming from Umiray River going to the Angat Reservoir.
- Umiray-Angat Transbasin Tunnel Rehabilitation Works 2012 - 2013 MWSS' Concessionaires
Rehabilitation and strengthening of existing tunnel structures/facilities to withstand future typhoons in order to ensure the continuous flow of raw water from the Umiray River to the Angat Reservoir.
- Bulacan Bulk Water Supply Project 2014 -2017 PPP
Construction of water distribution system that will provide bulk water supply to the water districts of the Province of Bulacan
- 15 CMS Water Source Development Project 2014 -2017 PPP /ODA
Construction of a new source for irrigation water intended as a replacement of the 15 cms NIA's irrigation allocation currently allocated to MWSS for domestic water supply. To be coordinated with NIA.
- Rehabilitation, Operation and Maintenance of Angat Dam AN4 &5 2013 onwards PPP
Rehabilitation, Operation & Maintenance of MWSS-owned Auxiliary Turbines 4 & 5 installed in the Angat Hydro-Electric Power Plant.
- Angat Water Utilization and Aqueduct Improvement Project Phase 3 2013 - 2015 ODA
Investigation and rehabilitation of the existing raw water conveyances (5 aqueducts and 3 tunnels) to Metro Manila.

Note: PPP = Public-Private Partnership; ODA = Official Development Assistance

Department of Interior and Local Government (DILG)

Current Initiatives & Programs

- MDGF-Enhancing Access to & Provision of Water Services with the Active Participation of the Poor
aims to enhance the provision of and access to water services in 36 waterless communities through a combination of improved policy environment and increases local capacities.
(a Joint Program of the Government and the United Nations, with funding from the Spanish government under the MDG Achievement Fund Strategies works with local governments and communities empowers the vulnerable and disadvantaged inspires commitment, support and partnerships)
- Sound Practices and Knowledge Products
Human rights-based approach to WATSAN development planning.
Godparent schne for knowledge and skills transfer

- Localized customer service code for Level II systems
- Fact sheets, Publications, Brochures
- Local Water Governance Toolbox - Physical and Web-based Knowledge Products
- Sagana at Ligtas na Tubig sa Lahat Program- 455 Waterless Municipalities 2011-2016
- Bottom-Up Planning & Budgeting Program 609 Focus Areas 2013-2016
- Sagana at Ligtas na Tubig sa Lahat Program (SALINTUBIG)
- A pro-poor initiative designed to provide water supply systems for waterless municipalities and intend to enhance/improve local capacities of LGUs and Water Service Providers in planning, implementation and operation and management of water supply facilities in a sustainable manner;
- Target Beneficiaries - 455 waterless municipalities, waterless barangays, resettlement / relocation sites, lying-in clinics, RHUs and BEMONCs
- Program Components
 - Capacity Development
 - Training and Workshops
 - Studies
 - OJT
 - Mentoring and Coaching
 - Infrastructure Investment
 - Construction
 - Rehabilitation
 - Expansion
 - Upgrading

Department of Public Works and Highways (DPWH)

Short-listed Structural Mitigation Measures

- Pasig-Marikina River Improvement (RI) + Dam
- Meycauayan RI
- Malabon-Tullahan RI
- South Parañaque – Las Piñas RI
- East Mangahan Floodway (Cainta & Taytay RIs)
- West Laguna Lakeshore Land Raising
- Land Raising for Small Cities around Laguna Lakeshore
- Improvement of the Inflow Rivers to Laguna Lake
- Manila Core Area Drainage Improvement
- West Mangahan Area Drainage Improvement
- Valenzuela, Obando and Meycauayan (VOM) Improve.(to be studied further)

Proposed Non-Structural Measures

- Strengthening of the Flood Information and Warning System (FIWS)
- Effective Flood Control Operation and Warning System (EFCOS) improvement
- New telemetric rainfall and water level gauging stations

Capacity Building for Strengthening Community-based FRM

- Update and implement Information and Education Campaign (IEC) programs
- Rainfall and water level monitoring by Barangay Disaster Risk Reduction and Management Councils (BDRRMCs)
- Construction of evacuation routes and temporary evacuation centers

Improvement of Management Information System (MIS) for Disaster Risk Management

Improvement and development of MIS

Capacity building

Reforestation and Watershed Management

Fort Bonifacio Retarding Tank - a model urban rainwater catchment system.

Estero de Paco Development - dredging, riprap, slope protection and phytoremediation, facelifting of residential homes, walkway/linear park

National Sewerage and Septage Management Program (NSSMP)

Project Description -

Increase number of sewerage and septage management projects (outside Metro Manila) by 2020

Septage Management Targets

All LGUs have septage management programs serving their urban barangays

Capital costs per project range from P4-71 M

Sewerage Targets

17 HUCs outside of MM serving 50% of urban barangays; to be done in 2 phases of 25% each (interceptor type systems)

Capital costs average P410 million/project/phase

National Strategy

Facilitate a bottom-up, demand-driven project development process by providing local implementers with training, tools and financial incentives, including NG cost share for sewerage.

DPWH (in coordination with DOH) – conduct a high-impact nationwide training and promotion campaign

Integral component of the Sanitation Roadmap and National Sustainable Sanitation Plan, broader, over-arching frameworks (needed water and sanitation sector reforms are being developed by other groups)

Local Strategy

LGUs, water districts, and small water service providers use the NSSMP Guide for Local Implementers to develop projects

Projects will include operational guidelines, ordinances, enforcement, user fees, promotion campaigns

LGUs encouraged to share capital costs with WDs and/or bid out contracts to the private sector for septage collection and treatment

DENR regional offices continue to lead the creation of WQMAs and Funds

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.

Bureau of Soils and Water Management (BSWM)

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

None

1.3.2 Organization of specific courses

None

1.3.3 Participation in IHP courses

International Training Course on Karst Ecosystem and Geomicrobiology, organized by the International Research Center on Karst (IRCK) under the auspices of UNESCO, Supported by Institute of Karst Geology (IKG), Chinese Academy of Geological Sciences (CAGS), China University of Geosciences (CUG), UNESCO Beijing Office, IGCP/SIDA 598, Guilin, China, 15-28 October 2014..

Philippine participant: Asst. Prof. Roberto S. Soriano, Institute of Civil Engineering, University of the Philippines.

Papers and Publications

None.

1.4 Participation in international scientific meeting

21st Regional Steering Committee Meeting of the UNESCO International Hydrological Programme for Southeast Asia and Pacific (UNESCO-IHP SEAP) and to present a technical paper in the 2nd Nakdong River International Water Week / International Water Forum 2013 (Na-Ri IWW/IWF 2013) - “Water Cooperation and 7th World Water Forum”, 30 September - 4 October 2013. Gyeongju, Republic of Korea.

22nd Regional Steering Committee Meeting of the UNESCO International Hydrological Programme for Southeast Asia and Pacific (UNESCO-IHP SEAP) and the International Conference on Ecohydrology (ICE 2014) - "Ecohydrology Approaches Facing the Global water Environment Challenges", Yogyakarta, Indonesia, 10-14 November 2014.

Philippine authors/presentations:

Cruz, Eric C., and Roy Anthony C. Luna (2014) . *A simplified model for determining hydrologic levels of salt and water in tailings reservoir.*

Cruz, Eric C., Carlo Eric L. Santos, and Jurgenne H. Primavera (2014). *Implementing engineering solutions with stakeholders participation – a mangrove-based coastal erosion mitigation project in the Philippines.*

Balderama, Orlando (2014). *Governance of Cagayan River Basin: characterization, institutional design and stakeholder participation towards development of integrated river basin masterplan.*

Naga, Pipalawan O., Baliamen A. Mamainte Jr., and Sherifa Rohannie K. Adiong (2014). *The challenge of sustaining our freshwater resources: the case of Lake Lanao.*

Liongson, L. Q. (2013). *Flood management for adaptation to climate change and population growth: The lesson of recent major floods in the Philippines*, Proceedings of the 2nd Nakdong River International Water Week / International Water Forum 2013 (Na-Ri IWW/IWF 2013), 30 September - 4 October 2013. Gyeongju, Republic of Korea.

Liongson, L. Q. (2014). *AASSA Regional Workshop on Sustainable Development Goal of Water and Sanitation after MDGs (Millennium Development Goals)*, 12 February 2014, in conjunction with the Opening Ceremony of iWc (innovative Water center), 13 February 2014, National Polytechnic Institute of Cambodia (NPIC), Phnom Penh, Cambodia AASSA Regional Workshop is jointly organized by the Association of Academies and Societies of Sciences.

Paper Presenter:

Leonardo Q. Liongson (Academician NAST-PHL and Professor, University of the Philippines).
Overview of Water Supply and Sanitation – Philippines: Challenges and Strategies.

Session 2 (Purification Technology and Sanitation) Co-Chairmen:

Leonardo Q. Liongson (Member, NAST PHL, Professor, University of the Philippines);
Surendra Raj Kafle (Vice-Chancellor, Nepal Academy of Science and Technology)]

Speakers:

Jae-Yeon Jang (Professor, Ajou University) - *The Impacts of Climate Changes on Water Sanitation*

Gwy-Am Shin (Professor, Ajou University) - *Efficacy, Effectiveness, and Sustainability of Household Water Treatment Systems*

Jeyong Yoon (President Scientists and Engineers without Borders/Professor, Seoul National University) - *Membrane Technology as an Appropriate Technology.*

Tabios, G. Q. III (2014), *Nakdong River International Water Week Meeting*, Gyeongju City, Gyeongbuk Province, Republic of Korea, 20-22 October, attending as speaker and panelist. This meeting is part of the preparatory meetings for the 7th World Water Forum to be held 2015 in Daegu Gyeongbuk, Republic of Korea.

1.4.1 Meetings hosted by the country

2nd International River Summit, "Reviving Rivers, Rebuilding Civilization", hosted by the local government of Marikina City, Metro Manila. Philippines, 19-21 November 2014.

Plenary Sessions and Parallel Sessions:

- Session 1: Water quality management
- Session 2: Watershed, Water resources management and eco-system services
- Session 3: Research & development and extension on river studies
- Session 4: Corporate social responsibility
- Session 5: Resilience building in river basin management
- Session 6: Water partnerships, convergence and governance
- Session 7: Biodiversity conservation in river revival
- Session 8: Role of river in culture and heritage
- Session 9: Flood risk management
- Session 10: Resilience building in river basin management

1.4.2 Participation in meetings abroad

No additional information is available.

1.5 Other activities at regional level

Global Water Partnership - South East Asia (GWP-SEA), 26th Steering Committee Meeting, 24th GWP-SEA Steering Committee, 11-12 March 2013, Manila, Philippines.

Global Water Partnership - South East Asia (GWP-SEA), 27th Steering Committee Meeting, 24th GWP-SEA Steering Committee, 1-2 October 2013, Yangon, Myanmar.

Global Water Partnership - South East Asia (GWP-SEA), Regional Meetings, 30 September – 3 October 3, Hanoi, Vietnam:

- September 30 - Workshop on GWP-SEA Strategy and Program Implementation
- October 1 - Water, Climate and Development Programme (WACDEP)
- October 2-3 - GWP-SEA Steering Committee Meeting

ADB Water Week 2013; Securing Water For All, 11-15 March 2013, ADB Headquarters, Pasig City, Metro Manila, Philippines.

1.5.1 Institutional relations /co-operation

No complete information is available.

1.5.2 Completed and ongoing scientific projects

No additional information is available.

2.0 Future Activities

2.1 Activities planned for 2014-2015

Participation in the 22nd RSC Meeting to be held in Indonesia and the stakeholder consultation for the 7th World Water Forum (Gyeongju, Republic of Korea).

Mapping of RSC Future Projects against IHP VIII "Water Security: Responses to Local, Regional and Global Challenges (2014-2021).

Participation in currently RSC-supported programs and activities such as APFRIEND, Catalogue of Rivers for SEAP, FFWS and the IHP training courses conducted by the Kyoto University.

Participation in the review of cross-cutting programs such as FRIEND, HELP and IWRM.

Evaluation by the national committee of the proposed IHP-VIII Themes, Focal Areas and Activities.

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, DRH, IHP training courses conducted by host countries, and joint hydrologic training courses and researches among member countries.



**NATIONAL REPORT ON IHP RELATED ACTIVITIES
IN REPUBLIC OF KOREA
In the period of June 2012 – May 2014**

**Korean National Committee
for
The International Hydrological Programme
Republic of Korea**

Abstract

Since the beginning of the seventh phase of IHP, the Korean National Committee for the IHP(IHP-KNC) has been and being paid its efforts to achieve the objectives set by UNESCO for this phase of IHP and the key focal area's projects have been and being executed in Korean river basins and in the field of hydrology and water resources in Korea. Research projects supported by the Government in the framework of the IHP in the period of June 2012 – May 2014 have been executed according to the implementation plan of IHP-VII phase.

Particularly, during this period, the IHP-KNC proposed to establish a UNESCO Category II Water Centre, the International Centre for Water Security and Sustainable Management(i-WSSM) at the K-water Institute, Republic of Korea, and this Centre was unanimously endorsed in the 20th Session of the Intergovernmental Council of the IHP and approved by the General Conference in 2013.

The IHP-KNC will actively continue and participate in the Asian Pacific FRIEND/HELP projects to complete with successful results and also will execute a HELP river basin project in collaboration with other Asia Pacific HELP projects and UNESCO international cooperative studies. Furthermore, a series of international symposiums and workshops have been and will be organized during this period as the IHP-VII and - VIII activities of IHP-KNC.

1. ACTIVITIES UNDERTAKEN IN THE PERIOD JUNE 2012 – MAY 2014

1.1 Meetings of the IHP National Committee

1.1.1 Decisions Regarding the Composition of the IHP National Committee

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), the seventh phase of IHP project(2008-2013) and eighth phase of IHP project(2014-2021) 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(2010), the Korean National Committee for the IHP was reorganized and strengthened to fulfill the IHP activities more effectively and actively.

Particularly, the Korean National Committee for the IHP has been reorganized to include more members from various water organizations in Korea under the supplement of the legal background in the beginning of 2011.

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 Contribution to / Participation in IHP-VII

In the beginning of the seventh phase of IHP(2008-2013) the Korean National Committee for the IHP has prepared the implementation plan of IHP-VII during the period(2008-2013) and the potential activities to be undertaken by the Korean National Committee for the IHP as listed in the following tables both according to the core programme Themes and Focal Areas;

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 :				MLTM/IHES
International Flood Initiative (IFI)	●	2008-2013		
International Sediment Initiative (ISI)				
Water for Peace (PCCP)				
UNESCO-IAEA Isotope (JIIHP)				
Shared Aquifer (ISARM)				
Global Network Arid Lands (G-WADI)				
Urban 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

Activities to have been and to be undertaken by the Korean National Committee

Name of the IHP National Committee REPUBLIC OF KOREA IHP-NC	Activities suggested by the IHP National Committee and their method of implementation
IHP VII Themes and Focal areas	
Theme 1:	
Focal area 1.1	Case studies on facility management techniques for abnormal climate
Focal area 1.2	Case studies of climate change impact on hydrological cycle Case studies of effect on water resources by climate change and development of evaluation system
Focal area 1.3	Case studies on regional hydrological extremes and water-related disasters
Focal area 1.4	Case studies of large scale groundwater dependencies related global change
Focal area 1.5	
Theme 2:	
Focal area 2.1	
Focal area 2.2	Best practices of good governance, capacity development and stakeholder participation at regional level
Focal area 2.3	
Focal area 2.4	
Focal area 2.5	
Theme 3:	
Focal area 3.1	Case studies of ecohydrological measures to protect and remediate catchment process
Focal area 3.2	Case studies on complementing engineering solutions with ecological measures resulting in sustainable carrying capacity of ecosystems Case studies on gravel contact oxidation process technology applied to improvement of stream quality
Focal area 3.3	
Focal area 3.4	
Theme 4:	
Focal area 4.1	Methodologies for safeguards against water borne biotic and abiotic pollutants
Focal area 4.2	
Focal area 4.3	
Focal area 4.4	
Theme 5:	
Cross-cutting programmes	
HELP	Regional 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(JIHP)	
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 this period of the seventh phase of IHP, the Korean National Committee for the IHP has been paid 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 and HELP basin studies

1.2 Activities at 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(The K-Water), 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 Regional Steering Committees / Working Group

- 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 2012-2014.
- Republic of Korea IHP National Committee organized 21st IHP RSC Meeting of Southeast and the Pacific in Gyeongju, Republic of Korea.

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 2012~2014 have been executed according to the above given table.
- 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(The K-Water) during this period.

- The following projects have been and are being implemented for the Asian Pacific FRIEND in the representative river basins chosen as the Korean Asian Pacific FRIEND, and a HELP basin(Kumho river) which was accepted as a HELP basin in Korea 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
 - Asia Pacific HELP(AP-HELP) river basin studies with UNESCO international joint cooperative studies

1.2.4 Collaboration with other national and international organizations / or programmes

The Korean National Committee for the IHP is functioning in the execution of IHP activities in collaboration with the following national and international organizations/or programmes; Korea Water Resources Corporation(The K-Water); Korea Water Resources Association(KWRA); Korean Society of Civil Engineers(KSCE); Korean Society of Agricultural Engineers(KSAE); Korean Meteorological Society(KMS); ICOLD Korean National Committee(KNCOLD); IWRA Korean Geographic Committee; International Hydrologic Environmental Society(IHES); Korea Federation of Water Science and Engineering Societies(KFWSSES); 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 international /regional water centres under auspices of UNESCO

- The Korean National Committee for the IHP proposed to establish a UNESCO Category II Water Centre, the International Centre for Water Security and Sustainable Management(i-WSSM) at the K-water Institute, Republic of Korea, and this Centre was unanimously endorsed by all member states in the 20th Session of the Intergovernmental Council of the IHP and approved by the General Conference in 2013.
- The Korean National Committee for the IHP has been collaborating very actively with other UNESCO Category II Centres such as ICHARM in Japan, Humid Tropic Centre in Malaysia and Regional Ecohydrology Centre in Indonesia.

1.5 Publications

- The Korean National Committee for the IHP is publishing IHP Annual Research Report and the Catalogue of Rivers in Korea 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

- Meetings hosted by the country
The following IHP meetings were hosted and organized by the IHP-KNC and IHES.
 - 2012 Nakdong River Water Week/International Water Forum(Na-Ri IWW/IWF 2012) held between 12-15 September 2012, Daegu Gyeongbuk area(Andong&Sangju), Republic of Korea.
 - 2013 IHP RSC Meeting held between 30 September – 3 October 2013, Gyeongju, Republic of Korea.
- 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, Asia Pacific HELP project and its

workshops, working Group meetings and etc.

2. FUTURE ACTIVITIES

- IHP-KNC will actively continue and participate in the Asian Pacific FRIEND/HELP projects to complete with successful results for the Southeast Asia and the Pacific and also will execute a HELP river basin project in collaboration with other Asia Pacific HELP projects and UNESCO international cooperative studies.
- The following international symposiums and workshops will be organized during 2012-2014 as the IHP-VII and -VIII activities of IHP-KNC.
 - Korean Workshops of AP-HELP during 2012-2014
 - 7th WWF Related Meetings, Daegu Gyeongbuk in 2013 and 2014.
 - 2014 International Water Forum(Na-Ri IWW/IWF 2014) Gyeongju, Republic of Korea

NATIONAL REPORT ON IHP RELATED ACTIVITIES
THAILAND

for

21st UNESCO IHP Regional Steering Committee Meeting for
Southeast Asia and the Pacific: RSC for UNESCO-IHP

3-4 October 2013

Gyeongju City, Gyeongbuk,
Republic of Korea

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1. Activities undertaken in the period of November 2012 – October 2013

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 follows:

- Chairman: Mr. Nitat Poowatanakul, Director General of Water Resources
Vice Chairmen: Deputy Director General of Water Resources
Deputy Director General of Royal Irrigation
Secretary: Director, Bureau of Research, Development and Hydrology,
Department of Water Resources
Members: Representatives from concerning agencies and experts are as follows:
1. National Park, Wildlife and Plant Conservation Department
2. Department of Groundwater 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
180/3 Rama 6 Road, Samsennai District,
Phayathai, Bangkok, 10400, Thailand
Tel : +66-22986604 Fax: +66-22986604
Email : sukontha.a@dwr.mail.go.th

1.1.2 Status of IHP-VII activities

The activities related to IHP-VII was undertaken, ongoing and will be implemented such as the enhancement of Radar network and the Meteorological Satellite Data Receiving Station, improvement of storm surge forecasting, flood forecasting and warning system, implement of integrated water resources management in overall river basin focused on public participation.

1.1.3 Decisions regarding contribution to/participation in IHP-VII

During November 2012 – October 2013, there was no Thailand National Committee –IHP meeting or discussion. However, the committee still encourages IHP members to continue sharing knowledge and technology, and cooperate in various ways to promote hydrological improvement and water resources criteria.

1.2 Activities at national level in the framework of the IHP

1.2.1 National/local scientific and technical meetings

Thai representatives attended in various meetings particularly on hydrology, meteorology, flood forecasting and warning system, water resources and environmental management.

1.2.2 Participation in IHP Steering Committees/Working Groups

Representatives from TNC – IHP and the Department of Water Resources participated in the 20th RSC-IHP Meeting for the IHP in Southeast Asia and the Pacific and the International Conference on Sharing Knowledge of Issues in Water Resources Management to Face the Future, 5-9 November 2012 in Langkawi, Malaysia,

1.2.3 Research/applied projects supported or sponsored

Research project approved by National Research Council of Thailand and funded by Thai government for fiscal year (B.E.2556) are as following:

- Feasibility and frequency of flood and land slide from climate change and global warming. (Case study : Northern Thailand)
- Enhancing capabilities of community to cope with water related disaster. (Case study : Chi river basin)
- Awareness of local community to impact of climate change and adaptation
- Climate change and impact on water resources management of community. (Multiple case study : tributaries of Mun river basin)
- Water resources management of Chi river basin community.
- Water resources management of Klong Tha Lat sub-basin with WEAP mathematical model.
- Study of any flood response with participation of Ban Klong Wa community. (Kor Hong municipality, Hat Yai district, Songkhla province)
- The effect of climate change on community based water management: the case study of the sub watershed area of Mun River, 1 October 2012-30 September 2014.
- The conservation planning on small canal and the way of life of people Ampawa district, Samutsongkarm province, June 2013- June 2014.

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

- Cooperate with Ministry of Natural Resources and Environment (MNRE) and other concerned agencies such as UNESCAP to organize a meeting /events/exhibitions on the occasion of the World Water Day in March 2013.
- Cooperate with JICA for project implementation on Comprehensive Flood Management Plan for the Chao Phraya River Basin during July 2012 – September 2013. The project is already completed with successful by the end of September.
- Trilateral Cooperation; Lao PDR, Thailand and German Agency for International Cooperation: GIZ on Nam Xong Sub-River Basin Management, Vangveing District, Vientiane Province, Lao PDR.

- Collaborate with German Agency for International Cooperation: GIZ under the support by German Federal Ministry of Environment, Nature Conservation and Nuclear Safety (BMU) to contribute the project on Improved Flood and Drought Prevention through Ecosystem-Based Adaptation in Watershed.

1.2.5 Other initiatives

- The Department of Water Resources initiates and cooperate the guideline on Conjunctive Water Management with the Department of Groundwater Resources, Thailand under the consultations of Natural Heritage Institute (NHI), the United States of America.

1.3 Educational and training courses

1.3.1 Contribution to IHP courses

None

1.3.2 Organization of specific courses

- National Training on Operation and Maintenance of ADCP and GPS equipment on 29-30 July 2013, Nong Khai, Thailand
- Training Programme on the sediment grain size analysis on 5-6 August 2013, Chiang Saen Hydrological Centre, Chiang Rai, Thailand
- National Training on Operation and Maintenance of Early Warning System in the High Risky Areas of Flash Flood and Landslide between 9-10 May 2013, with total 1,054 stations, cover with 3,074 villages. The course to increase understanding and skills for Public Relations and hear comments from the public and representatives of the early warning system for flood risk areas - landslide prone areas in the foothills and plains for 2013

1.3.3 Participation in IHP courses

- Thai representative attended the training course on Precipitation Measurement from Space and its Applications, 18 November-1 December 2012, Nagoya, Japan.
- Thai representative attended the International Workshop on Remote Sensing and eco-hydrology in arid regions under the Asian Water and Development Information for Arid Lands-A Global Network – UNESCO IHP (Asian G-WADI/IHP), 16-20 September 2013, People's Republic of China.
- Thai representative attended the Urban Water Security Learning Week organized by Asia-Pacific Center for Water Security, Tsinghua University, in September 2013, People's Republic of China.

1.4 Publications

There are numerous Publications from various conferences.

1.5 Participation in international scientific meeting

1.5.1 Meetings hosted by the country

- Thailand by Ministry of Natural Resources and Environment hosted the 12th ASEAN Ministerial Meeting on the Environment in September 2013.
- Royal Thai Government hosted the 2nd Asia-Pacific Water Summit and exhibitions, 14-20 May 2012, Chiang Mai, Thailand.
- Thailand by the Department of Water Resources hosted the ASEAN Water Dialogue Conference 2013: AWDC 2013, 25-27 September 2013, Bangkok, Thailand.

1.5.2 Participation in meetings abroad

Representatives from Thailand participated in

- World Water Week 2013, 1-6 September 2013, SIWI, Stockholm, Sweden.
- 13th ASEAN Working Group on Water Resources Management, 24-26 June 2013, Darussalam, Brunei.

1.6 Other activities at regional level

1.6.1 Institutional relations /co-operation

- TNC-IHP has remained coordination closely and contacts with UNESCO Jakarta Office.

1.6.2 Completed and ongoing scientific projects

- Completed project

The Mekong-HYCOS is an MRC project funded by Agence Française de Développement (AFD) and Fonds Français pour l'Environnement Mondial (FFEM). The Mekong-HYCOS project operated by the Information and Knowledge Management Programme (IKMP). Since 2006, it has upgraded existing hydro-meteorological stations in Cambodia, Lao PDR, Thailand, Viet Nam and China with state-of-the-art equipment and tools as well as operating systems to meet the standards of the World Meteorological Organization, the project's partner. The project also installed new posts in the countries.

Currently, there are 49 stations throughout the region, 17 on the mainstream, 30 on the tributaries and 2 tidal stations in the Mekong Delta. These stations share raw data on rainfall and water levels through the MRC's data sharing platform. Moreover, the MRC's Flood Management and Mitigation Programme and national flood forecasting agencies use the data for their flood modelling and trigger flood warnings if waters reach critical levels. Near real-time flood forecasting information is also available on the MRC's website: <http://www.mrcmekong.org>.

- Implementation of Joint-Discharge and Sediment Transport and Bedload Measurements on Mekong River of Thailand.

-Nam Pong project A series of training for national modellers under IWRM principles

- Lam Ta Kong project A series of on the job training/workshop for capacity building for the application of ArcSWAT

- Flow model calibration and data preparation for sedimentation model held on Jul 10-12, 2013
- The LTK sedimentation model calibration to be held on Aug 21-23, 2013

2 FUTURE ACTIVITIES

2.1 Activities planned until December 2014

Thai representatives will participate in the 23rd IHP Training Course on Ecohydrology for River Basin Management under Climate Change, 2-13 December 2013 in Kyoto, Japan.

2.2 Activities foreseen for 2013-2014

- 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
- Promotion on Capacity Building on Water Resources Management for River Basin Committee
- Participate in the international forum/conference on water resources management.

2.3 Activities envisaged in the long term

- Enhancing activities contributed to IHP-VII
- Enhancing activities in Flood and Drought Management
- Highlight on Integrated Water Resources Management in 25 river basins
- Continuation of raising public awareness and education in water resources management
- Continuation of raising public awareness in efficient water resources management
- Continuation of raising public participation for better water resources management

NATIONAL REPORT ON IHP RELATED ACTIVITIES

I. ACTIVITIES UNDERTAKEN IN THE PERIOD OCTOBER 2013 - OCTOBER 2014

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 Prof. Tran Thuc, Vietnam Institute of Meteorology, Hydrology and Climate Change - Ministry of Natural Resources and Environment.

1.1.2 Status of IHP-VIII activities

Prepare for the participation/contribution to IHP-VIII activities.

1.1.3 Decisions regarding contribution to/participation in IHP-VIII

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, Ministry of Science and Technology, and Professional Societies (particularly the Viet Nam Natural Resources and Environment, Viet Nam Fluid Mechanics, and Viet Nam Geography Societies).

The IHP National Committee has two meetings with the Vietnam National UNECO Commission on the activities of the IHP National Committee. 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 Viet Nam National Committee for the IHP have attended and participated actively in all of the annual meetings of the Regional Steering Committee.

Participate in Asian Pacific FRIEND.

1.2.3 Research/applied projects supported or sponsored

- Development of "Special Report on Managing Risk of Extreme Events and Disasters to Advance Climate Change Adaptation (SREX)".
- "Applying Norwegian earth system model for climate change scenario development, monsoon and climate extreme events studies in Viet Nam", Project funded by the Government of Norway.
- "Strengthening National Capacities to Respond to Climate Change in Viet Nam, Reducing Vulnerability and Controlling GHG Emissions", Project funded by UNDP.

- “Creation of an overarching framework for NAMA and MRV in Vietnam” Project funded by Germany.
- Project “Development of Viet Nam’s Intended Nationally Determined Contributions”, Document prepared for the Vietnamese Government for consideration to be submitted to UNFCCC.

1.2.4 Collaboration with other national and international organizations

- In collaboration with the RA II Working Group on Hydrological Services, WMO, preparing Work plan on: Assessment of Changes in Climate Extremes, Their Impacts on Water Resources, and Translating Climate Information into Action in Water Resources Management.

1.2.5 Other initiatives

1.3 Education and training courses

1.3.1 Contribution to IHP courses

None.

1.3.2 Organization of specific courses

None.

1.3.3 Participation in IHP courses

Several Vietnamese have participated in IHP courses and workshops during the reporting period, including IHP Training course on Numerical Prediction of High-Impact Weather systems, Urban Storm Water Management.

1.4 Publications

- Tran Thuc (2014), Contributing author of “Green Growth in Practice – Lessons from Country Experiences”, Green Growth Best Practice (GGBP) Publication.
- Tran Thuc, Huynh Thi Lan Huong, and Do Tien Anh (2014), Contributing author of “NAMA Guide Book – Manual for Practitioners Working with Mitigation Actions, OECC Publication.
- Tran Thuc, Lead reviewer of “Guidance to NAMA Design (2013) – Building on Country Experience”, UNFCCC Publication.
- Tran Thuc, Huynh Thi Lan Huong, and Dao Minh Trang (2013), Chapter “Vietnam” in the Publication of "National Greenhouse Gas Emissions Baseline Scenarios - Learning from Developing Countries", Danish Energy Agency, OECD and UNEP Riso Center Publication.
- Tran Thuc, Huynh Thi Lan Huong (2013), Nationally Appropriate Mitigation Actions (NAMA), Science and Technology Publishing House.
- M. Souvignet, P. Laux, J. Freer, H. Cloke, D.Q. Thinh, Tran Thuc, J. Cullmann, A. Nauditt, W.A. Flügel, H. Kunstmann, L. Ribbe (2013), Recent climatic trends and linkages to river discharge in Central Vietnam, Journal of Hydrological Process.

1.5 Participation in international scientific meetings

- Attending the Nineteenth session of the Conference of the Parties (COP 19) and Ninth session of the Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol, 04 - 22 Nov 2013.
- Attending Regional Workshop on Nationally Appropriate Mitigation Actions in Asia and the Pacific: Scaling-up climate change mitigation efforts and prospects for NAMAs in the waste sector, 18 and 19 March 2014, UNESCAP, Bangkok, Thailand
- Attending the 10th Session of the IPCC Working Group II contribution of the AR5 and 38th Session of IPCC, 25-29 March 2014, *Yokohama, Japan*.
- Attending the workshop“Intended Nationally Determined Contributions: preparation and implementation”, Punta Cana, Dominican Republic, September 3rd to 10th, 2014.
- Attending the RA II Working Group on Hydrological Services, WMO, Seoul, Republic of Korea, 30 September – 2 October 2014.
- Attending the Sixth part of the second session of the Ad Hoc Working Group on the Durban Platform for Enhanced Action (ADP 2.6) of the United Nations Convention Framework on Climate Change, 17-25 October 2014, Bonn, Germany.
- Offering lecture at United Nations University in Tokyo, 28-29 October, 2014.

1.6 Other activities at a regional level

1.6.1 Institutional relations/co-operation

None

1.6.2 Completed and ongoing scientific projects

None under the aegis of IHP-VIII

II. FUTURE ACTIVITIES

2.1 Activities planned for 2014-2015

- Attending meeting of 22th IHP Regional Steering Committee for Southeast Asia and the Pacific.
- Participating in regional and national activities of IHP.

2.2 Activities envisaged in the long term

Unknown at this time.

PAKISTAN **NATIONAL REPORT**

ACTIVITIES UNDERTAKEN IN THE YEAR 2014

A) Development of a Combined System – Constructed Wetlands and FILTER Technique – for Wastewater Treatment at National University of Sciences & Technology (NUST), Islamabad H-12 Campus

National University of Sciences & Technology (NUST) was entrusted the project entitled “Application of FILTER Technology for Wastewater Treatment - Pilot Study at NUST Islamabad Campus” sponsored by the United Nations Educational, Scientific & Cultural Organization (UNESCO), used for the first time in Pakistan, a combination of Constructed Wetland and FILTER (Filtration and Irrigated cropping for Land Treatment and Effluent Reuse) technique developed at Commonwealth Scientific & Industrial Research Organization (CSIRO) of Australia and tested successfully both in Australia and China.

The main objective of the UNESCO sponsored project was to practically demonstrate the use of FILTER technology for wastewater treatment and re-use at NUST Islamabad Campus under a Pilot Study. The wastewater being generated from offices, student hostels and staff residential colony located at NUST Islamabad Campus is directed towards a Sedimentation Tank and after settling of solid waste & scum is discharged into a Constructed Wetland divided into eight compartments. In the last wetland compartment, aeration (aeration system based on solar energy) is also carried out. The effluent from the Constructed Wetland discharges, through a distribution system, to FILTER plot for further wastewater quality improvement.

The effluent from the FILTER is then collected through the tile drainage system and its quality compared with the inflow wastewater. The whole system is based on gravity flow without the use of any energy consumption, except the aeration system which uses solar energy – a renewable energy. As the treated wastewater is satisfactorily meeting the Pakistan National Environmental Quality Standards (NEQS), thus it is being used for horticulture & replenishing underlying groundwater aquifer. The whole system is not only conserving fresh water being presently used for horticulture but also raising the water table of the local area. The solid waste collected from the Sedimentation Tank after drying up can be used as fertilizer for trees & plants, thus converting the whole project into “Zero Waste”.



CW-FILTER System in operation at NUST

PROJECT IMPACTS

- 75000 gallons of waste water treated daily
- Reduction of health hazards after disposal outside NUST
- Improved ecology of surrounding environment
- Recycled water available for horticulture and ground water aquifer recharge
- Conservation of stressed ground water aquifer
- Gravity flow results in Zero Energy required for operation
- Zero Waste as collected solids usable as fertilizer
- No skilled manpower required for operation/ maintenance
- Field operational site available for teaching
- Proposal for similar project worth 0.1 M USD for CDA submitted

B) International Training Workshop on “Capacity Building of Community Elders and Media Towards Flood Vigilance and Disaster Reporting”, held from 25 – 26 September, 2014 at NUST, Islamabad

A two day international training workshop on “Capacity Building of Community Elders and Media Towards Flood Vigilance and Disaster Reporting” was organized by the NUST Institute of Civil Engineering (NICE), School of Civil and Environmental Engineering (SCEE), National University of Sciences and Technology (NUST) in collaboration with UNESCO and in cooperation with NDMA, PMD, FFC, SUPARCO and other partner organizations.

The purpose of the workshop was to impart training to the participants that would assist in vulnerability reduction of communities living in the remote flood plains, creating awareness in people towards their role during preparation, response and recovery processes of a disaster, understand the role of communication and information in effective dissemination of flood forecasts & warnings and management under all three tiers of flood management system.

The speakers included representatives from NDMA, UNESCO, Pakistan Meteorological Department (PMD), FFC, Federal Flood Division (FFD) and faculty members from NUST.

The participants were briefed on various topics/subjects including Integrated Water Resources Management (IWRM), Major Water Systems, Hydrometeorology of floods in Pakistan, Flood forecasting system in Pakistan, Role of Remote Sensing Data for the assessment and Management of Floods, Role of NDMA in Flood Management and Causes of Floods. The speakers apprised the workshop trainees on the roles & responsibilities and functions of their respective organizations, coordination mechanism with other disaster management bodies during different phases of flood management and also shared lessons learnt, issues faced and options to improve flood management especially focusing on recent flood events the country has faced.

The outcomes of the workshop which were highlighted included: i) Improvement in flood forecasting and early warning systems; ii) Highlight the need for integrated flood management based on approach of Sustainable Development; iii) Design review of hydraulic structures and flood protection infrastructure in all provinces; iv) Flood plain mapping/zoning; & v) Removal of anomaly regarding the role of NDMA, Planning Commission and ERRA in rehabilitation & recovery in post-flood.

As part of training material, Training Manual for Community Based Flood Management was also distributed among the participants of the training and resource persons. The training manual has been compiled by NUST in three different languages including Urdu, English and Sindhi to develop better understanding of the communities.

In the end UNESCO’s Representative, handed over more than 1500 Hand Crank Radio sets, alongwith 3000 Training Manuals, to Chairman NDMA which shall be distributed among the selected vulnerable communities in the four provinces, Gilgit Baltistan, Azad Jammua & Kashmir and FATA for easy access to information and to stay well informed in the field during emergency situations besides for more effective and coordinated disaster related information collection and distribution for real time response and evacuation.

In the end Certificates of completion of training were distributed among the participants by the Chairman NDMA.

TRAINING WORKSHOP IMPACTS

- Training of Stake holders (FFD, FFC, SUPARCO, NDMA, PDMAs, DDMAs etc) in Disaster Risk Reduction (DRR) and Disaster Risk Management (DRM)
- Training of Community Elders in flood affected areas
- Training of Media in disaster reporting
- 3000 training manuals in English, Urdu and Sindhi
- Distribution of 1560 Hand Cranked Radio in flood affected areas to receive early flood warning

Training Manual for Community Based Flood Management

		
Urdu ISBN-978-969-8535-24-7	Sindhi ISBN-978-969-8535-25-4	English ISBN-978-969-8535-26-1





ANNEX G
REPORTS OF CATEGORY 2 CENTRES

HUMID TROPICS CENTRE KUALA LUMPUR

*The Regional Humid Tropics Hydrology and Water Resources Centre
for Southeast Asia and The Pacific*



UNESCO-IHP 22nd Regional Steering Committee Meeting for Southeast Asia and the Pacific, Yogyakarta, Indonesia 13 & 14 November 2014

DIRECTOR'S REPORT



CONTENTS

THE REGIONAL HUMID TROPICS HYDROLOGY AND WATER RESOURCES CENTRE FOR SOUTHEAST ASIA AND THE PACIFIC (HTC KUALA LUMPUR)

FOREWORD



The Humid Tropics Centre Kuala Lumpur was inspired by increasing awareness of the importance of hydrology and water resources management in humid tropics region. It has become the prominent issue to the world organization.

The Regional Humid Tropics Hydrology and Water Resources Centre for Southeast Asia and the Pacific (HTC) is one of the UNESCO's Category II water centres. The HTC started operation in early 1997. An agreement between UNESCO and the Government of Malaysia was signed on 28 October 1999. The HTC aims to act as a catalyst in carrying out local, regional and international collaboration, consultation and partnership in water management. More specifically, the

objectives of the HTC are:

- To promote a conducive atmosphere for collaboration through technology and information exchange, education and science.
- To increase scientific and technological knowledge about the hydrological cycle.
- To promote and increase scientific and technological knowledge about urban stormwater management, ecohydrology, humid tropics and water education

The focal areas of HTC since 2009 are: Integrated Water Resources Management (IWRM), Urban Stormwater Management, Ecohydrology, River Waste Water Management, Humid Tropics and Water Education. The scope of activities includes applied research, services/advising/consulting, innovation product development, education, and software development.

HTC has been involved in the cross-cutting APFRIEND River Catalogue and some of the information can be access through <http://htckl.water.gov.my> or <http://htckl.org.my/apfriend>. The Centre contributed to the SWITCH-in-Asia Urban Water Management through the construction of a demonstration integrated MSMA Stormwater Management Ecohydrology (SME) project at HTC and will continue to carry out the R&D&C for the benefits of UNESCO-IHP Strategic Plans. The SME demonstration project was officiated by H.E. Irina Bokova, the Director General of UNESCO on 21st May 2013.

Hopefully in the years to come, some of the component of the project can be successfully implemented through the Upscaling SME project at Langat river basin in Malaysia, in collaboration with one of the university that involve in UNESCO-HELP River Basin programme. The main target together with the implementation of other environmental projects at the river basin is to improve from the present stage E-Evolving to the next level stage O-Operating.

We wish very much to continue in the collaboration and networking and offer our services as a regional water centre under the auspices of UNESCO.

With Best Wishes,

Dr. Mohamed Roseli bin Zainal Abidin
Director
Humid Tropics Centre, Kuala Lumpur
Malaysia

INTRODUCTION

This report highlights events and activities that had taken place since the 21st Regional Steering Committee Meeting for South East Asia and the Pacific UNESCO IHP held in Gyeongju, Republic of Korea from 03rd – 04th October, 2013 and throughout the year 2014 (till 30th October 2014). This report also highlights future programmes and activities for the year 2015 planned by the Centre. The report is categorized as follows;

1. Chapter 1: Activities Implemented and Participated at International and Regional Level.
2. Chapter 2: Activities Implemented and Participated at National Level.
3. Chapter 3: Quality Management System and Water Education Programme.
4. Chapter 4: Future Programme for 2015.
5. Chapter 5: AP Friend Water Archive.
6. Chapter 6: Finance in 2013- 2014.
7. Chapter 7: Staffing in 2014.
8. Chapter 8: Publications in 2013/2014.
9. Chapter 9: Concluding Remarks.



CHAPTER 1

ACTIVITIES IMPLEMENTED AND PARTICIPATED AT INTERNATIONAL AND REGIONAL LEVEL

1.1. Seminar/Workshop/Training

Attended the 23rd IHP Training Course: Ecohydrology for River Basin Management under Climate Change, Kyoto, Japan, 2nd -13th December 2013. The course was attended by Ir. Madam Vasukey Palany Kumar (Head of Assistant Director).

Attended the Seminar On Forecasting Flood And Control Technology at Infrastructure University Kuala Lumpur (IUKL) on 17th June 2014. The deputy director of HTCKL, Ir. Hjh. Zainab bt. Hashim presented a paper title KL SMART FLOOD FORECASTING AND CONTROL SYSTEM.

Attended the 7th RCE Asia Pacific Meeting and International Symposium on “A Decade of Regional Centres of Expertise on ESD: Reflections and advances in Asia-Pacific” on 27th August 2014 at Dewan Budaya, Universiti Sains Malaysia & Minden Height National School. This event was attended by Dr. Mohamed Roseli bin Zainal Abidin, Director of HTCKL and Mr. Khairuddin Mohamed, Assistant Engineer of HTCKL.

1.2. Meeting

Attended the “21ST Regional Steering Committee Meeting UNESCO-IHP Southeast Asia & the Pacific held in Gyeongju Rep. of Korea from 30th Sept 2013 to 5th October 2013. The meeting was attended by Dr. Mohamed Roseli bin Zainal Abidin.

Attended the Strategic Meeting of Asia-Pacific IHP-HELP and Ecohydrology at Grand Mahakam Hotel, Jakarta, Indonesia from 2nd to 3rd December 2013. The meeting was attended by Dr. Mohamed Roseli bin Zainal Abidin.

Attended the 21st Intergovernmental Council (IGC) in UNESCO, Paris from 18th -20th June 2014. The meeting was attended by Dr. Mohamed Roseli bin Zainal Abidin.



1.3. Conference and Technical Visit

Attended the Peri Urban 2014 International Conference in Sydney, Australia from 8th - 9th July 2014. Dr Mohamed Roseli bin Zainal Abidin submitted a paper title WATER SECURITY AND SUSTAINABLE CHALLENGES THROUGH URBAN STORMWATER MANAGEMENT ECOHYDROLOGY: CASE STUDY AT HTCKL.

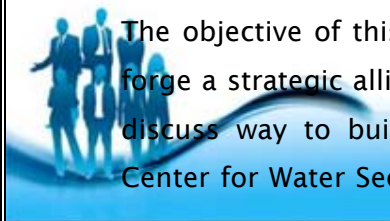
Attended the Joint University of Canberra-UNESCO International Forum on Sustainable Landscape Future: Solving Complex Problems through sustainable science in Canberra, Australia from 10th - 11th July 2014. Dr. Mohamed Roseli bin Zainal Abidin presented a paper title INNOVATIVE URBAN WATER ECOSYSTEMS FOR RESILIENT ENVIRONMENT.

Attended & co-organized The 13th International Conference on Urban Drainage (ICUD 2014) in Borneo Convention Centre Kuching, Sarawak (BCCK) from 7th -12th September 2014. The theme of this conference is "Urban Drainage in the Context of Integrated Urban Water Management: A Bridge Between Developed and Developing Countries". Dr.Mohamed Roseli bin Zainal Abidin was a co-chairman meanwhile Ir. Hj. Zainab bt. Hashim was a member of the Organising Committee. Other than that, Mrs. Devi Peechmani, Assistant Director of HTCKL was a member of the International Scientific Committee And Secretariat. HTCKL presented two papers during the ICUD 2014 i.e Bioretention System for Urban Stormwater Quantity Management Towards Sustainable Development: A Case Study of Humid Tropics Centre Kuala Lumpur and another paper was Evaluation of Rainwater Harvesting System under Tropical Climate: A Case Study at Humid Tropics Centre Kuala Lumpur. These two papers were presented by Ir. Vasukey Palany Kumar, Head Assistant Director and Mrs. Sandra Ligong, Assistant Director of HTCKL.

In conjunction, technical visit was conducted by the organizing committee on 10th September 2014. Place of visit are Bau Town Flood Mitigation Project, Kuching, Sarawak, Centralised Sewerage System for Kuching City and Sarawak River Barrage and Shiplock.

1.4 Visit to HTCKL by Director General and Senior Clerk K-Water Research Institute, R&D Planning & Management Dept., Korea on 17 December 2013.

The objective of this visit are to build up a mechanism for new regional cooperation and forge a strategic alliance for sustainable development of the "Category II Water Center", to discuss way to build advance structuralized system for operation of the International Center for Water Security and Sustainable Management (i-WSSM) and to promote 7th World



Water Forum (Regional Process & 2nd SCM). The establishment of UNESCO i-WSSM was officially approved at the 37th UNESCO General Conference.

1.5 Visit to HTCKL by former Director General of DID (Datuk Ir. Keizrul Abdullah), Netherlands Alumni Association Malaysia (NAAM) members, and members of Malaysian Dutch Business Council on 18 December 2013.

The aim of this visit is to demonstrate to all NAAM members and also members from Dutch Business Council about the technical viability of Rain Water Harvesting System as an innovative solution to address global water shortage issues.

CHAPTER 2

ACTIVITIES IMPLEMENTED AND PARTICIPATED AT NATIONAL LEVEL

2.1 Malaysia World Water Day 2014 (WWD2014)

With a theme “Water & Energy”, Malaysia celebrated the World Water Day (WWD) 2014 on 25th Mac 2014 at Dewan Sri Siantan, Kompleks Perbadanan Putrajaya. This community programme was officiated by the Malaysian Minister of National Resources & Environment, the Honorable Datuk Seri G.Palanivel.

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, post graduate and doctorate level in the field of hydrology and water resources. The objective was to promote Hydrology and Water Resources subjects at university level.

Malaysia UNESCO Day 2013 & Malaysia UNESCO Day 2014

In year 2013, Malaysia UNESCO Day with a theme “Education for All” was held at Independence Memorial Square, Melaka from 3rd October to 6th October 2013 and was officiated by the Deputy Prime Minister of Malaysia and also the President of the Malaysia National Commission for UNESCO (SKUM), the Honorable Tan Sri Dato’ Hj. Muhyiddin Hj. Mohd Yassin. The Director of UNESCO Office, Jakarta, Dr. Hubert Gijzen represented UNESCO in the opening ceremony. On the occasion of Malaysia UNESCO Day 2013, the Government of Malaysia reaffirmed its support to the mission and commitment of the



United Nations Educational, Scientific and Cultural Organisation to ensure the peace and well-being of the global community. HTCKL as usual, participated in exhibition in Science & Technology in a way to celebrate the leading role of Malaysia in implementing UNESCO's global mandate.

This year theme of Malaysia UNESCO Day is "Our Heritage is World Heritage". The occasion was held at Dataran Merdeka, Kuala Lumpur on 18th October 2014. The event was officiated by the Deputy Prime Minister of Malaysia, the Honorable Tan Sri Dato' Hj. Muhyiddin Hj. Mohd Yassin and was witnessed by His Excellency Prof. Dr. Hubert Gijzen, Director of UNESCO Regional Office, Jakarta. HTCKL participated in this event as one of the member under Science Secretariat to participate in the Science & Technology exhibition.

2.2 Research Activities

HTC carry out its R&D activities according to its first two functions under Article II (i.e. (a) to coordinate the implementation of cooperative hydrological and water resources research projects and activities, and (b) to network with IHP National Committees and other similar centres for exchange of scientific and technical information on research results and the UNESCO-IHP cross-cutting programmes of SWITCH-in-Asia: Urban Water Management; as well as UNESCO-HELP River Basin (Langat River).

The R&D carried out is also in conjunction with UNESCO IHP-VIII STRATEGIC PLAN (2014-2021); "Water Security: Responses to Local and Global Challenges" and the themes and focal areas of Themes 1, 3, 4 and 5 in line with the UNESCO Strategic objectives (37C/4); strategic objective no. 4: Strengthening science, technology and innovation systems and policies-nationally, regionally and globally and strategic objective no. 5; Promoting international scientific cooperation on critical challenges to sustainable development. The main focuses are in stormwater management, ecohydrology, river management, waste water management and water education.

Most of the R&D are being carried out through collaboration and networking with local universities and under the R&D committee of Malaysian National IHP.



The R&D carried out for 2014 – 2015 is as per table follows:

IHP VIII Themes	No.	Activities/Action Plan
THEME 1 : <i>Water related Disasters and Hydrological Change</i>	1.)	Study on Artificial Bio-Macropore for Enhancing Soil Infiltrability for Urban catchment at HTCKL and Langat-HELP River Basin
THEME 3: <i>Addressing Water Scarcity and Quality</i>	1.)	Desalination of seawater for drinking and domestic water use in small islands such as using the step solar still system technique. Working with IOC.
	2.)	Research on Performance of Gross Pollutant Trap (GPT) Trapping Devices versus Life Cycle Cost and Gross pollutant Management Strategies Knowledge Portal Case Study River Of Life
THEME 4: <i>Water and Human Settlements of the future</i>	1.)	A water based recreational site to a rural community as well as to others through Rural River Rejuvenation (R3) which means of bringing aquatic life back to rural rivers and cleaning up their waters so as to be fit for recreation.
	2.)	A novel approach to reuse Alum Sludge for pottery manufacturing as well as to explore the possibility to be used as a building material in order to ensure better environmental sustainability as well as sound economical value. Alum Sludge is a potential environmental threat that is produced massively during the process of treating drinking water.
	3.)	Agricultural Non-Point Source Pollution and Impact on Reservoir Sedimentation and Water Quality. Non-point source (NPS) pollution occurs as water moves across the land or through the ground and picks up natural and human-made pollutants, which can then be deposited in lakes, rivers, wetlands, coastal waters, and even groundwater.
THEME 5: <i>Ecohydrology, Engineering Harmony for a Sustainable World</i>	1.)	Ecohydrology expert system of lake management using wireless sensor of real time monitoring (effectiveness of wireless sensor networks in real-time application, prototype system for real time monitoring and predicting several ecological parameter, expert system for ecological
	2.)	Eco-Friendly Integrated Green Technology Expert System for Sustainable Green Infrastructure (GENIUS)
	3.)	Upscaling water security to meet local, regional and global challenges such as SME
THEME 6: <i>Water Education, Key for Water Security</i>	1.)	Promoting and enhancing Ecohydrology and HELP approaches, knowledge

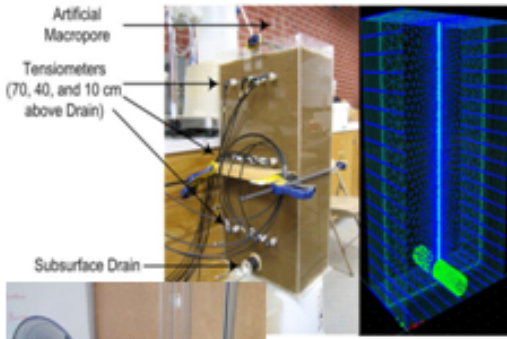


2.2(a) Study on Artificial Bio-Macropore for Enhancing Soil Infiltrability for Urban catchment at HTCKL and Langat-HELP River Basin (on-going).


The objective of this study is to design & evaluate the performance of the artificial bio-macropore based on land use type during storm event. The scope of works is as follows;

- Soil sampling and laboratory experiments
- Estimates of field infiltration
- Determination of in situ soil hydraulic properties
- Optimization of dimension of artificial macropore
- Testing optimum dimension of artificial macropore
- Evaluation of the artificial macropore on storm discharge processes
- Installation of 450 artificial macropore in the field together with various stakeholder at Humid Tropics Centre Kuala Lumpur and Langat River.

Study on Artificial Bio-Macropore for enhancing Soil Infiltrability for Urban Catchment at HTCKL and Langat –HELP River Basin



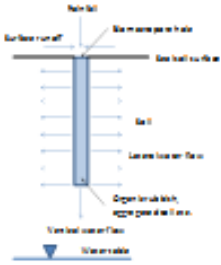
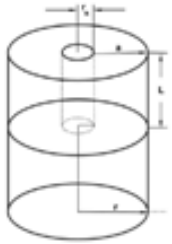
Artificial Macropore
Tensiometers (70, 40, and 10 cm above Drain)
Subsurface Drain



Lab Instrumentation

- Macropore is a continuous large opening in soil (Beven, 1982)
- Although macropore is <1% of the surface area of soil, it greatly increase the infiltration rate (Geubert & Gardner, 2000)
- Plays important role in water flow and solute transport (Beven, 1982, Allaire et al., 2002, Weiler&Naef, 2003, Shi et al., 2012, Zhou et al., 2012.)
- The usage of heavy machines increased the density of upper soil layer and destroy macropores (Beven, 1982).

A research using the artificial bio-macropore hole to enhance soil-water infiltration rate and to reduce the surface runoff during storm event

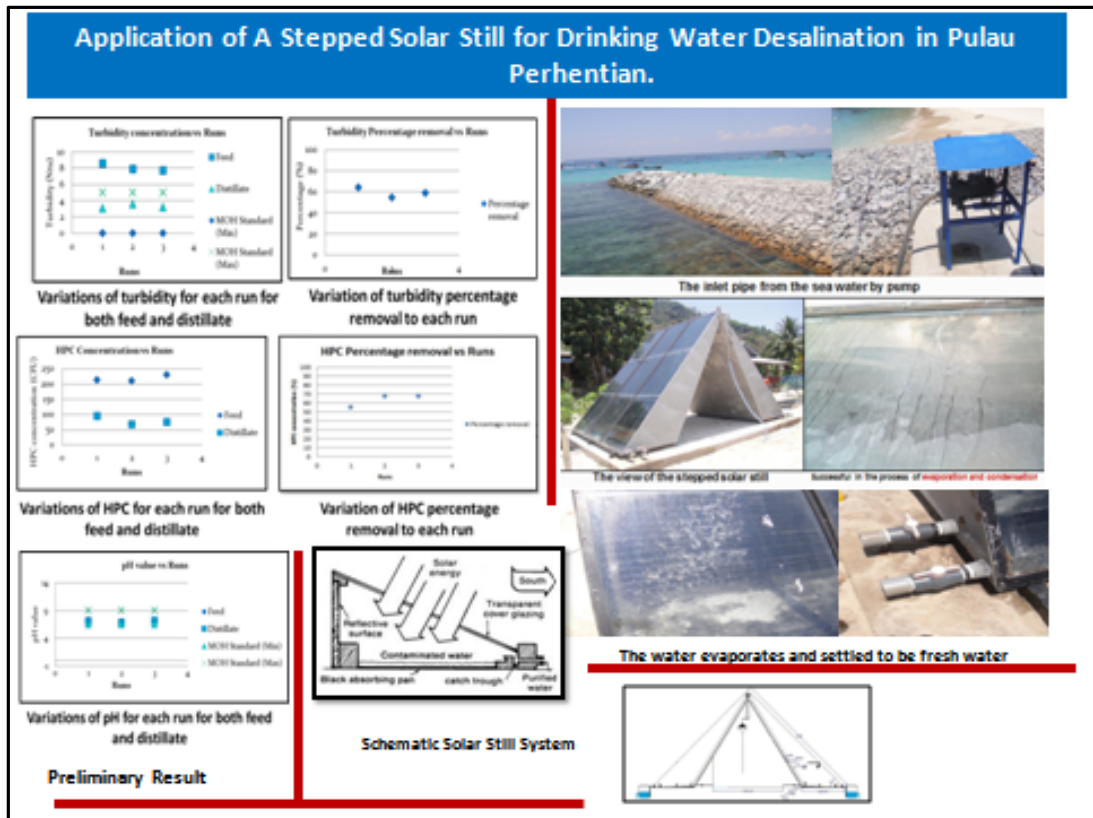
$$\frac{\partial \theta}{\partial t} = \frac{1}{r} \frac{\partial}{\partial r} \left(r K \frac{\partial h}{\partial r} \right) + \frac{\partial}{\partial z} \left(K \frac{\partial h}{\partial z} + K' \right)$$



2.2(b) Desalination of seawater for drinking and domestic water use in small islands such as using the step solar still system technique (on-going).

The objective of this study is to develop and test the performance and productivity of a prototype stepped solar still for sea water desalination on Perhentian Island. The scope of works includes;

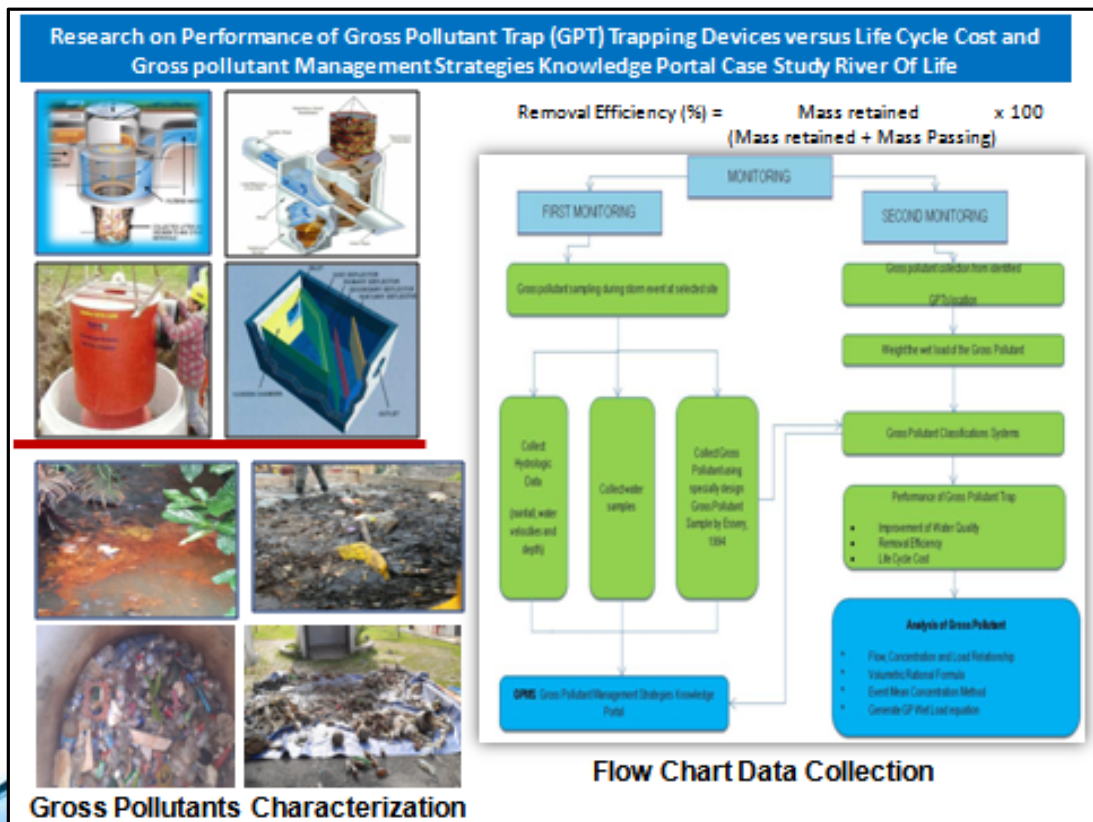
- Application of thermal technologies for desalination techniques involved the heating of saline water and the collection of distillate or condensed vapor to obtain pure water.
- Analysis of water samples for water quality.



2.2(c) Research on Performance of Gross Pollutant Trap (GPT) Trapping Devices versus Life Cycle Cost and Gross pollutant Management Strategies Knowledge Portal Case Study River of Life (on-going).

The objective of this research is to evaluate the performance of GPTs and develop the efficiencies and cost savings whilst maximising the environmental performance during the operational phase of existing GPTs. The scopes are;

- Collecting basic information of Gross pollutant traps location using GPS and map using GIS in digitize related to catchment boundary and land use type.
- The identification process of gross pollutant classification and performance of trapping efficiencies in the trapping system at selected site.
- Gross pollutant and water sampling and laboratory experiments
- Develop the Gross Pollutant Classification Systems
- To analyse the Gross Pollutant based on flow, concentration and load relationship, volumetric rational formula event mean concentration method and generate Gross Pollutant wet load equation.
- To assess the Pollutant Removal Performance vs Life Cycle Costs



2.2(d) Water based recreational site to a rural community as well as to others through Rural River Rejuvenation (R3) which means of bringing aquatic life back to rural rivers and cleaning up their waters so as to be fit for recreation (on-going).

The objective of this R3 is to improve river water quality for recreation by using bio-filter techniques and the scope of works (phase 1) is as follows;

- Installation of heavy duty mild steel trash screen
- Construction of MBB Biofilter housing structure.
- Supply and install anchor for phytoraft
- Sampling & testing for water quality parameters



2.2(e) A novel approach to reuse Alum Sludge for pottery manufacturing as well as to explore the possibility to be used as a building material in order to ensure better environmental sustainability as well as sound economical value (on-going).

This research aims to create a new approach that help to reduce the effect of the ever increasing Alum Sludge produced by most water treatment plants in Malaysia and hence creating a safer and more sustainable environment. The scope of this study is as follows:



- Site visit to the study area to assess the amount and composition of Alum Sludge.
- Data collection for leachate at disposal sites.
- To identify the optimum composition of admixtures for pottery/building material manufacturing.
- Micro-level analysis for stress and strain in granular assemblies.
- Manufacture of prototype material.
- To generate significant reduction of hazardous Aluminum Hydroxide containing sludge disposition, and thus a significant solution towards sustainable development practices.

A Novel Approach to Reuse Alum Sludge in Manufacturing of Building Materials and Pots using Admixtures and Thermal Curing (by-product of water treatment plant) (On-going)

- To reuse Alum Sludge in optimum amounts to preserve environment.
- To stabilize shrinkage of pots and building material under different temperature and admixtures proportion.
- To investigate the most suitable proportion of alum sludge content for building material with the optimum strength.
- To determine the strength of building material in different proportion and different

BENEFIT OF THE RESEARCH

This research will benefit in terms of providing a novel ingredient of raw material for pot manufacturers and building material manufacturers. As such, the research will contribute to the following:

- To reduce the pollution which cause by alum sludge
- To solve the problem of disposal of alum sludge which face by water treatment plant
- To contribute efforts towards green technology that can have direct positive impacts towards the environment, manufacturer as well as the consumer.
- To give the manufacturers an alternative choice for selecting raw material (clay or alum sludge).

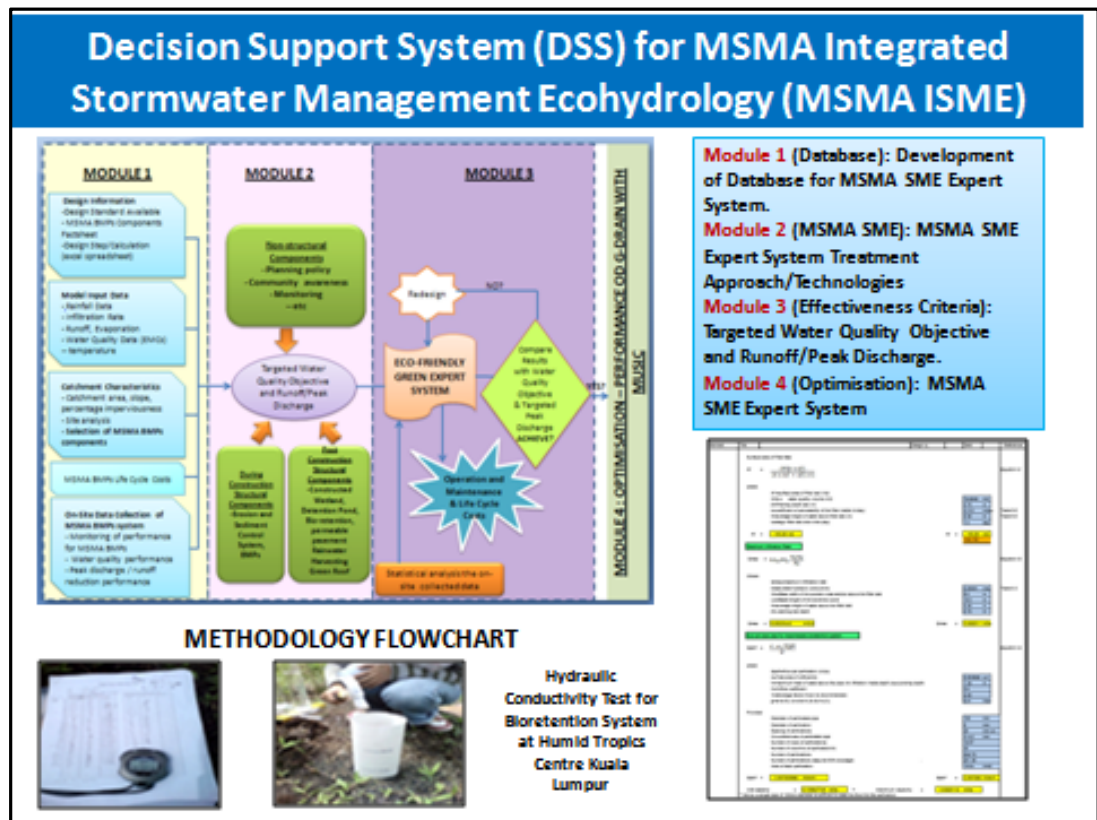


2.2(f) Eco-Friendly Integrated Green Technology Expert System for Sustainable Green Infrastructure (GENIUS) or Decision Support System (DSS) for MSMA Integrated Stormwater Management Ecohydrology (MSMA ISME) (On-going).



The objective is to develop a Decision Support System for MSMA integrated Stormwater Management Ecohydrology based on expert data and user input. The scope of work includes;

- To develop a database for MSMA SME Expert System that consist of information related to the MSMA SME design standards available, MSMA SME components factsheet and design step and calculation using excel spreadsheet and its component to be set in this expert systems.
- To provide the model input data (includes rainfall data, infiltration rate and soil properties, inflow hydrograph, initial water quality data and temperature), catchment characteristics to assemble the data for the expert system.
- Collection of MSMA SME System Components during the monitoring stage in terms of water quality improvement, stormwater runoff reduced, heat reduction, water storage, etc. These on-site data will then analyzed and integrate in the expert system.
- The performance of MSMA SME expert system will be compared with MUSIC software to analyze its reliability and outputs in terms of the urban stormwater systems






The R&D that continues from last year project, 2013 (Under the Strategic Plan Phase IHP-VII for the themes and focal areas of Theme 1, Theme 3 and Theme 4) is as below:

2.2(g) Monitoring performance of demonstration wastewater treatment plants at Sungai Hiliran; (Phase IHP-VII: Theme 3 & 4). There are 2 research under this project.i.e ;


- Monitor the performance of biotechnology plant (EnviroTex) to treat the water pollution from the release of azo-dye, used for Batek Industries. (On-going).

Enviro-TEX® - Biotechnology Plant to treat the water pollution from the release of azo-dye

COMPONENT	DESCRIPTIONS
A	Silicate Removal & PH Correction
B	EnviroTex Reactor Stage 1
C	EnviroTex Reactor Stage 2
D	Multi Media Filter
E	ES Composter

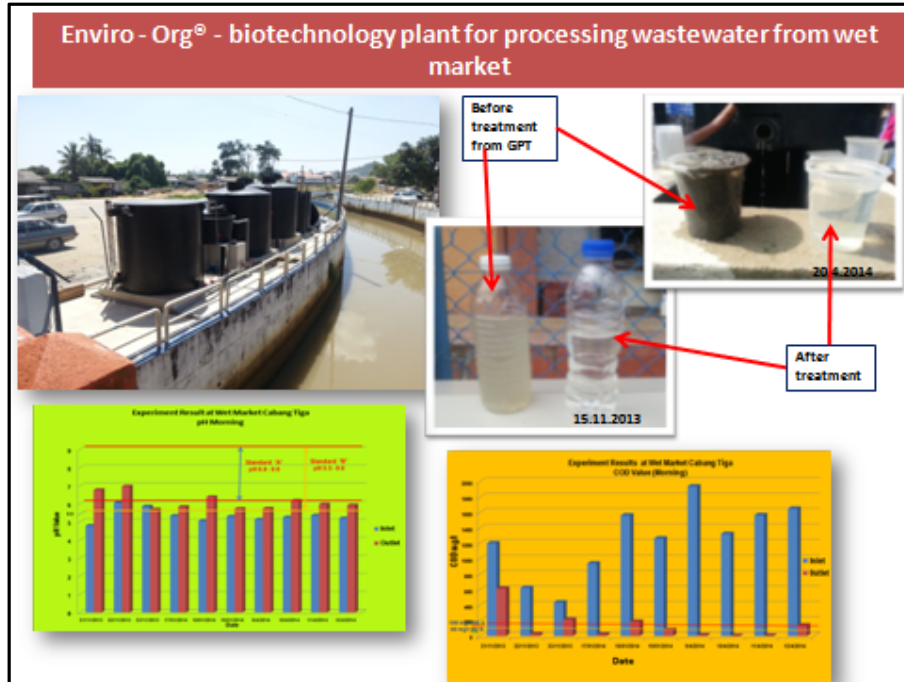
Preliminary Result for Kilang Batik from March'13 until Nov'13



Date	Inlet pH	Outlet pH
17/3/2013	10.5	8.5
15/4/2013	10.5	8.5
22/4/2013	10.5	8.5
4/6/2013	10.5	8.5
6/6/2013	10.5	8.5
22/06/2013	10.5	8.5
23/06/2013	10.5	8.5
6/7/2013	10.5	8.5
20/07/2013	10.5	8.5
21/07/2013	10.5	8.5
22/07/2013	10.5	8.5
3/8/2013	10.5	8.5
26/08/2013	10.5	8.5
21/09/2013	10.5	8.5
21/11/2013	10.5	8.5

- Monitor the performance of biotechnology plant (Enviro-Org) for processing wastewater from wet market.(completed)





2.2(h) Urban Eco-Hydrology for Resilient Environment (UCOREN) – Working Group 3: Component Ecohydrology (Phase IHP-VII: Theme 3) (On-going).

Working Group 3: URBAN ECOHYDROLOGY FOR RESILIENT ENVIRONMENT (UCOREN)

The challenge:
We need to restore back the river

Can be done with proper techniques, knowledge, commitment and involve stakeholders engagement

Part of Sungai Penchala :in the process of learning and doing the right thing)

Sg Penchala (Class IIA Clean, Living And Vibrant)

Upstream of Sungai Penchala – In pristine condition

Notes: Once the R&D projects and programmes completed, the output will be either or combinations in the form of technical reports, technical guidelines, papers, proceedings, posters, innovation products and demonstration projects.

2.3 Seminar/Courses/Training Workshop

- One (1) Seminar was conducted in year 2014 through networking and collaboration with Malaysia Technology University (UTM) that is the first national conferences on Non Point Source Pollution (NPS2014) on 14th to 15th May at Vivatel Hotel, Kuala Lumpur. The seminar was discussed on the findings of the Impact on Reservoir Sedimentation and Water Quality at Sembrong Dam & Study on Agricultural Non Point Source Pollution in River. Dr. Mohamed Roseli had given a keynote address title TOWARDS POLICY STATEMENT AND STRATEGIC PLAN FOR NON POINT SOURCE POLLUTION CONTROL.



- Participants: government officers, consultants (private), lecturers, university students, NGOs', MIHP members.



CHAPTER 3

QUALITY MANAGEMENT SYSTEM AND WATER EDUCATION PROGRAMME

Since HTC Kuala Lumpur was awarded the MS ISO 9001:2008 quality management certification, continual improvement has always being carried out. The UNESCO SWITCH-in-Asia Urban Water Management: MSMA Stormwater Management Eco-hydrology project in HTC compound is used as the quality management system. The external surveillance auditing for 2014 has been carried on 27th - 28th October 2014.

List of some of the Water Education Programmes carried out are as follows:

Water Education: Lecture and Talk Given

No.	Lecture and Talk	Place & Date
1.	Proposal For Promoting and Implementing Geospatial Water Related Disaster Management Programmes as Part of UNESCO IHP-VIII Strategic Plan	UNESCO-IHP 21st Regional Steering Committee Meeting for Southeast Asia and the Pacific, Gyeongju, Republic of Korea, 3 & 4 October 2013
2.	Urban Water Management Through the Implementation of Integrated Stormwater Management Ecohydrology: Case Study at HTCKL and Propose Upscaling at Langat River Basin	The Asia Pacific Strategic Meeting on HELP and Ecohydrology, Jakarta, Indonesia, 2 - 3 December 2013
3.	Progress Report Of Working Group (WG) 2: Urban Ecohydrology	LRGS - Urban Ecohydrology for Resilient Environment (UCOREN) Project and Publication Workshop, Colmar Tropicale Resort, Bukit Tinggi, Pahang, 4 - 6 April 2014
4.	Keynote Address: Towards Policy Statement and Strategic Plan for Non Point Source Pollution Control	1st National Conference on Non Point Sources Pollution (NPS 2014), Vivatel Hotel, Kuala Lumpur, 14 - 15 May 2014, Kuala Lumpur
5.	Water Security And Sustainable Challenges Through Urban Stormwater Management Ecohydrology: Case Study At HTCKL.	Peri-Urban 2014 International Conference in Sydney, Australia, 8th - 10th July 2014
6.	Innovative Urban Water Ecosystems For Resilient Environment	Joint University of Canberra-UNESCO International Forum on Sustainable Landscape Future: Solving Complex Problems through sustainable science in Canberra, Australia 10th - 11th July 2014
7.	Bioretention System for Urban Stormwater Quantity Management Towards Sustainable Development: A Case Study of Humid Tropics Centre Kuala Lumpur.	13th International Conference on Urban Drainage (ICUD2014) in Borneo Convention Centre Kuching, Sarawak (BCKK) 7th -12th September 2014
8.	Evaluation of Rainwater Harvesting System under Tropical Climate: A Case Study at Humid Tropics Centre Kuala Lumpur.	

Water Education: University Students R&D

No.	Name of Students	Title of Research	Candidate
1.	Ms Nur Asmaliza binti Mohd. Noor	Evaluation on Hydrologic and Environmental Performance of three Constructed Wetlands in Malaysia	PhD (graduated in September 2014)
2.	Mr Kok Kah Hoong	Evaluation of Green Roof as an Option of Green Technology for Urban Stormwater Quantity and Quality Control	Master Degree (graduated in August 2013)
3.	Ms Amirah Hanim binti Mohd. Fuad	Monitoring Program of MSMA Stormwater Management Ecohydrology Project at HTCKL	Master Degree (graduated in 2013)
4.	Ms Nur Fadzilla binti Usop	Sensitivity Analysis on the Estimation of Evapotranspiration Model, Penchala River Basin (working group: Urban Ecohydrology)	M.Sc (graduated in July 2012)
5.	Mr. Mohd. Khairul Idlan bin Muhammad	Ecohydrological Modeling of Water Discharge and Pollutant Loads in Penchala River (working group: Urban Ecohydrology)	PhD candidate
6.	Ms Asma Nabila binti Abd Kader	Effectiveness of Green Roof in Controlling Rate of Surface Water and Water Quality at HTCKL	Bachelor Degree (graduated in 2013)
7.	Ms Naimah binti Yusoff	Erosion Risk Potential Categorization Along Langat River	Completed Master Degree 2013
8.	Ms Nor Bakhiah binti Ibrahim	Historical Sediment Geochemistry and Hydrochemistry of Sembrong Reservoir	PhD candidate
9.	Four students from University of Malaya	Will use various components of Integrated Stormwater Management Project at HTCKL	Two (2) for Master; Two (2) for PhD

Water Education: Papers in 2014

No.	Title of Paper
1.	Gross Pollutants Study in Urban Areas under Tropical Climates, Journal of Civil Engineering and Architecture, Volume 8, No. 1 (Serial No. 74), pp. 107-114
2.	Evaluation of Rainwater Harvesting System under Tropical Climate: A Case Study at Humid Tropics Centre (HTC) for 13th ICUD
3.	Greywater Reuse System for Non-Potable Uses at Humid Tropics Centre, Kuala Lumpur for Journal of Water Resources Management
4.	Bioretention System for Urban Storm Water Quantity Management Towards Sustainable Development: A Case Study Humid Tropics Centre, Kuala Lumpur for 13th ICUD

Water Education: Others

HTCKL had been nominated as a Council Member of Regional Centre of Expertise on Education for Sustainable Development (RSEN). The Director of HTCKL had attended the 7th RCE Asia Pacific Meeting and International Symposium on “ A Decade of Regional Centres of Expertise on ESD: Reflections and advances in Asia-Pacific” on 27th August 2014 at Dewan Budaya, Universiti Sains Malaysia & Minden Height National School.



CHAPTER 4

FUTURE PROGRAMME 2015

4.1 The future activities planned or to be participated as shown in the table below;

NO	PROGRAMME /ACTIVITIES	2015
1.	Study on Artificial Bio-Macropore for Enhancing Soil Infiltrability for Urban catchment at HTCKL and Langat-HELP River Basin	Continuation from 2014 Project
2.	Desalination of seawater for drinking and domestic water use in small islands such as using the step solar still system technique	
3.	Research on Performance of Gross Pollutant Trap (GPT) Trapping Devices versus Life Cycle Cost and Gross pollutant Management Strategies Knowledge Portal Case Study River Of Life	
4.	Rural River Rejuvenation (R3) Project at Jenderam River, Sepang	
5.	A Novel Approach To Reuse Alum Sludge In Manufacturing Of Building Material And Pots Using Admixtures And Thermal Curing	
6.	Eco-Friendly Integrated Green Technology Expert System for Sustainable Green Infrastructure (GENIUS) or Decision Support System (DSS) for MSMA Integrated Stormwater Management Ecohydrology	
7.	Monitoring performance of demonstration wastewater treatment plants at Sungai Hiliran; Enviro-Tex	Continuation from 2013 Project
8.	Databook Putrajaya Lake and Constructed Wetland Management.	MFIT. Upscaling Water Security To Meet Local, Regional, And Global Challenges. New programme.
9.	Databook Langat-HELP Basin, the results of the studies/research carried out by the various parties.	
10.	Report on Upscaling of MSMA Stormwater Ecohydrology at Catchment Level (Langat River).	
11.	Eco hydrology lake management expert system of using wireless sensor monitoring of real time	
12.	Stormwater quality behaviors and hydrological quantification of oil palm/forest catchment for an Improved streamflow modelling.	
13.	Developing an eco-sustainable index for the community in the study area	
14.	IWRM curriculum for HELP and Ecohydrology based on Langat-HELP basin.	
15.	Regional Sejahtera Education for Sustainable Development Network (RSEN) program consisting of lectures, demonstrations and technical visits.	
16.	Forum on Water Security, Stormwater Ecohydrology, and IWRM	
17.	International Conference on Water Resources (ICWR) 2015	To be held in Langkawi, November 2015
18.	Best Thesis Award in Hydrology and Water Resources for local university students (category PhD, Master, Undergraduate)	In Conjunction with World Water Day
19.	Construction of A Stepped Solar Still System at HTCKL. To study its used for domestic and drinking water from river water and other water sources.	New programme

20	Forecasting Erosion Induce Landslide. Under Malaysia-New Zealand Environmental Cooperation. Involve sharing of knowledge, R&D, seminar, visit.	Subject to budget approval.
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- Funding/ Collaborator of the planned activities above either Government of Malaysia or UNESCO through UNESCO Jakarta.

4.2 Operational Plan

HTCKL will continue to perform and carry out its obligation under Article 2 of the Agreement related to;

- ✓ Coordinating the implementation of cooperative hydrological and water resources research projects and activities;
- ✓ Networking with IHP National Committees and other similar centre for exchange of scientific and technical information on research results;
- ✓ Organizing training courses, seminars, workshops and meetings for knowledge and technology transfer;
- ✓ Producing related hydrological and water resources publications and media for distributions.

4.3 Strategic Plan linked with IHP-VIII (Water Security: Responses to Local, Regional and Global Challenges)

- HTCKL Focus Area on R&D and water education based on UNESCO IHP VIII Themes (2014 - 2021) related to Sustainable Development and Science, and UN Post-2015 Water Agenda. HTCKL will continue to contribute in stormwater management, ecohydrology, river basin management, waste water management through its R&D programmes and through the three cross-cutting programmes i.e. UNESCO SWITCH (Sustainable Water Management Improves Tomorrow's Cities Health)-in-Asia: Urban Water Management; APFRIEND (Asia Pacific Flow Regimes from International Experimental and Network Data) and UNESCO-HELP (Hydrology for the Environment, Life and Policy) the Langat River Basin.
- The scope of activities will continue to includes applied research, advising/consulting, continuing education and software development.





CHAPTER 5

AP FRIEND WATER ARCHIVE

Water Data Archive

The Centre has developed a new structure of database for the Water Data Archive. 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. IV. It can be accessed through www.htckl.water.gov.my

<ul style="list-style-type: none"> • Knowledge need to be shared and disseminate. • In 2012, HTCKL produced a new website for networking at national and international level. • The international levels focus on the collaboration and networking among the Water Related Centres under the auspices of UNESCO-IHP, especially for the Southeast Asia and the Pacific region. • The interface include such as news, network, programmes, R&D, education, publications and linkages of partners. HTCKL activities and events will be displayed. Others will be encouraged to also contribute articles, announcement and programmes. The interface has been completed. 	
<p>Regional Level</p> <ul style="list-style-type: none"> • Information Technology • The Centre has developed a new structure of database for the Water Data Archive. 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. It can be accessed through http://htc.ebox.com.my or http://htckl.org.my/apfriend. 	

The website developed is for sharing information on projects/programmes and publications by HTCKL. Currently, there is an access problem to the website which link to our Department of Irrigation and Drainage. We are rectifying the problems.



CHAPTER 6

FINANCE

6.1 Operation and Maintenance

The annual operating budget for the year 2013 and 2014 is shown in the table below.

No.	Component	Amount (USD \$)		Contributing Agency
		2013	2014	
1.	<u>Operation and Maintenance</u>			
	• Trust Account	27,660	29,063	Government of Malaysia
	• Operating allocation			
	➢ Current	67,190	67,804	Government of Malaysia
	➢ One Off	-	-	
	➢ Others	-	-	
	Subtotal	94,850	96,867	
2.	<u>Emolument</u>			
	• Staff salary	233,250	320,656	Government of Malaysia
	Subtotal	233,250	320,656	
3	<u>Sponsorship</u>			
	• for Seminar on Geospatial Disaster and UNESCO-Help Basin	8,600	-	Malaysia National Commission for UNESCO
		5,000	-	UNESCO Jakarta
	• Organizing Best Thesis Award	3,125	3,125	UNESCO MIHP
	Subtotal	16,725	3,125	
	TOTAL	344,825	420,648	

6.2 Development

Development Fund for 2014 and 2015 are as follows:

No.	Component	Amount (USD \$)		Contributing Agency
		2014	2015	
1.	Research and Development	290,625.00	334,375.00	Government of Malaysia (DID)
	TOTAL	290,625.00	334,375.00	

Note: No Development Fund received for year 2013



CHAPTER 7

STAFFING IN 2014

7.1 Outgoing

- Mrs. Hamidah bt. Hashim the former Senior Clerk of HTCKL has been transferred to Pejabat Lembaga Sungai Klang (PLSK) on 31st June 2014.
- Mrs.Sarvamudthy a/p Sinnasamy the former Assistant Engineer of HTC Kuala Lumpur retired on 31st August 2014.
- Ir. Vasukey a/p Palany Kumar the former Head Assistant Director of HTCKL had been transferred to DID Perak on 31st July 2014.
- Mrs. Devi a/p Peechmani the former of Assistant Director of HTCKL was on study leave to continue her Master study in Structural Engineering on 09th September 2014.
- Mr. Shah Razif bin Razali the former Assistant Engineer of HTCKL has been transferred to Pejabat Lembaga Sungai Klang (PLSK) on 01st November 2014.

7.2 Incoming

- Ir. Ms Hjh Zainab binti Hashim, Deputy Director had reported her duty in HTCKL on 02nd January 2014 (replacing Datin Rohani Ahmad)
- Dr. Norlida Mohd. Dom, Head of Assistant Director had reported her duty in HTCKL on 01st August 2014 (replacing Ir. Vasukey a/p Palany Kumar).
- Mr. Mohamed@Hizam bin Mohd Hashim, Senior Assistant Engineer had reported his duty in HTCKL on 1st June 2014 (replacing Mrs. Hamidah bt Hashim as well as a new post in HTCKL)
- Miss Azliza Binti Aziz, Senior Assistant Engineer had reported her duty in HTCKL on 6th June 2014(New additional post in HTCKL)
- Mr. Izrul Faris bin Idris, Assistant Engineer had reported his duty in HTCKL on 4th August 2014 (replacing Mrs.Sarvamudthy a/p Sinnasamy).
- Mrs Sharina Bt Sulaiman, Assistant Director had reported her duty in HTCKL on 1st October 2014 (replacing Mrs. Devi a/p Peechmani)
- Mr. Nasaruddin bin Nasir, Assistant Engineer had reported his duty in HTCKL on 01st November 2014 (replacing Mr. Shah Razif bin Razali).



Note: HTC Kuala Lumpur Organization Chart is as shown in Figure 1

CHAPTER 8

PUBLICATIONS

8.1 Publications by HTCKL in 2013/2014 are as listed below:

- Journal of Water Resource Management, Vol. 1, No. 2, December 2013.
- Technical Report: Porous Pavement, 2013
- Technical Report: Constructed Wetland, 2013
- Proceedings of Seminar on Geospatial Disaster and UNESCO-HELP Basin: Water Co-operation, Security and Geohazards.



CHAPTER 9

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 15 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.

HTC Kuala Lumpur plays a major role in conducting research in the field of hydrology and water resources and in contribution within framework of International Hydrological Programme (IHP) activities. The centre also provides research under the established Malaysian Hydrological Programme (MIHP) and in the lead of conducting a number of multidisciplinary collaborative researches in national and regional level.

Besides the research activities, HTC Kuala Lumpur also plays a very active role in the area of capacity building to increase scientific and technological knowledge about hydrological cycle, thus increasing the capacity to better manage and develop the water resources in a holistic manner.

Another major role of HTC Kuala Lumpur is to promote the conducive atmosphere for collaboration among countries in the regions of Southeast Asia and the Pacific through technology and information exchange, education and science.



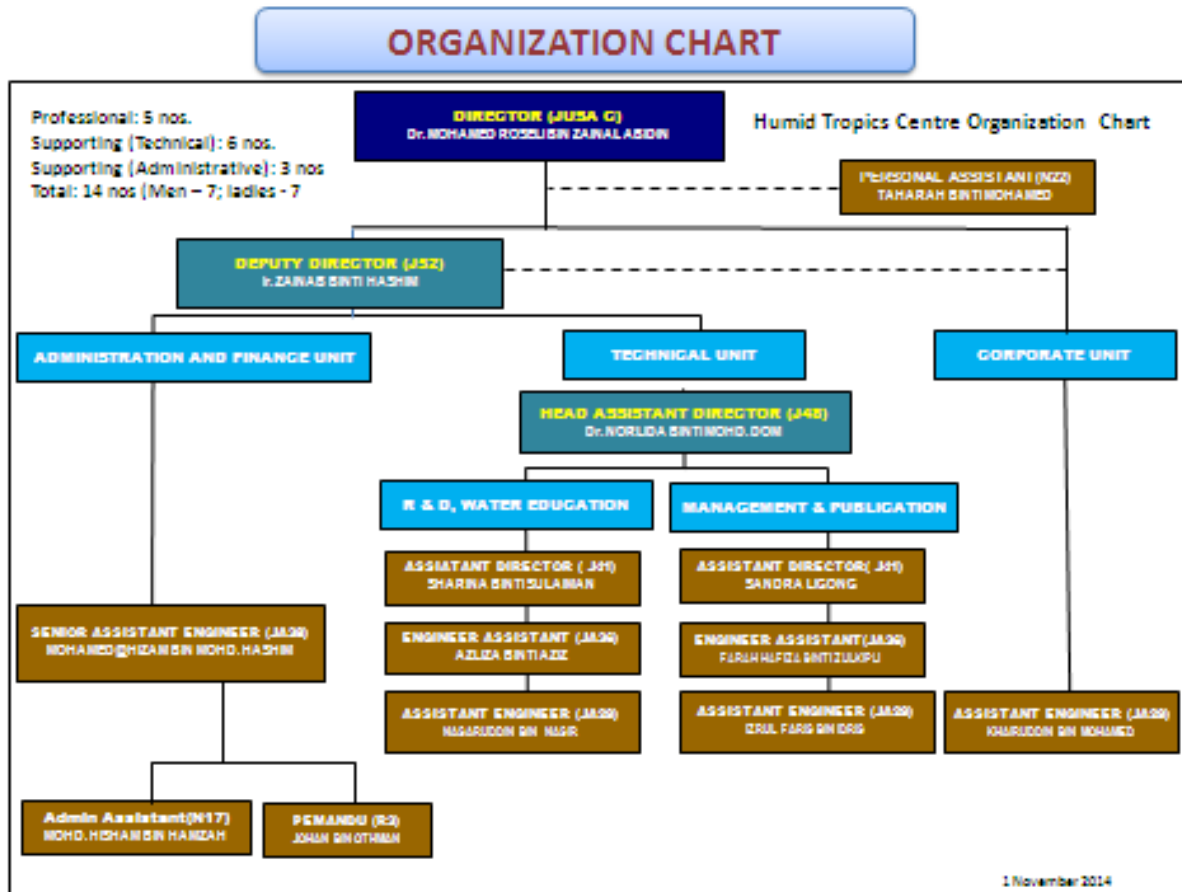


Figure 1: Organizational Chart of HTCKL

THANK YOU

**DR. HJ. MOHAMED
ROSELI BIN ZAINAL
ABIDIN**
Director
Humid Tropics Centre
Kuala Lumpur (HTCKL)
Department of
Irrigation and Drainage
Malaysia

HUMID TROPICS CENTRE KUALA LUMPUR
No. 2, Jalan Ledang off Jalan Duta, 50480
Kuala Lumpur
Tel. 03 20958700 Fax 03 20953366
Email : htckl@water.gov.my



APCE

Asia Pacific Center for Ecohydrology

Category II Centre of UNESCO

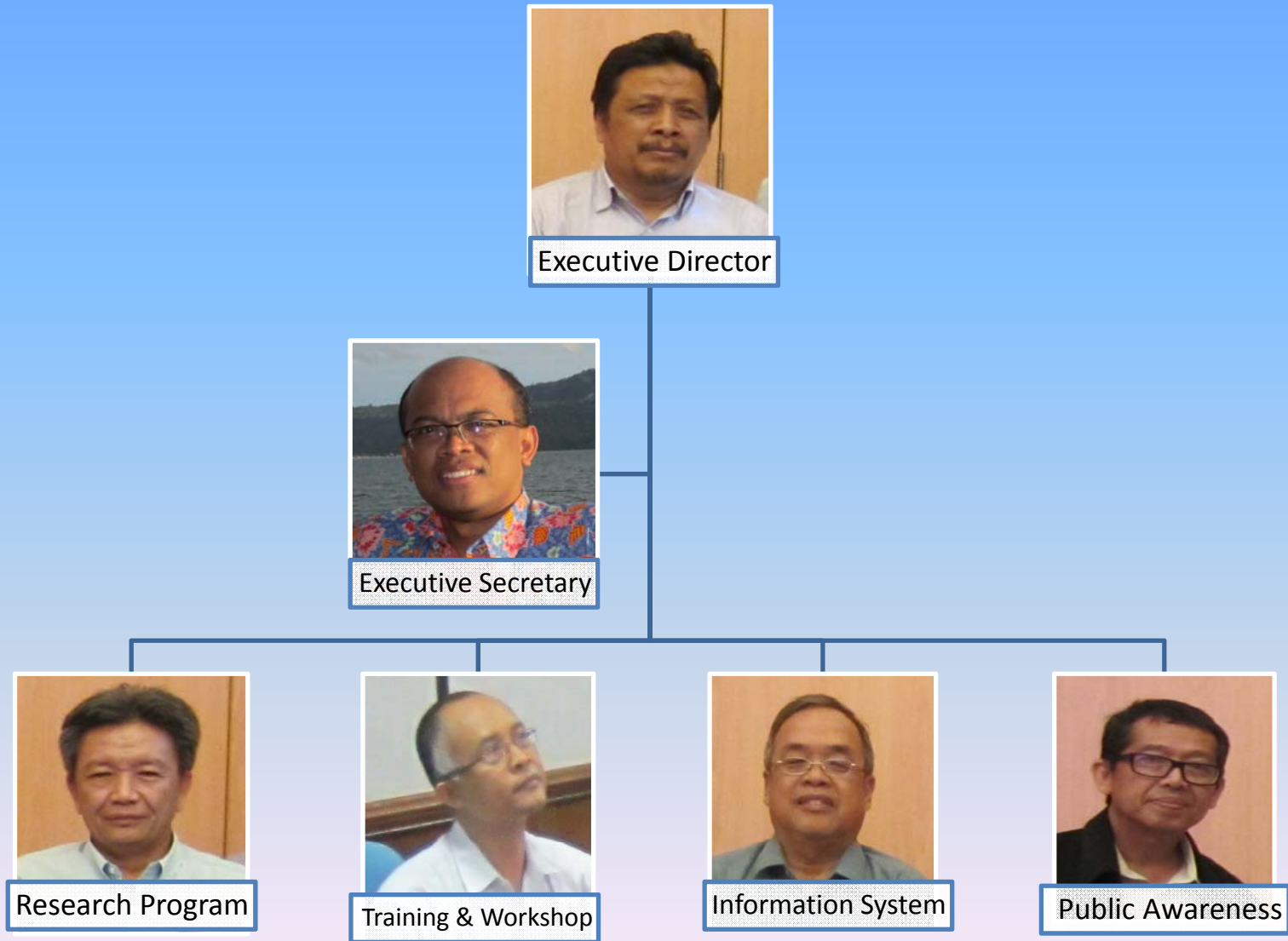


INDONESIAN INSTITUTE OF SCIENCES

History of the APCE formation

- 1980's saw a shift in the UNESCO program of science to society
- Organizing training and workshops on Ecohydrology in Indonesia (2001, 2003 and 2005)
- Declaration of Asia Pacific Ecohydrology in Fiji, in 2003
- Establishment of the APCE Preparatory Committee by the Chairman of LIPI in 2006
- Formation of APCE in the 35s UNESCO conference in Paris in 2009
- Agreement between the Government of Indonesia and UNESCO: Implementation of APCE in March 28, 2011

Organization Structure



Governing Board Member

- Prof. Dr. Iskandar Zulkarnain (Indonesia)
- Prof. Dr. Soontak Lee (Korea)
- Prof. Dr. Kaoru Takara (Japan)
- Prof. Dr. Quentin Grafton (Australia)
- Prof. Dr. Shahbaz Khan (Unesco)
- Prof. Dr. Hidyat Pawitan (Indonesia, Observer)

APCE Building





APCE DIRECTIVE ACTION

- **VISION**

- To be an Internationally Reputed Asia Pacific Center in Urban and Rural Ecohydrology by 2021

- **MISSION**

- Develop understanding and practices of ecohydrology through research, training and knowledge exchanges, information systems and public awareness.

- **VALUES**

- Wisdom
- Integrity
- Harmony

STRATEGIC GOAL

1. To promote local resources base ecohydrological research
2. To strengthen local capacity to adopt ecohydrological concept and approach
3. To provide easy access to local resources based ecohydrological information and knowledge
4. To enhance public awareness of local resources based ecohydrological practices

Research Program

- Promote research on ecohydrology in two demonstration sites contributing to sustainable water management and climate change:
 - Ecohydrology demonstration site : “Study on the implementation of Ecohydrology approach and avoided deforestation in Peatland Rewetting and conservation in Ex-Mega Rice Project location”
 - Ecohydrology demonstration site : “Water quality and sediment control of the cascade reservoirs along Citarum River Basin using ecohydrology concept”

Training and Capacity Building

- Establish web-based knowledge platform for the collaboration and exchange of scientific, technical and policy relevant information and technical book series in Asia Pacific Ecohydrology
- Develop guidelines/tools in efficient incorporation of Ecohydrology in Basin Management Plans

- 2014
 - Training Workshop on Lake Management (Collaboration with ILEC Japan)
 - Public Communication (Saguling Reservoir, Ciamis, West Jawa)
 - IHP Council Meeting in UNESCO, Paris
 - Canberra Meeting
 - Delegation of WLC 15 in Perugia
 - Ecohydrology Training Course, ICE 2014, RSC-22 in Yogyakarta : 8 – 14 November 2014

IHP Training Course : 8 – 9 November 2014



ICE 2014 : 10-11 November





Press Conference of ICE2014

Dinner Reception by Yogyakarta
Special Region Government : 10 November 2014



22nd IHP RSC Meeting



- 2015
 - Peatland Rewetting (Collaboration with UNESCO Jakarta Office)
 - Saguling Demosite (Collaboration with UNESCO Jakarta Office)
 - Road to WLC-16, Bali (Collaboration with Ministry of Environment and Forestry and Ministry of Public Work)
 - Strengthening the Networking with Universities (In Collaboration with UNESCO Jakarta Office)
 - Participate in WWF in Korea
 - Public Awareness

The Way Forward

- Getting more support from the Government (Relationship, Institutionally, Financially)
- Strengthening the networking with the center under UNESCO, Universities, other institutions
- Develop demosite in selected and specific purpose: Small Island Demosite, Karstic Ecohydrology Demosite, Peatland ecohydrology Demosite....

THANK YOU...

ANNEX H
**REPORT ON PREPARATION OF THE 7TH WORLD WATER
FORUM AND NAKDONG RIVER INTERNATIONAL WATER
WEEK 2014/INTERNATIONAL WATER FORUM
(NA-RI IWW/IWF 2014)**



7th World Water Forum
Daegu - Gyeongbuk, KOREA

Towards the 7th World Water Forum **Daegu Gyeongbuk, Korea 2015**

Soontak LEE

Co-Chair, Intl' Steering Committee of the 7th WWF 2015

Distinguished Professor, Yeungnam University, Korea

President, Intl' Hydrologic Environmental Society(IHES)

Governor, World Water Council(WWC)



World Water Forum



7th World Water Forum
Daegu - Gyeongbuk, KOREA

The Largest Intl.
Event in the field of
Water

- **Every 3 years**
- **Co-Organization** : Host Country + World Water Council<WWC>
- Forum Event(one week) + **Preparatory Process**(more than two years)

Ex. 6th World Water Forum : 35,000 entrances

- **15 heads of State, of government & European Commissioners**
- **103 Ministers, Vice-Ministers & Secretaries of State**

Mobilizing debate &
action for all water
issues

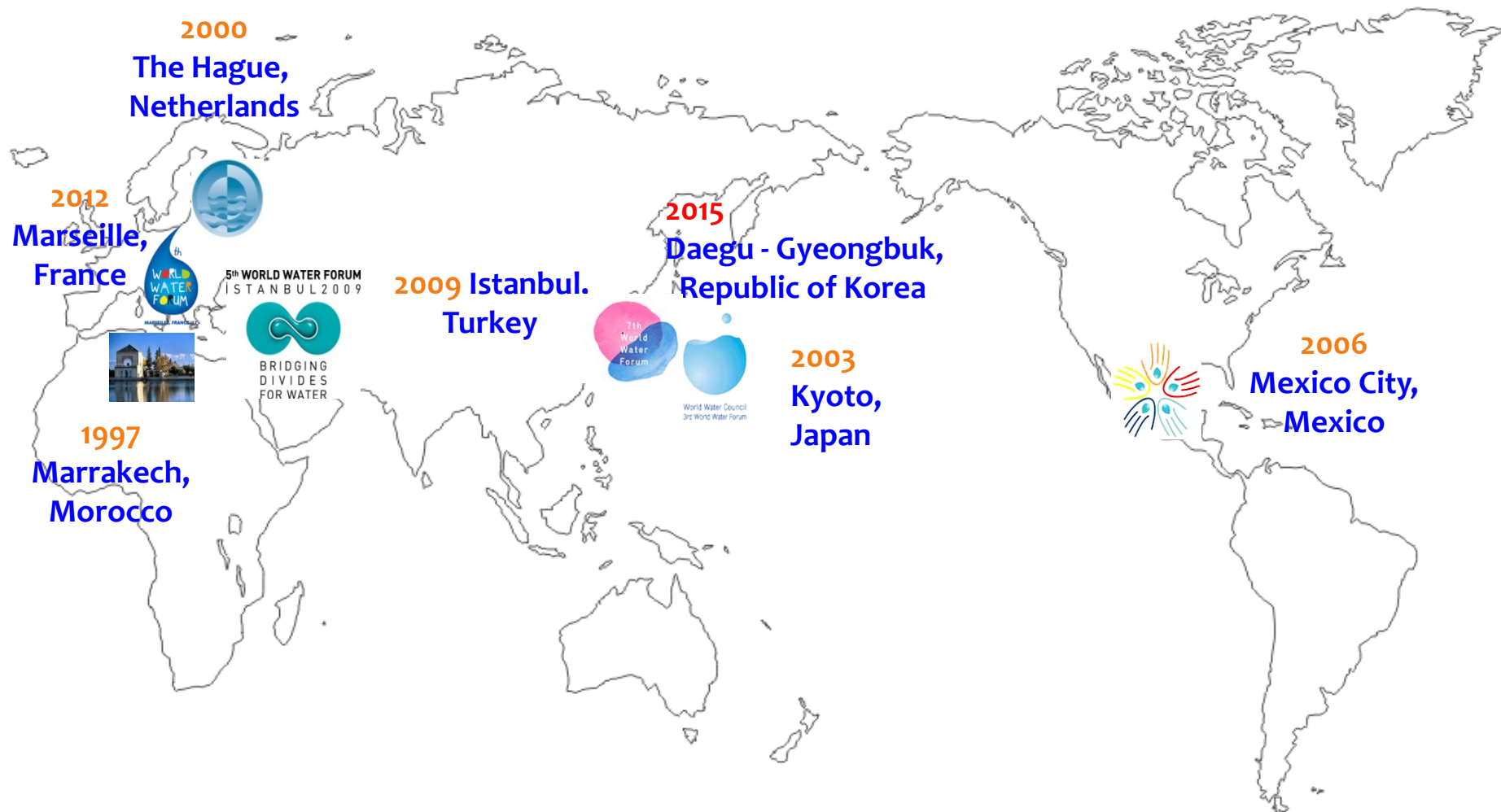
- **Provide a Platform** for all stakeholders to **exchange, learn together and catalyze concrete actions** for improved water resources & services development & management
- **Engage policy and decision-makers** in a dialogue to establish commitments

Ex. Ministerial Declaration, Water Expo from the business view

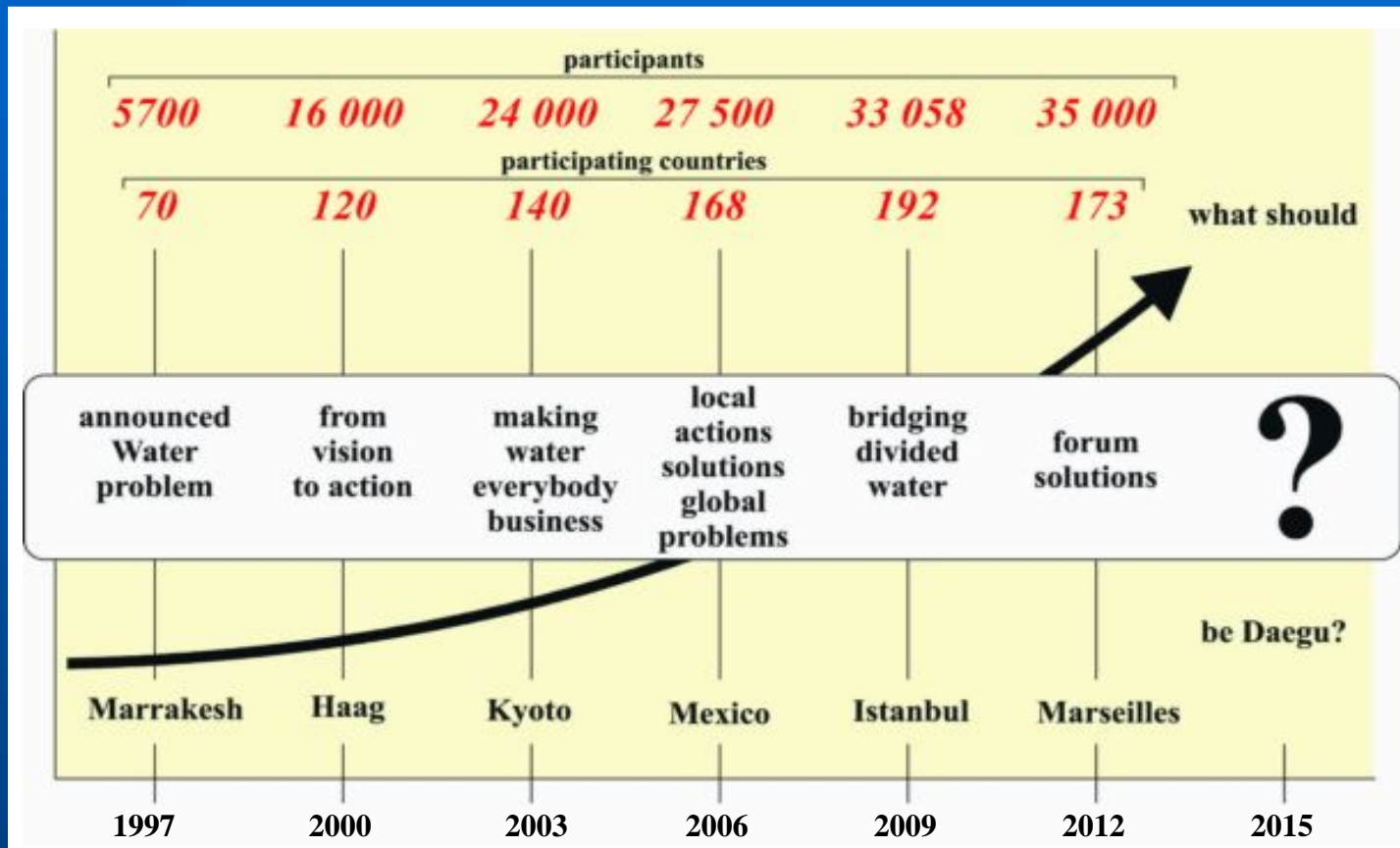
World Water Forum



7th World Water Forum
Daegu - Gyeongbuk, KOREA



Participants and states in past WWF



- History of WWF has now long ways 1997-2015
- 6 Forums, Many thousands participants, impressive dynamic



Core Value

1st

Vision For Water, Life & Environment

2nd

From Vision to Action

3rd

A Forum with a Difference

4th

Local Actions for a Global Challenge

5th

Bridging Divides for Water

6th

Time for Solution

7th

Water for Our Future



WWF7 Slogan

“Water for Our Future”

우리 장래의 물을 위하여

“Stands for our will to move forward to the future by implementing solutions to water challenges of today”

*7th World Water Forum
Daegu Gyeongbuk, Republic of Korea
12-17 April, 2015*



WWF7 Logo



The logo of the 7th Forum embodies the Taegeuk pattern (Great balance) from the Korean flag using Korea's ink painting technique to indicate harmony through interaction between Yin and Yang.

The logo includes our hopes to resolve water-related problems and to promote harmonious use of water for sustainable development and management.

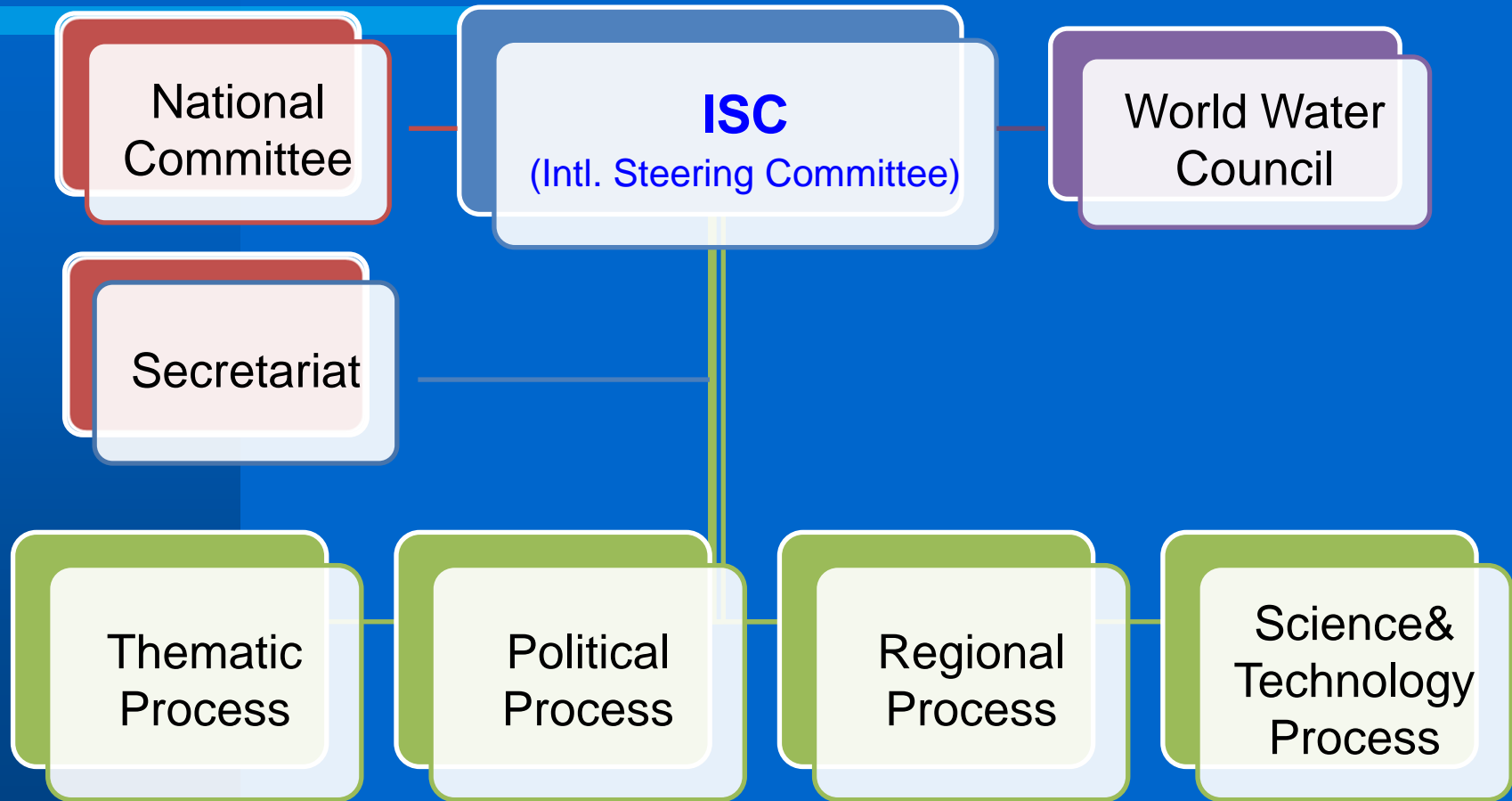
Keyword for the 7th World Water Forum

“Implementation”

Water for Our Future

Now it's time to **SHARE** and **IMPLEMENT**
the various solutions presented
at the previous forum and other major water events
for a concrete **RESULT** and better **FUTURE**

Organization Structure



* Citizens Forum organized in conjunction with above 4-processes.

Progress

Major Steps

11 Nov.
2011

18 Dec.
2012

13-15 May
2013

27-28 Feb.
2014

12-17 April
2015

Selected
as a Host
Country

The Enactment
of
the Special Law

Kick-Off
Meeting
(1st SCM)

2nd SCM
(Stakeholder
Consultation
Meeting)

7th World
Water Forum

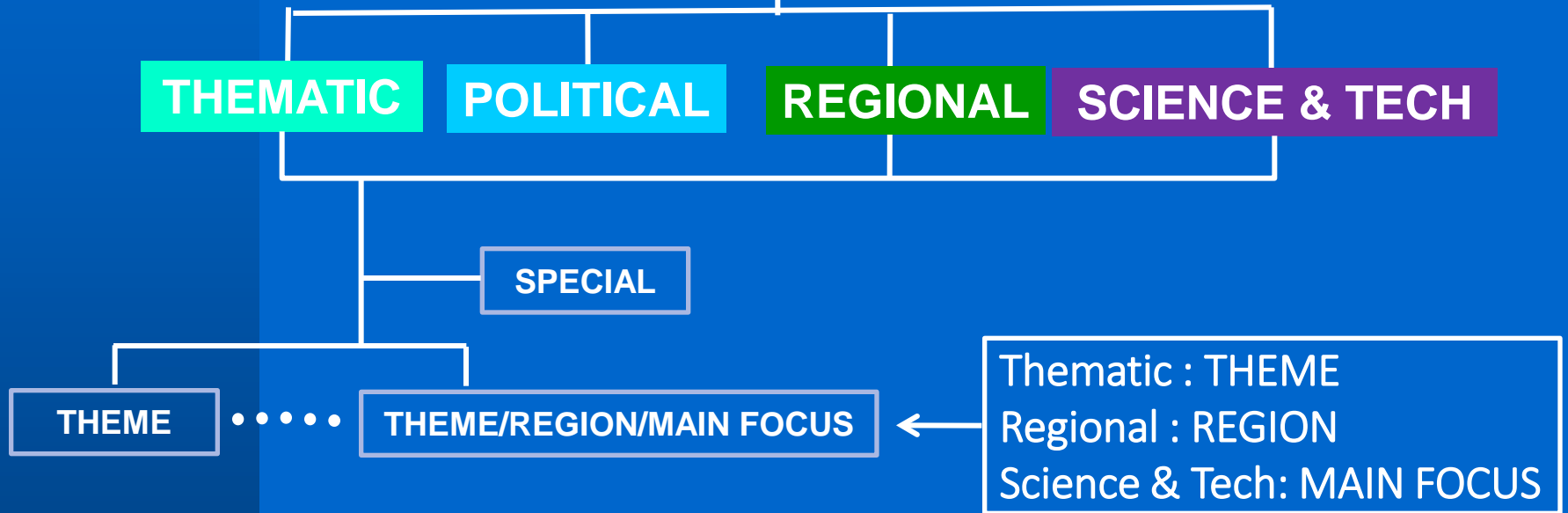


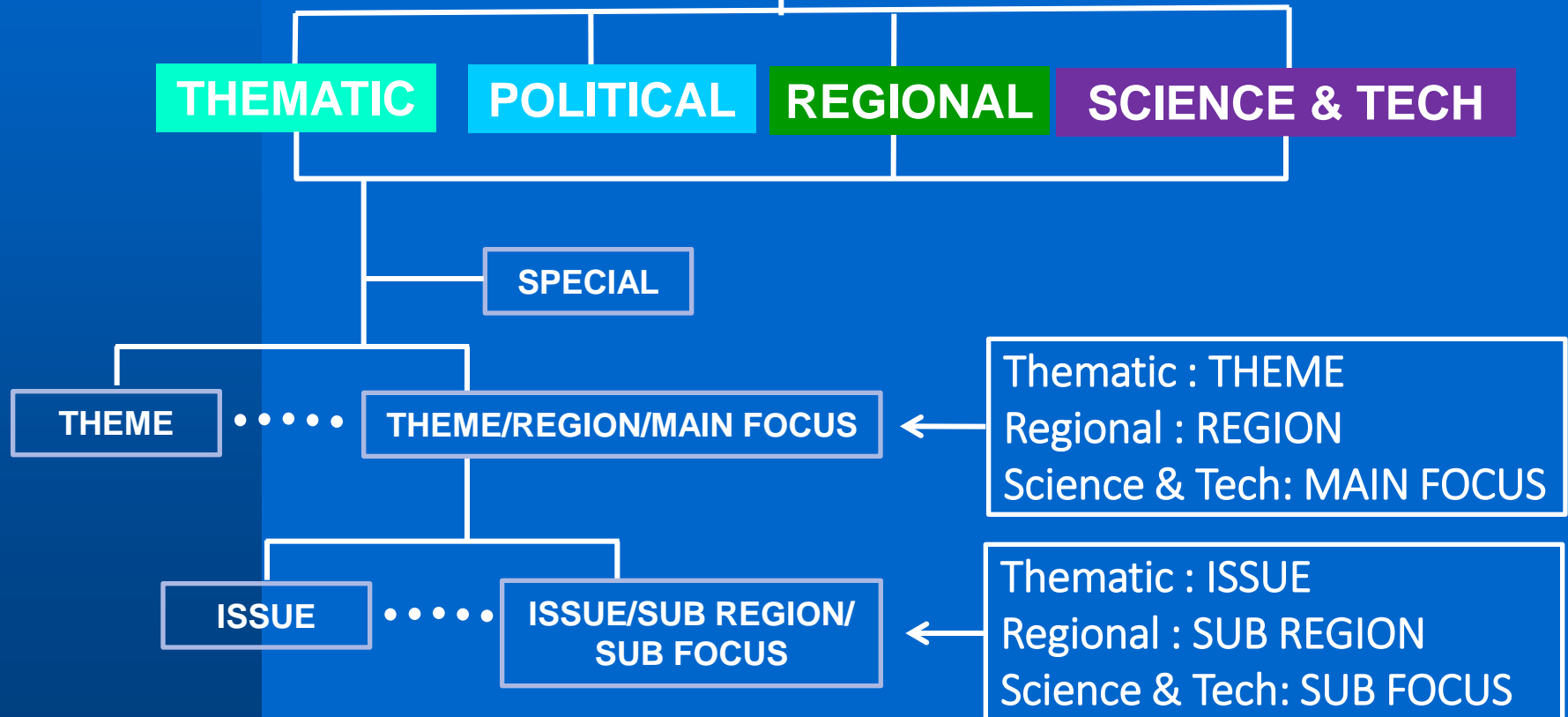


KICK-OFF MEETING



7th World Water Forum
Daegu - Gyeongbuk, KOREA







Progress

Thematic Process

Thematic Framework

3 ACTION

GOALS

The Future We Want

1. Water Security for All

2. Water for Development and Prosperity

3. Water for Sustainability: Harmonizing Humans and Nature

1 ACTION

TOOL

Engines for Change

4. Constructing Feasible Implementation Mechanisms

Progress

Thematic Process

Thematic Framework

ACTION GOAL 1 – The Future We Want

1. Water Security for All

- 1.1 Enough Safe Water for All
- 1.2 Integrated Sanitation for All
- 1.3 Adapting to Change Managing Risk and Uncertainty for Resilience and Disaster Preparedness
- 1.4 Infrastructure for Sustainable Water Resource Management and Services

ACTION GOAL 2 – The Future We Want

2. Water for Development and Prosperity

- 2.1 Water for Food
- 2.2 Water for Energy
- 2.3 Water and Cities

Progress

Thematic Process

Thematic Framework

ACTION GOAL 3 – The Future We Want

3. Water for Sustainability: Harmonizing Humans and Nature

- 3.1 Green Growth, Water Stewardship and Industry
- 3.2 Managing and Restoring Ecosystems for Water Services and Biodiversity
- 3.3 Ensuring Water Quality from Ridge to Reef
- 3.4 SMART Implementation of IWRM

ACTION TOOL – Engines for Change

4. Constructing Feasible Implementation Mechanisms

- 4.1 Economics and Financing for Innovative Investment
- 4.2 Effective Governance: Enhanced Political Decisions, Stakeholder Participation and Technical Information
- 4.3 Cooperation for Reducing Conflict and Improving Transboundary Water Management
- 4.4 Water Cultures, Justice and Equity



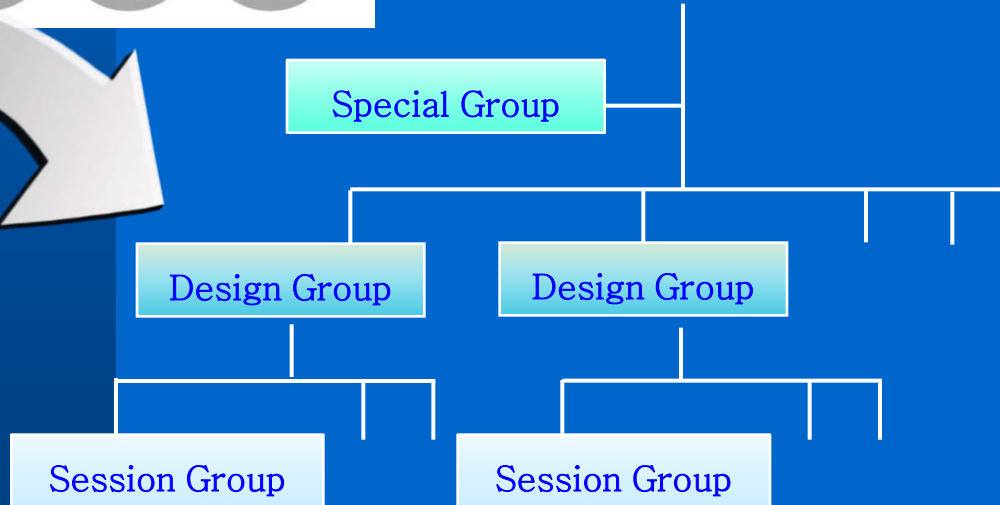
Progress

Thematic Process

TP Working Group Structure



- Process Commission: Supervision**
- Special Group: In charge of developing the Special Programs and the Action Monitoring System**
- Design Group: In charge of managing themes, supporting Water Showcase and the Action Monitoring System**
- Session Group: In charge of the Issues (thematic sessions), and helping to collect cases for the Water Show Case**



Progress

Thematic Process

Special Program Water Showcase

- Share practical case-based projects and experiences **among global community through active interaction**
- Provide reasonable resolutions and guidelines for common water-related concerns **including technology application, project conduction, policy-making and capacity enforcement**
- Award three highly assessed cases **at the 7th Forum**



7th World Water Forum

Water Showcase



Progress

Thematic Process

Special Program Thematic Special Sessions

Some kinds of joint special sessions between other processes of high level panels (ex. SDGs)

➤ Provide a platform which addresses the key role and function of water for ensuring sustainable development for global communities, including UN agencies.



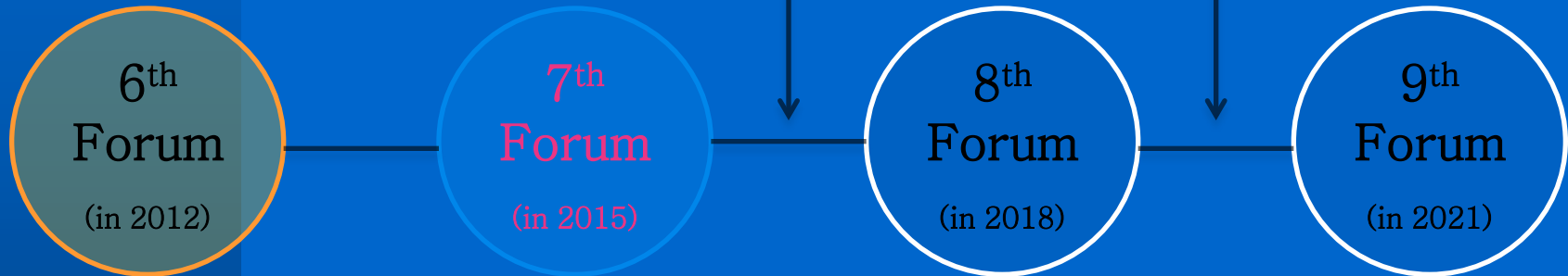
Progress

Thematic Process

Special Program Action Monitoring System

Mechanism of the System

➤ Monitor and assess the activity/project progress for the implementation roadmaps of the 7th Forum



- Establish the **Action Monitoring System** to develop and share the implementation roadmaps at the thematic level
- Consider the current state of the 6th Forum's Solutions & Targets

- Synthesize monitoring results
- Modify : add/delete

Progress

Political Process

Purpose

1

Increase political will and global awareness for water

2

Bring together politicians and government officials to actively communicate

3

Plan and implement effective policies to address water challenges



Progress

Political Process

Ministerial Process

- Core part of the Political Process.
- Open to Ministers in charge of Water & all relevant Mi
- Works towards the preparation and adoption of a consensus-based Ministerial Declaration.



Progress

Political Process

Parliamentarian Process

- Provides guidance to law-makers on how to improve their country's legislation and budget allocations for water, while raising awareness.



Progress

Political Process

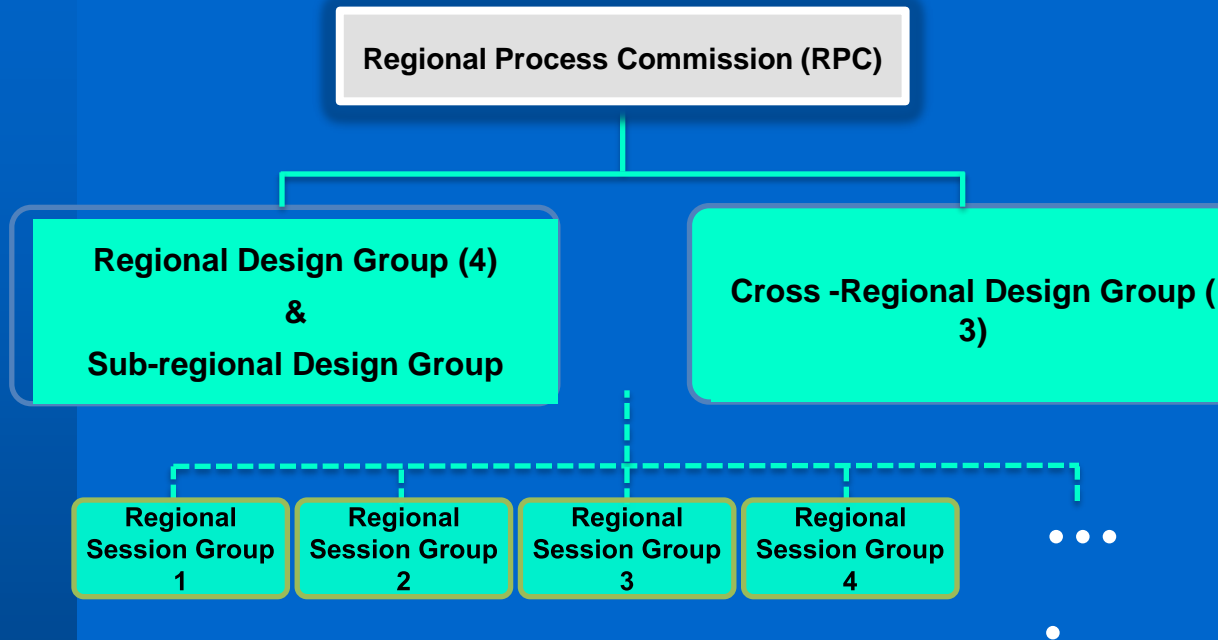
Local and Regional Authorities Process

- The era of decentralization
- International and national politics work better in relation to territorial strategies for development.
- Enhances integration and efficiency of water politics through multilevel governance

Progress

Regional Process

Structure



- **Regional / Cross-Regional Design Groups (led by Regional Coordinators)**
- **Sub-regional Design Groups (applicable to Regions that have Sub-regional division / led by Sub-regional Coordinators)**
- **Regional Session Groups (in charge of sessions)**

Progress

Regional Process

Regional and Cross regions



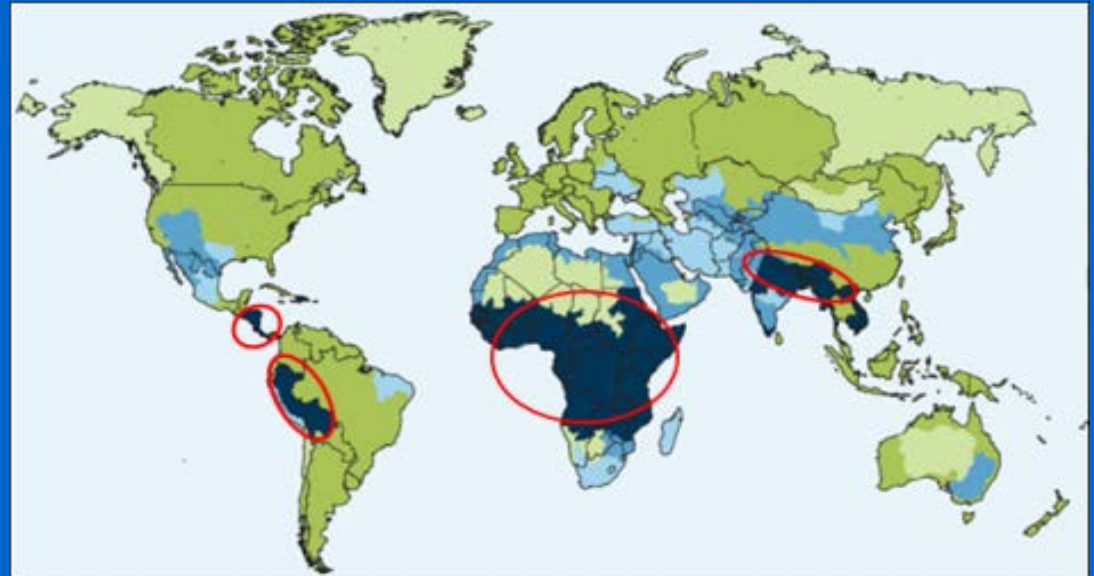
Region	Regional Coordinators
Asia-Pacific	Asia-Pacific Water Forum (APWF) Korea Water Forum (KWF)
Africa	Africa Ministers Council for Water (AMCOW)
Americas	CONAGUA/ANEAS (Mexico)
Europe	Danish Water Forum (DWF) French Water Partnership (FWP)
Arab (cross-regional)	League of Arab States
Economic Water Insecure (cross-regional)	Global Water Partnership(GWP)
Mediterranean (cross-regional)	Mediterranean Institute for Water (IME) GWP-Mediterranean

Progress

Regional Process

Economic Water Insecure Cross-region

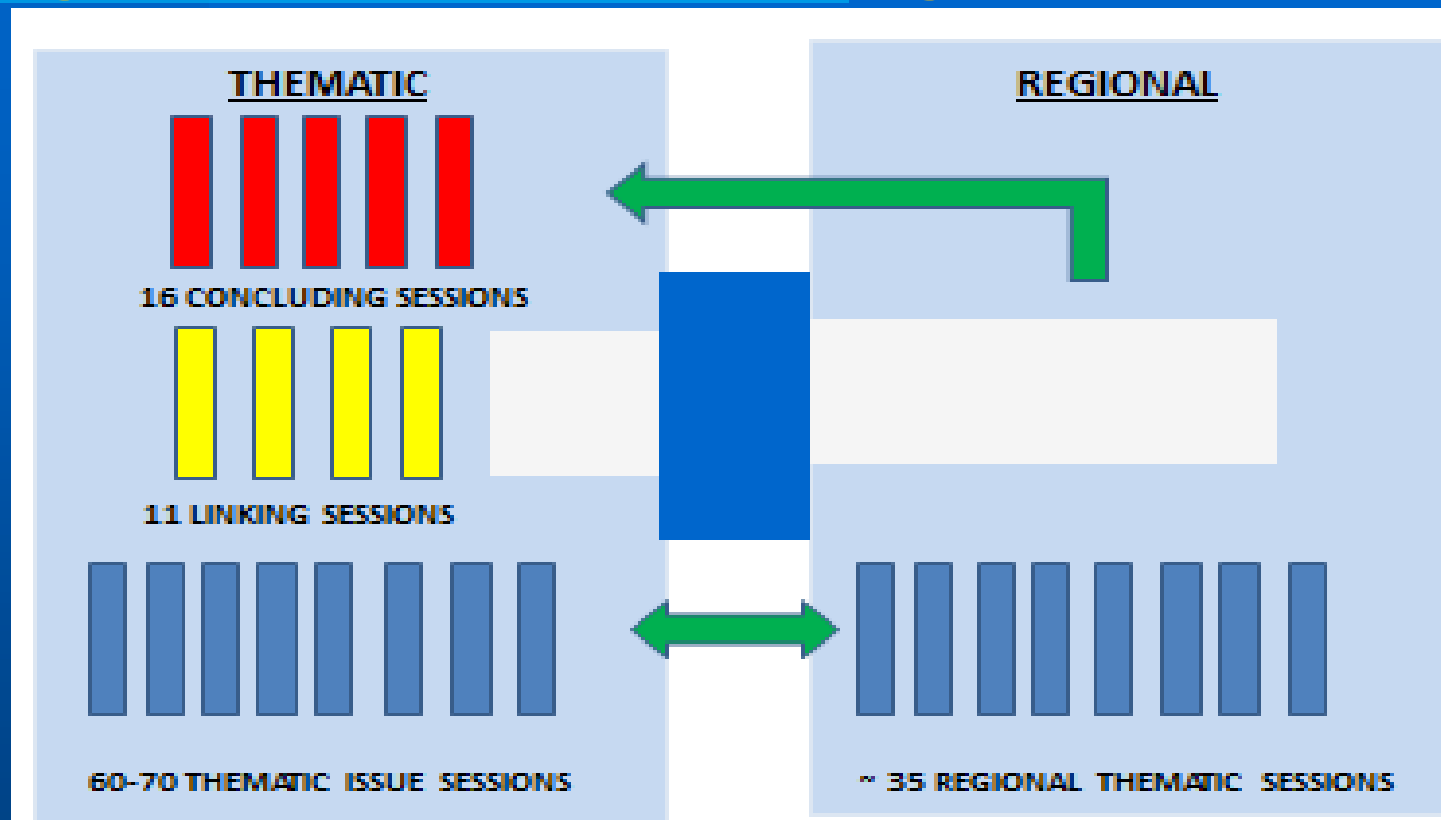
- Areas where access to water is not limited by resource availability, but by human, institutional and financial constraints over distribution of the resource to different user groups



Progress

Regional Process

Regional-Thematic Process Linkage





Progress

Science & Technology Process

Conceptual Overview

SPECIAL PROGRAMMES	MAIN FOCUS AREAS					Forum Feature
	Efficiency	Resource Recovery	Climate Change Disasters	Smart Technology	Ecosystem Services	
White Papers	✓	✓	✓	✓	✓	Forum sessions
CEO innovation Panel	Synthesis of Main Focus Areas - Basis for discussions and recommendations by CEO Innovation Panel					High level panel plenary sessions
World Water Challenges	Each Main Focus Area - Basis for call for solutions and recommendations for replication and up-scaling					Exposure in EXPO on podiums and Presentations

*WEF: Water, Energy and Food

Progress

Science & Technology Process

Special Programme : White Papers

White Papers: strategic insight and foresight

- **The main areas are developed** covering leading edge, state of the art and appropriate science and technology development and application
- **High quality 'science, technology and innovation' reports** are prepared by the leading experts
- For each main focus area, a **STP Design Group (DG) are formed** to produce the report and lead other activities
- **Case-based presentations and practical exchange of information** are the significant features of these sessions
- They will combine strategic insight based on practical cases and foresights relevant for policy-making and investments.



Progress

Science & Technology Process

Special Programme : CEO Innovation Panel

CEO Innovation Panel : Bringing together business leaders from the water sector and beyond – promoting innovation in water;

- To promote and create momentum around innovation in the water sector
- To discuss the effective ways of water innovations
- To encourage new relationships between water-related and other stakeholders to increase awareness in and beyond the water industry and a stepping stone for international





Progress

Science & Technology Process

Special Programme : World Water Challenges

World Water Challenges: linking problem owners with solution providers

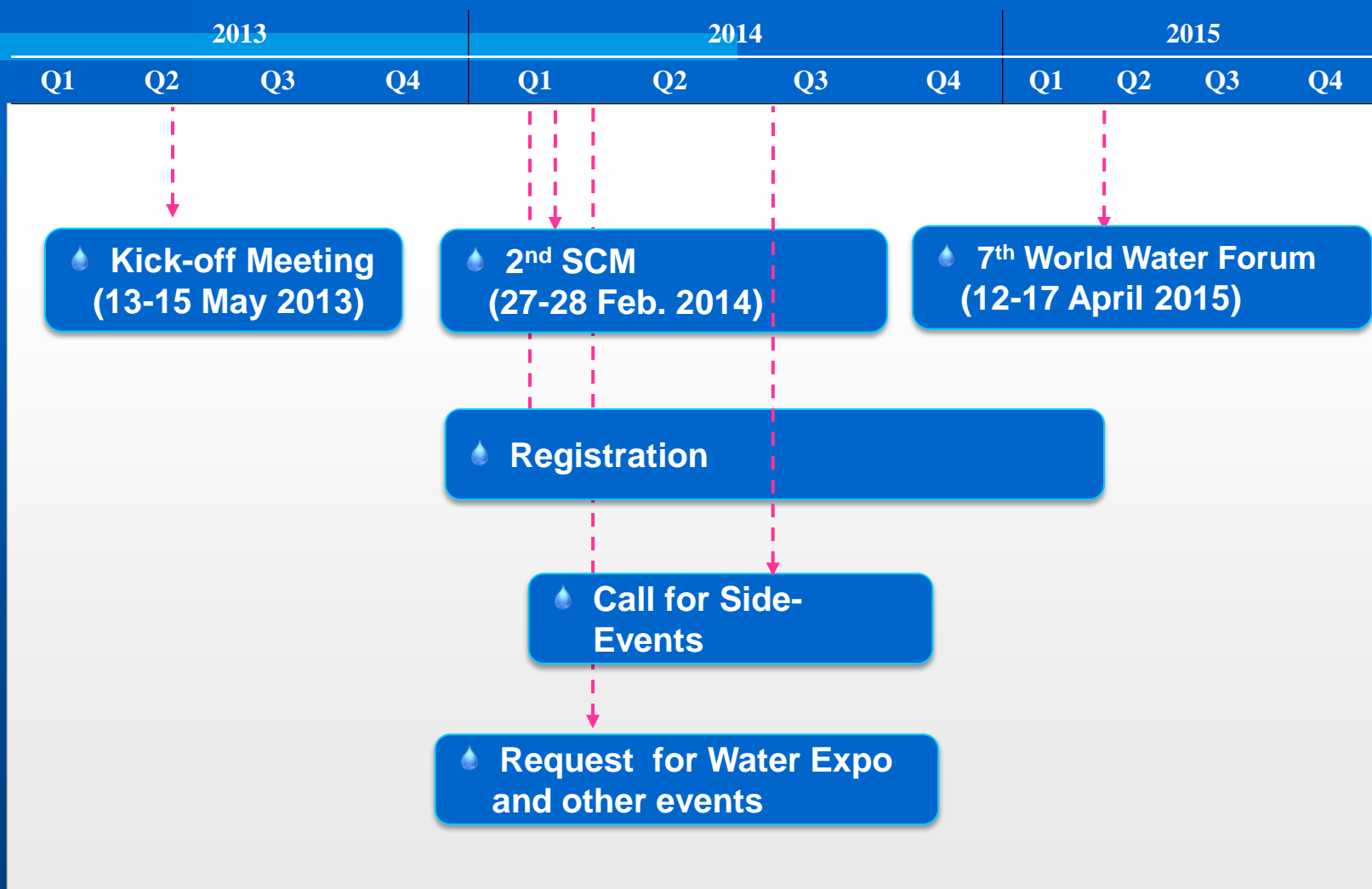
- For each of the defined STP World Water Challenges, **problem owners will be invited to submit specific cases and situations** that are emblematic for the defined challenge and that need to be addressed urgently.
- For each of the STP World Water Challenge, **solution providers will be invited to submit proposals to tackle the defined situation.**
- These proposals will be reviewed and **the finalists will be selected to present their solution at the 7th World Water Forum.**

*Note: A direct connection with the 7th World Water Forum – Regional Process will be made here. This could include **a tailored session for the specific solutions on urgent water issues by regions** so as to promote the involvement of various stakeholders.*



Future Plans

Roadmap





Future Plans Important Dates

★ 2nd SCM

★ 7th World Water Forum



2014

2015

Q1

Q2

Q3

Q4

Q1

Q2

Registration

Early Bird Registration
(from Apr., up until 3 months before the Forum)

Pre-Registration
On-Site Registration

4 Processes

- Completion of Working Groups (June)
- Draft of the Forum program (~ Dec.)

Water EXPO

Early Bird
(Apr.~Jul)

Booth allocation

Citizen's Forum

- Call for Proposals (Mar.~)
- Selection of Programs (~ Dec.)

Co-located
Events

Application
(Apr.~Aug.)

Selection of Programs

Future Plans

Venues & Programs

Daegu: EXCO



- Opening & Closing Ceremony
- Thematic Process
- Science & Technology Process
- Expo & Fair
- Citizen's Forum

Gyeongju: HICO



- Political Process
- High-level Panel
- Regional Process
- Citizen's Forum



CONCLUSION



7th World Water Forum
Daegu - Gyeongbuk, KOREA

Significance : Another legacy in the making...





CONCLUSION

- ◆ *Forum will serve to generate important momentum to implement the many solutions and ideas developed during the Forum into practical actions and contribute to solving water problems by becoming a platform for collective action and joint learning for people from all around world.*
- ◆ *A Golden Opportunity for Water Colleagues Provided ; Cooperating with key water sector players ; Displaying stakeholder's abilities on the international stage ; Enjoying the best water networking opportunities.*
- ◆ *Active and Close Collaboration with World Water Community and Real Achievement of Daegu Gyeongbuk as World Capital of Water such as during the period of 2012~2015.*





Thank You

감사 합니다.



ANNEX I
POST- CATALOGUE OF RIVERS INITIATIVE

Proposal for making the Catalogues of Hydrologic Analysis as the successive series of the Catalogues of rivers

Drafted by IHP Japan team

Purpose

To make a **reference book** for enhancing the understanding of hydrology and water resources in the **Southeast Asia and the Pacific region** through various examples using the information included in the **Catalogue of Rivers**. The reference book also contributes to water education in **IHP-VIII water security**. The examples include various hydrological topics with practical and also academic issues. The book would include a sample computer program to solve the example. In the reference book, it is expected to use the data shown in the catalogues of rivers. **Thus, the book is regarded as the successive series of the catalogues of rivers.**

Target users

Practitioners and university students who study hydrology and water resources engineering

What can be provided

In the text book, the basics of the hydrological theories and various applications are explained using examples with its solutions. In some cases, the sample programs are provided. The data of the catalogues of river is to be used.

Table of Contents

Theme 1: Water-Related Disasters and Hydrological Change

- Flood runoff
- Hydrologic frequency analysis
- Water and heat balance

Theme 2: Groundwater in a Changing Environment

- Groundwater
- Infiltration
- Subsurface runoff

Theme 3: Addressing Water Scarcity and Quality

- Water quality

Theme 4: Water and Human Settlements of the Future

Theme 5: Ecohydrology, Engineering Harmony for a Sustainable World

Study area

Chapter 3: Evapotranspiration

Thornthwaite Method

Study Area

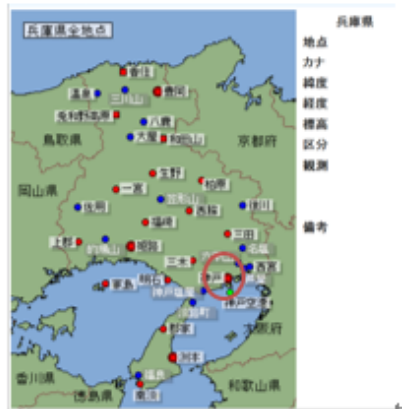


Figure 1: Study area. The red circle indicates Kobe city where the temperature data used in the example is measured.

Data

Table 1 shows mean monthly temperature of Kobe city for the year of 2013. Estimate the monthly potential evapotranspiration of Kobe city using Thornthwaite method.

Table 1. Mean monthly temperature of Kobe city for 2013

Mean monthly temperature (°C) for 2013	
Kobe city: lat. 34.7, lon. 135.2	
Jan.	1
Feb.	2
March	4.5
April	9.5
May	2.5
June	3.5
July	11.5
Aug.	16.5
Sep.	11
Oct.	6.5
Nov.	5
Dec.	6

Data

Result:

Thornthwaite (1948) derived a set of equations to estimate monthly potential evapotranspiration. The equations are expressed as follows:

$$E_p(i) = 0.533 D_0(i) \left(\frac{10t_i}{J}\right)^\alpha \quad (1)$$

where $\alpha = 6.75 \times 10^{-7} J^3 - 7.71 \times 10^{-5} J^2 + 1.79 \times 10^{-2} J + 0.492$ (2)

$$J^{\frac{1}{3}} = \sum_{i=1}^{12} \left(\frac{t_i}{5}\right)^{1.514} \quad (3)$$

where $E_p(i)$ is the potential evapotranspiration (mm/day) of the i th month, t_i the mean monthly temperature (°C), $D_0(i)$ the mean monthly sunshine hour (12hour/day).

From Table 1 and Equation (3), then Equation (2), J and α can be estimated:

$$J^{\frac{1}{3}} = \sum_{i=1}^{12} \left(\frac{t_i}{5}\right)^{1.514} = \left(\frac{1}{5}\right)^{1.514} + \left(\frac{2}{5}\right)^{1.514} + \left(\frac{4.5}{5}\right)^{1.514} + \left(\frac{9.5}{5}\right)^{1.514} + \left(\frac{2.5}{5}\right)^{1.514} + \left(\frac{3.5}{5}\right)^{1.514} + \left(\frac{11.5}{5}\right)^{1.514} + \left(\frac{16.5}{5}\right)^{1.514} + \left(\frac{11}{5}\right)^{1.514} + \left(\frac{6.5}{5}\right)^{1.514} + \left(\frac{5}{5}\right)^{1.514} + \left(\frac{6}{5}\right)^{1.514} = 21.50$$

$$\therefore \alpha = 6.75 \times 10^{-7} J^3 - 7.71 \times 10^{-5} J^2 + 1.79 \times 10^{-2} J + 0.492 = 0.85$$

$D_0(i)$ can be calculated using the following equations:

$$D_0(i) = \frac{2H}{0.2618} \quad (4)$$

$$\sin\left(\frac{H}{2}\right) = [A / \cos \theta \cos \delta]^{\frac{1}{2}} \quad (5)$$

$$A = \sin\left(\frac{\pi}{4} + \frac{(\theta - \delta + r)}{2}\right) \sin\left(\frac{\pi}{4} - \frac{(\theta - \delta + r)}{2}\right) \quad (6)$$

where θ is the latitude of the observation point (rad), δ the solar declination (rad), H hour angle (rad) from the sunrise to culmination considering horizontal refraction r ($=0.01$). The solar declination δ is expressed as:

$$\delta = 0.33281 - 22.984 \cos(wf) - 0.34990 \cos(2wf) - 0.13980 \cos(3wf) + 3.7872 \sin(wf) + 0.0325 \sin(2wf) + 0.07187 \sin(3wf) \quad (7)$$

where $w = \frac{2\pi}{365}$, in bissextile year $w = \frac{2\pi}{366}$ and J the number of the days from the New Year's Day.

As the result, the estimated monthly potential evapotranspiration is shown in the right

Result (cont.)

where ϕ is the latitude of the observation point (rad), δ the solar declination (rad) from the sunrise to culmination considering horizontal

(=0.01). The solar declination δ is expressed as:

$$\delta = 0.33281 - 22.984 \cos(wJ) - 0.34990 \cos(2wJ) - 0.13980 \cos(3wJ) + 3.7872 \sin(wJ) + 0.0325 \sin(2wJ) + 0.07187 \sin(3wJ) \quad (7)$$

where $w = \frac{2\pi}{365}$, in bissextile year $w = \frac{2\pi}{366}$ and J the number of the days from the New Year's Day.

As the result, the estimated monthly potential evapotranspiration is shown in the right hand side column of Table 2.

Table 2. Mean monthly evapotranspiration of Kobe city estimated for 2013

Month	Temperature (°C)	Evaporation (mm/day)
Jan.	1	0.23
Feb.	2	0.45
March	4.5	0.99
April	9.5	2.04
May	2.5	0.70
June	3.5	0.97
July	11.5	2.61
Aug.	16.5	3.35
Sep.	11	2.19
Oct.	6.5	1.28
Nov.	5	0.94
Dec.	6	1.04

References:

Brutsaert, W.: Hydrology: An Introduction, Cambridge University Press, 2005

Ikebuchi, S., Shiiba, M., Takara, K., and Tachikawa, Y.: Ace Hydrology, Asakura Press, 2006

The format of the reference book will be carefully discussed among member countries as it was so in the catalogues of rivers.

References

ANNEX J
SERVICES OF THE GLOBAL RUNOFF DATA CENTRE



Services of the Global Runoff Data Centre (GRDC)

Ulrich Looser

Global Runoff Data Centre at the
Federal Institute of Hydrology (BfG) Koblenz, Germany

GRDC operational environment

Operates under the auspices of the
World Meteorological Organisation (WMO)



on the advice of an
International Steering Committee

with the financial support of the
Federal Republic of Germany



within the
Federal Institute of Hydrology



GRDC Main functions

- Acquisition and storage of global historical discharge data and associated metadata
- Dissemination of historical discharge data (370 000 station-years) and derived products from currently ~ 9000 stations in 160 countries (“One-stop shop”)
- Support to the water and climate related programmes and projects of the United Nations and their specialised agencies
- Service to the international research community on global change and climate services
- Cooperation and participation in international projects and programmes such as:
 - GCOS (Global Climate Observing System)
 - UNESCO IHP FRIEND-Water (Flow Regime from International Experimental and Network Data)
 - GEO (Group on Earth Observations)
 - GEWEX (Global Energy and Water Exchanges)
 - OGC (Open Geospatial Consortium) Hydrology Domain Working Group
 - etc.
- The GRDC is **not** substituting the functions of the National Hydrological Services
- Ownership of the data remains with the original Data Provider

GRDC Data Acquisition

Governed by WMO Resolutions on free and unrestricted exchange of hydro-meteorological data and support to the GRDC

- Opportunity driven
 - Maintenance of contacts with National Hydrological Services and especially with the people within the organisations
- No formalised processes
 - Cooperation and resolutions are not legally binding
 - Dependent on good will and voluntary cooperation

GRDC Data Policy

GRDC data are available to users free and unrestricted under specific conditions

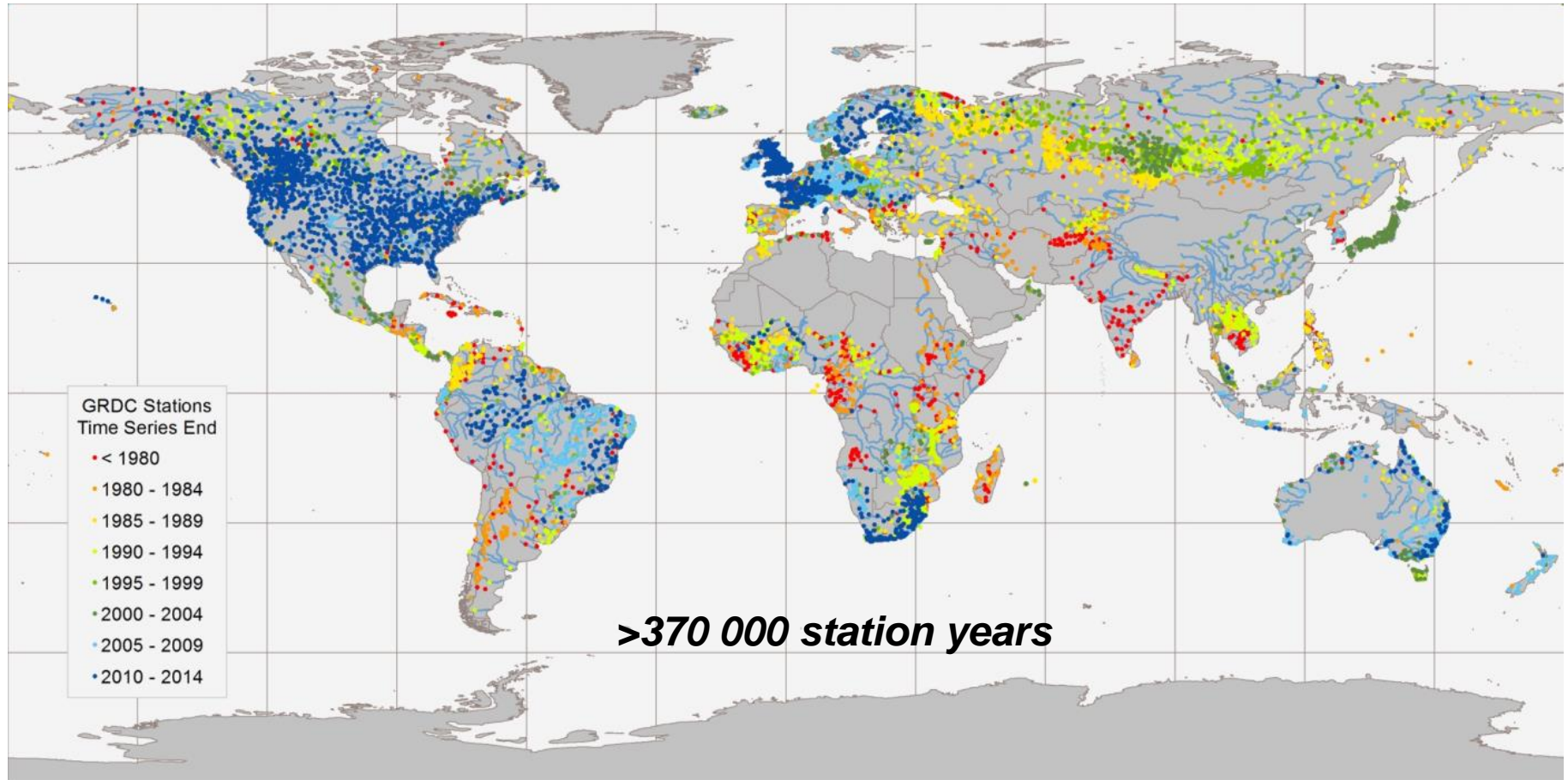
Data requests must be in writing: e.g. E-mail, letter or facsimile

Data users must sign a user declaration stating that:

- Data may not be used for commercial purposes
- Data may not be transferred to third parties
- Data users agree that the GRDC may inform data providers about the use of their data
- After completion of the studies, two copies of the results will be provided to the GRDC
- The source of the data must be acknowledged in all publications

Status of the Global Runoff Database

Global Coverage of GRDC Stations indicated by **time series end**



9009 GRDC stations with monthly data, incl. data derived from daily data (Status: 24 June 2014)
Koblenz: Global Runoff Data Centre, 2014.

European Water Archive (EWA)

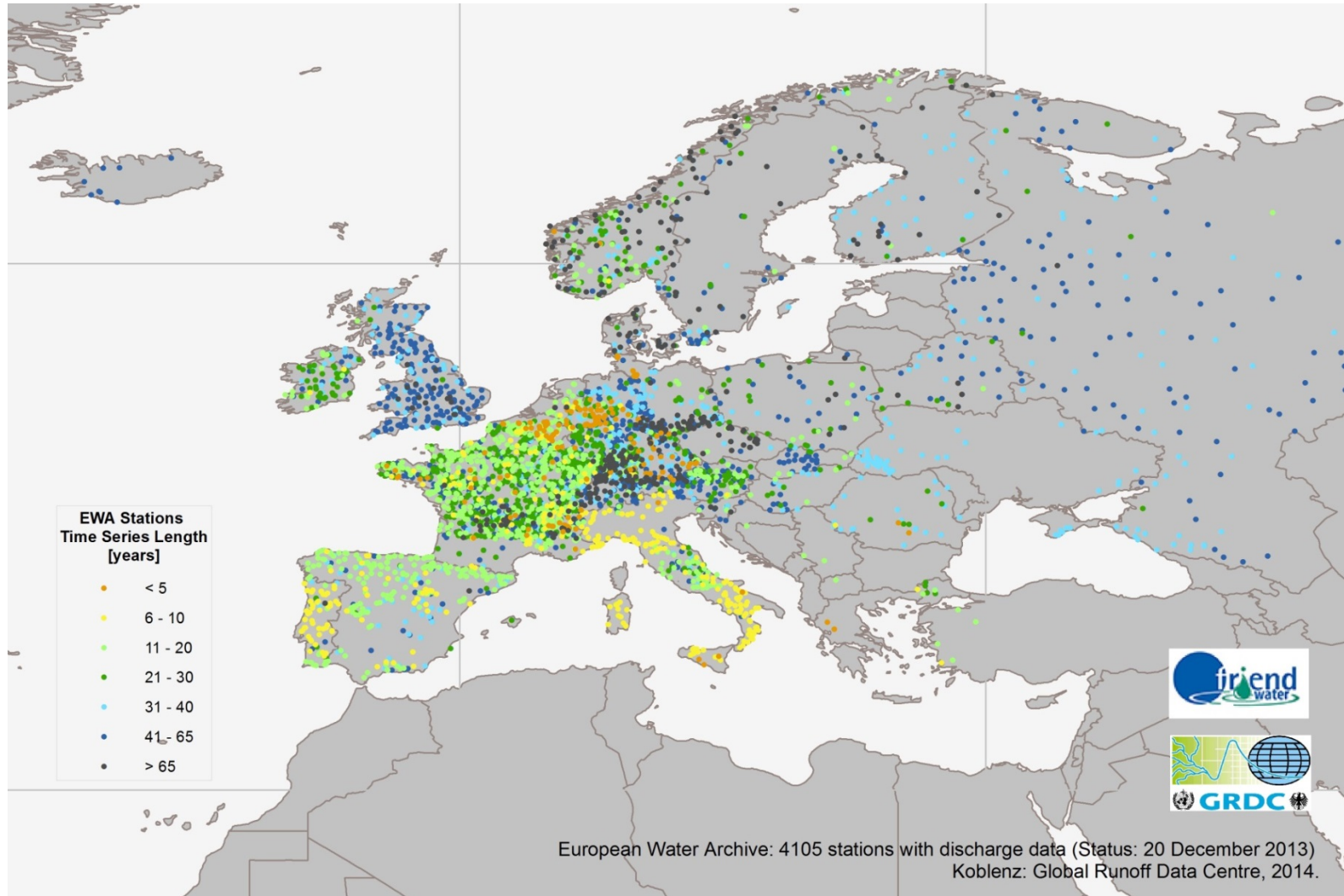
- Central feature of the EURO-FRIEND-Water Project of IHP (Project 1)
- Maintained by the GRDC since 2004, continuously updated
- Access exclusively restricted to the EURO-FRIEND-Water community

Database Status October 2014:

- daily flow records,
station metadata
- 4,105 (+256) gauging stations
- 28 European countries
- ISO-conform metadata provided to FRIEND-Water Database Portal
- Last updates 2013/14: SI, SE, AT, CH, DE, FR, FI, GB

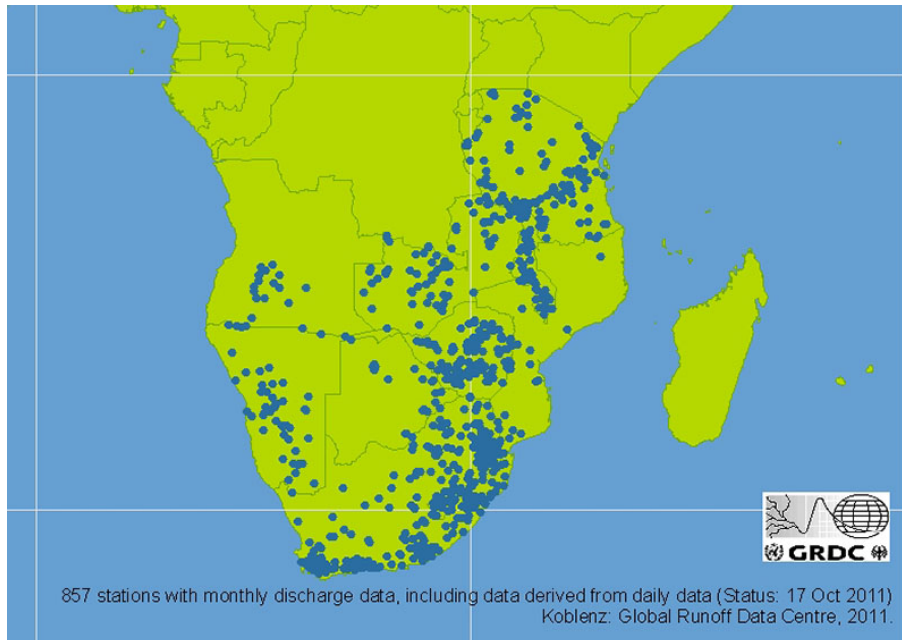
- presently information on 4 105 stations is stored in the EWA
- a total of 134 000 years of mean daily discharge data are available
- average of 33 years of mean daily discharge data per station

European Water Archive (EWA)



SA-FRIEND Database at GRDC

- Feature of the SA-FRIEND project of IHP (Project 5)
- Nov 2010: CEH Wallingford delivered the SA-FRIEND database to the GRDC
- 2011: Integration into the GRDC data management structures
- 2012: Data access under the conditions of the GRDC data policy



Dataset Status October 2014:

- core metadata of 676 gauging stations in 12 participating countries
- daily / monthly records of river discharge in the period 1912 – 2013
- Updates 2014: ZA, NA
- Negotiations: Malawi, Tanzania

Future of FRIEND-Water Databases

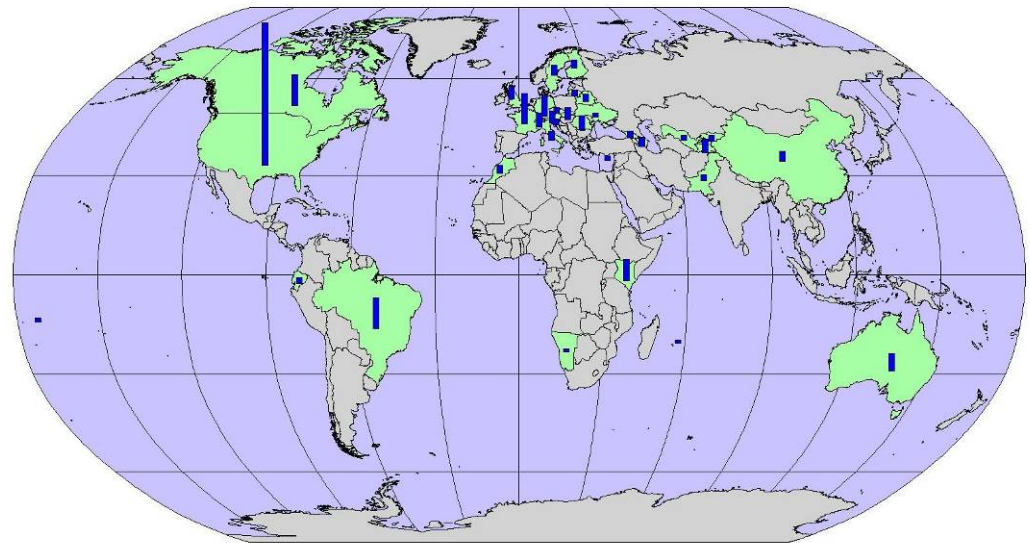
- FIGCC (FRIEND-Water Intergroup Coordinating Committee) decision in Montpellier (Oct 2014) to integrate FRIEND-Water Databases into GRDC database
- Single data policy for all data
- GRDC as a service to multiple UN-Programmes demonstrating the cooperation between those programmes at WMO, UNESCO, UNEP...
- Successful integration of SA-FRIEND-Water database already achieved
- Busy with the integration of the EURO-FRIEND-Water database
- Negotiations to start with other FRIEND-Water groups

Climate Sensitive Stations Dataset under development

- Identification of stations representing climate sensitive river basins having minimal disturbance
- WMO selection criteria
(<http://www.wmo.int/pages/prog/hwrrp/Hydroclimate/hydroclimate2.htm>)
- Access under the conditions of the GRDC data policy

Project Status October 2014:

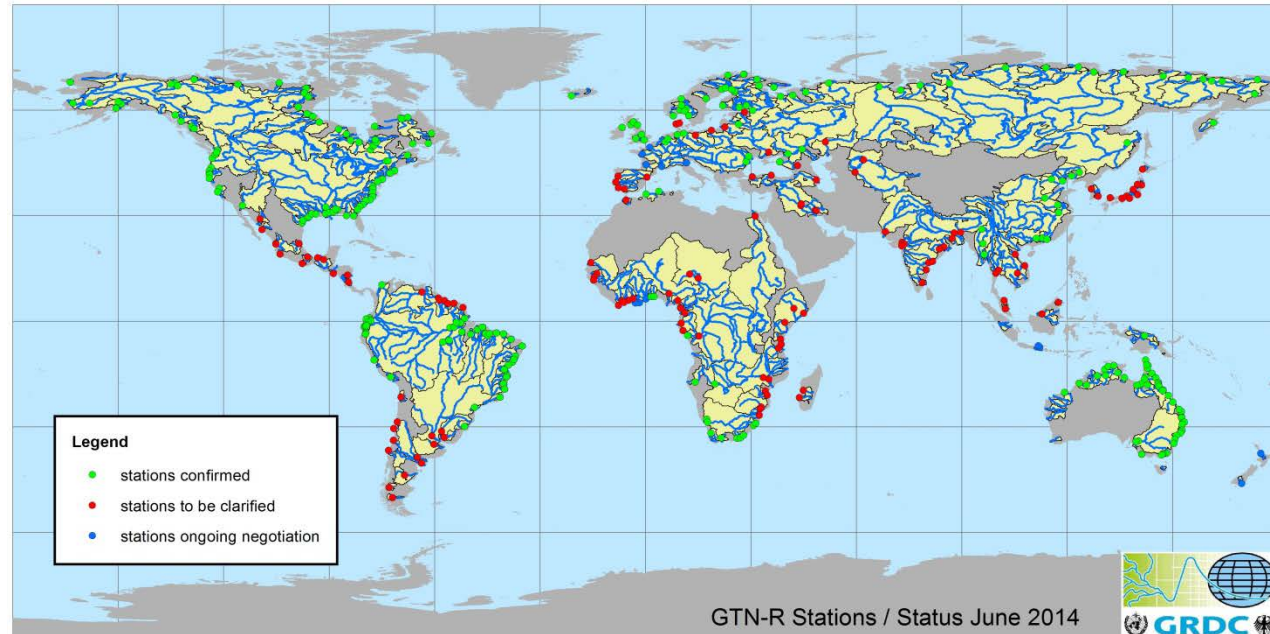
- 2,482 identified stations
- 1,175 GRDC stations confirmed
- 34 countries contributed
- daily / monthly streamflow records / station metadata



Global Terrestrial Network for River Discharge (GTN-R)

- Compilation of the GCOS Baseline River Network (T6 of GCOS-IP [IP-04 T4])
- Regular provision of near real-time data to the evolving GTN-H
- System for the automated collection and harmonisation of near real-time data
- Service for an automated provision of river discharge data

- Status October 2014:
- daily discharge data
- ~ 280 confirmed stations
- 13 national data providers
- 19 countries ongoing negotiations



GRDC Stations in Google Earth

AMAZONAS - OBIDOS - PORTO

GRDC-Id	3629000
Nat. Station-Id	17050000
Country	BR - BRAZIL
GRDC Region	3 - South America
GRDC Subregion	29 - Amazon (d/s Trombetas confluence - d/s T
Latitude (dec. deg.)	-1.9472 S checked
Longitude (dec. deg.)	-55.5111 W checked
Area (km ²)	4680000
Altitude (m. a. s. l.)	37
Status	active station
Monthly data	1928 - 1998 - 29.98 % missing
Daily data	1927 - 1998 - 30.06 % missing
Average flow (m ³ /s)	169185.219

AMAZONAS - OBIDOS - LINGRAFO

GRDC-Id	3629001
Nat. Station-Id	17050001
Country	BR - BRAZIL
GRDC Region	3 - South America
GRDC Subregion	29 - Amazon (d/s Trombetas confluence - d/s T
Latitude (dec. deg.)	-1.9192 S checked
Longitude (dec. deg.)	-55.5131 W checked
Area (km ²)	4680000
Altitude (m. a. s. l.)	-999
Status	active station
Monthly data	-
Daily data	1968 - 2008 - 6.15 % missing
Average flow (m ³ /s)	178002.938

US Dept of State Geographer
 © 2014 Google
 © 2009 GeoBasis-DE/BKG
 Data SIO, NOAA, U.S. Navy, NGA, GEBCO

Google earth

eye alt 16596.13 km

GRDC Data Products

BfG - Data Products - Windows Internet Explorer

http://www.bafg.de/GRDC/EN/03_dtpdrcts/dataproducts_node.html;jsessionid=05238BFBE18CA7A06DA8EB3CF0FC183E.live2051

GRDC Data and Map Products

All data and map products are provided for the benefit of the research, please acknowledge the project for which the data products are used. GRDC, Koblenz, Federal Institute for Hydrology

Disclaimer: GRDC does not guarantee the accuracy of the derived data. Owners of the data should check the data for plausibility. The GRDC nor its staff are liable for any damage or loss of data.

Freshwater Fluxes into the World Oceans (GRDC, 2009)
Mean annual freshwater inputs to the oceans from hinterland areas of 5° grid cells along the continents coastlines, the freshwater fluxes over the continental coastlines within 5° or 10° latitudinal bands, and from land areas associated with the GIWA regions, calculated on the basis of a 0.5° source grid of

Freshwater Fluxes into the World Oceans

Long-Term Mean Monthly Discharges and Annual Characteristics of GRDC Stations

Folie 13 von 19

Standarddesign

Englisch (Großbritannien)

Microsoft PowerPoint - [...]

BfG - Data Products - ...

GRDC Map Products

GRDC Map Products

All map products are provided under states the non-commercial use of the source. If you are interested to use G accept and sign the *Declaration of the explanatory summary of the project*. Please cite in all publications and pr GRDC as the source of data: Global Data Centre, Koblenz, Federal Instit

Disclaimer: GRDC reserves the right completeness or quality of the data data and responsibility for errors rem made to check data for plausibility a errors in the data unknown to the GF held responsible for the consequences of the use of GRDC data.

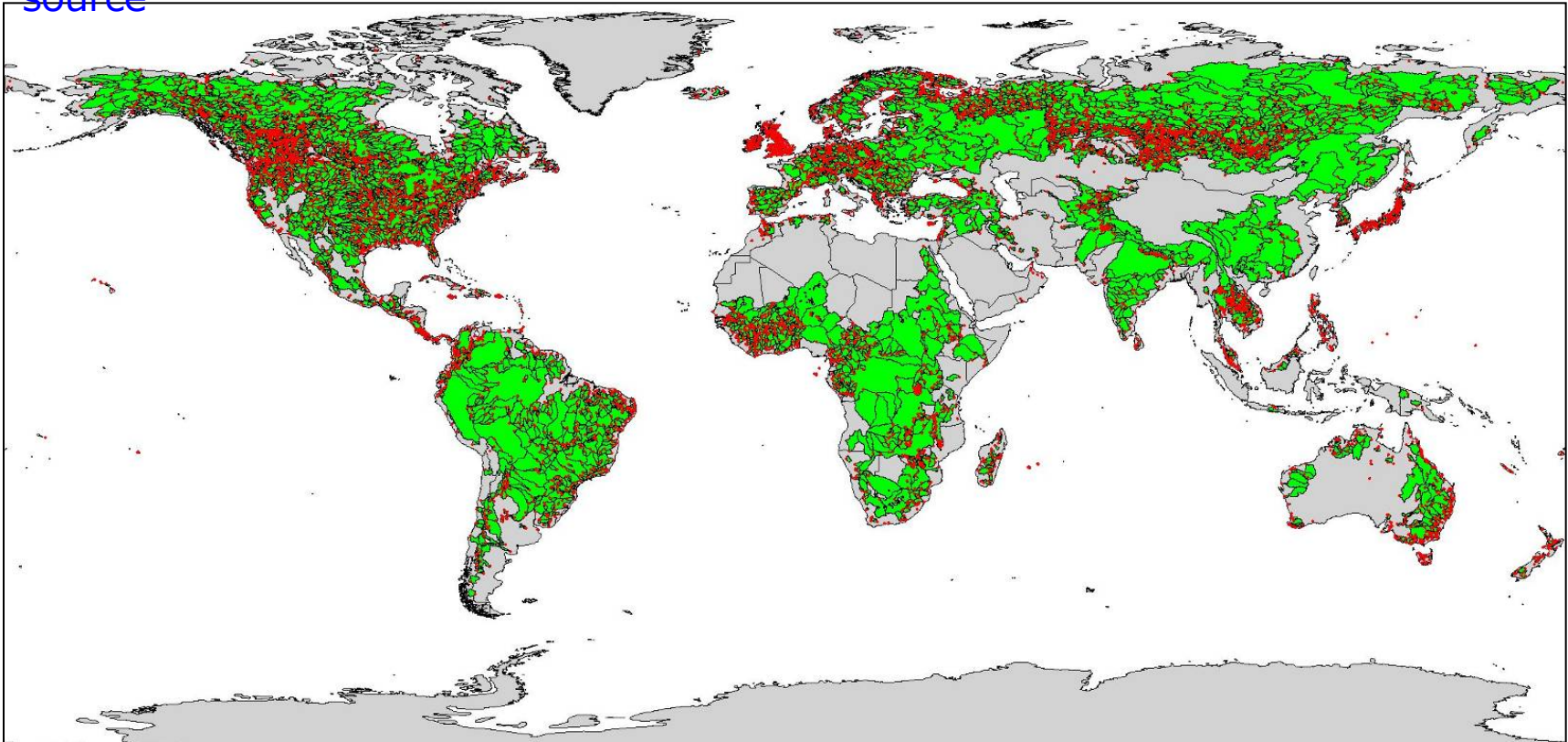
Major River Basins of the World (GRDC, 2007)

The *Major River Basins of the World* is an ongoing GIS project of the Global Runoff Data Centre (GRDC) that aims at the provision of a set of shape files for the use with Geographic Information Systems (GIS). This dataset was created for the generation of GRDC map products and will be updated from time to time whenever extensions are required by future GRDC projects. At present the dataset comprises the GIS layer of 405 river basins and 687 associated rivers.

[More ...](#)

Watershed boundaries of GRDC stations

- Watershed Boundaries of more than 7000 GRDC Stations provided as GIS Shapefiles
- Delineation based on *HydroSHEDS* drainage network (Lehner et al., 2008)
- Delineation done by Bernhard Lehner (McGill University, Canada)
- Methodology used is published as Report 41 in the GRDC Report Series
- GRDC Data Policy applies: non-commercial use and citation of GRDC as the source





GRDC Data Dissemination and Services

GRDC Catalogues (XLS, KMZ)

River discharge data (E-Mail → FTP)

Future: Web Services

Partner Data Centres

Precipitation: GPCC

gpcc.dwd.de

Global Precipitation Climatology Centre

Offenbach, Germany



Water Quality: GEMS/Water GEMStat

<http://www.gemstat.org>

Global Environment Monitoring System of UNEP DEWA

Koblenz, Germany



Groundwater: IGRAC

<http://www.igrac.net>

International Groundwater Resources Assessment Centre

Delft, The Netherlands



Lakes and Reservoirs: HYDROLARE

www.hydrolare.ru

International Centre on the Hydrology of Lakes and Reservoirs

St. Petersburg, Russia





...more than 25 Years GRDC

Global Runoff Data Centre (GRDC)

Ulrich Looser (Head)

Irina Dornblut

Thomas de Couet

Johannes Pauler

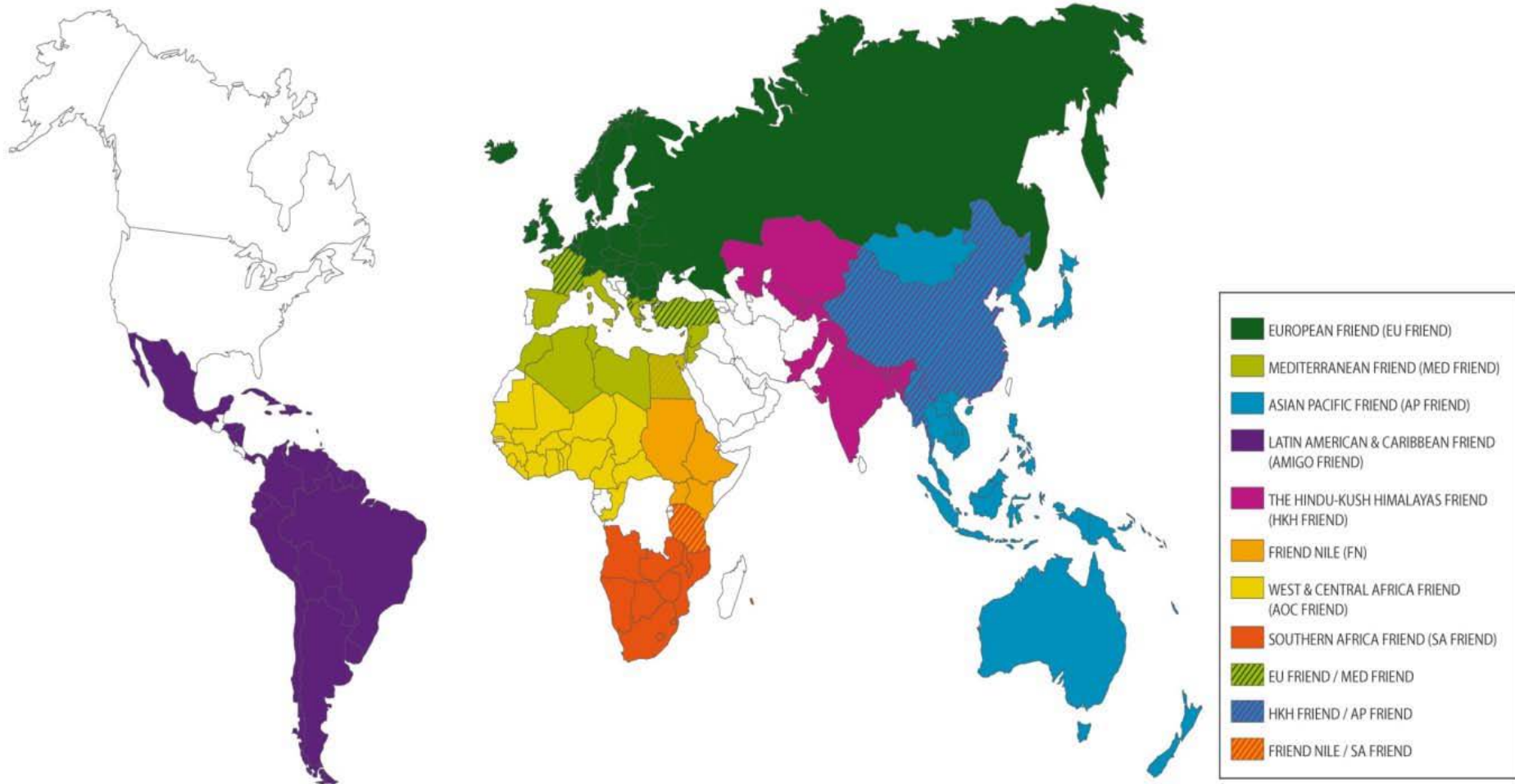
e-mail: grdc@bafg.de, web: <http://grdc.bafg.de>

Thank you for your attention!

Future of FRIEND-Water Databases

- FIGCC (FRIEND-Water Intergroup Coordinating Committee) decision in Montpellier (Oct 2014) to integrate FRIEND-Water Databases into GRDC database
- Single data policy for all data
- GRDC as a service to multiple UN-Programmes demonstrating the cooperation between those programmes at WMO, UNESCO, UNEP, FAO...
- Successful integration of EURO- and SA-FRIEND-Water databases already achieved
- Negotiations to start with other FRIEND-Water groups

Current FRIEND-Water Groups



**ANNEX K GROUP DISCUSSION ON 4 PROJECT AREAS
(AGENDA ITEM ADDED DURING DAY 1)**

Workshop summary on

1. Water Security

2. IWRM including AP-Eco-hydrology, AP-HELP

3. Water related disasters

4. Water education

Theme 1: Water Security (Surface and groundwater)

Malaysia:

- Water resources management plan at basin scale (water security)
- Demand against availability (intra basin Transfer) – Water transfer .

RSC is requested to provide a “template or develop a template” for a knowledge base process evaluating existing reports.

Proposer: Dr Haji Hanapi M Noor

hanapi@water.gov.my

Mongolia:

- Water transfer (intra basin transfer) and water security to alleviate GW overuse.
- Transfer to take place for agriculture and industrial (mostly mining and energy).
- Transboundary conflict with RU (Baikal Lake).

RSC is requested to validate Mongolian data in support of environmental sustainable use of water.

Proposer: Mr Bat-Ochir Gantulga

gantulga@mne.gov.mn

Theme 2: IWRM, AP-Eco-hydrology, AP-HELP

Title: Development of the AP IWRM implementation strategy with case studies through AP-HELP and AP Eco-hydrology approach

Responsible country: Korea, Malaysia, Philippines, Indonesia

Actions:

- Collect case studies on how to implement/ apply for IWRM in pilot areas including river basin level, urban area, upland, lowland, lake and reservoir) in each country; IWRM implementation/ adoption strategy in each country
- Compile those case studies and learn knowledge, experience and strategy for implementation and adoption of IWRM concept
- Broaden the AP-HELP Network

Working Group Leader: Prof Sontak Lee (soontaklee@hanafos.com; leest@yu.ac.kr),

Working Group Deputy: Dr. Elfithri (elfith_ukm@yahoo.com)

Participants: Dr. Roseli, Dr. Liongson, Dr. Sutapa, Prof. Harjono

Theme 3: Water related disasters

Country present:

China
Japan
Myanmar
Papua New Guinea
Rep of Korea
Thailand
Vietnam

Theme 3: Water related disasters

ICHARM Proposal

- Establish AP Int'l Flood Initiative for implementation of IFI

Proposer: Director of ICHARM through Dr Ai

Theme 3: Water related disasters

Vietnam proposal

- A study on how to translate scientific knowledge in water related disaster into adaptation actions to **produce decision support tool for decision makers.**
- 4 step activities including:
 1. methodology for translation,
 2. data collection,
 3. gap identification,
 4. public/stakeholder consultations.

Proposer: Tran Thuc

Theme 3: Water related disasters

Thailand proposal

- Study on temporal changes in rainfall distribution in Asia Pacific region.
- Proposer: Wandee Pattanasatianpong

Theme 3: Water related disasters

Joint proposal from China , Thailand and to involve Japan (to be contacted)

- Joint project for urban flood management plan implementation in case cities in China and Thailand based on existing Japanese technologies (from hydrodynamics modeling to risk assessment).

→ outputs:

- selection of relevant models
- Sewage systems planning

Working Group Leader: Prof. Takara

Participants: Wandee Pattanasatianpong, Yan Huang, Ismail Abustan, Akira Kawamura

Theme 3: Water related disasters

Korean proposal

- optimization strategy for pumping stations in order to reduce flood impacts
 - Application of Korean strategy on different densely populated area in Vietnam and Myanmar

Proposers: Joong Hon Kim, Tran Thuc, Than Zaw

Theme 3: Water related disasters

Call for funding by Papua New Guinea

- Call for funding for an implementation project on community-based flood early warning system (communication materials and evacuation drills)
- Call for training in IWRM and Water related disaster mitigation (short course and Master degree program)
- Proposer: Mr. Joseph Jure (jjure@dec.gov.pg) , Ir. Hanapi (hanapi@water.gov.my)

Theme 4: Water Education

Project 1:

Title: Curriculum Development for Ecohydrology & Climate Change

Target: Universities (Master's Degree)

Person in Charge: Kyoto and Nagoya Universities (Prof. Ishizaka, Prof. Sumi), APCE (Prof. Harjono and Dr. Sutapa), Dr. Elfithri

Email: hery.harjono@gmail.com; email Pak Ignas

Estimated cost: No cost – material will be developed from the 23rd IHP Nagoya Training Course Textbook

Timeline: 4 months

Theme 4: Water Education

Project 2:

Title: **Curriculum Development for Climate Change**

Target: Universities (Master's Degree)

Person in Charge: Kyoto and Nagoya Universities (Prof. Ishizaka, Prof. Sumi), APCE (Prof. Harjono and Dr. Sutapa)

Email: hery.harjono@gmail.com, Email pak ignas

Estimated cost: No cost – material will be developed from the 19th, 21st, 23rd IHP Nagoya Training Course Textbook

Timeline: 4 months

Theme 4: Water Education

Project 3:

Title: Leveraging knowledge through basic training for water professionals

Target: Water Professionals and Practitioners

Person in Charge: Prof. Chikamori, Prof. Kobayashi and Prof. Nguyen

Email: tikamori@cc.okayama-u.ac.jp

Estimated cost: printed materials and travel cost

Timeline: sample material by 31 March 2015

Potential Funding Source: UNESCO (Jakarta and/or HQ)

Theme 4: Water Education

Project 4 (Future Project):

Title: Tour guidebook about water related culture and natural heritage incl. information about water ecology

Target: General public and primary/secondary education

Person in Charge: Prof. Takara and Dr. Arduino

Email: takara.kaoru.7v@kyoto-u.ac.jp

Estimated cost: No cost – material will be produced in e-book form and adopted from “Encyclopedia of rivers”

Timeline: TBD-End of IHP VIII

Theme 4: Water Education

Project 5 (Future Project):

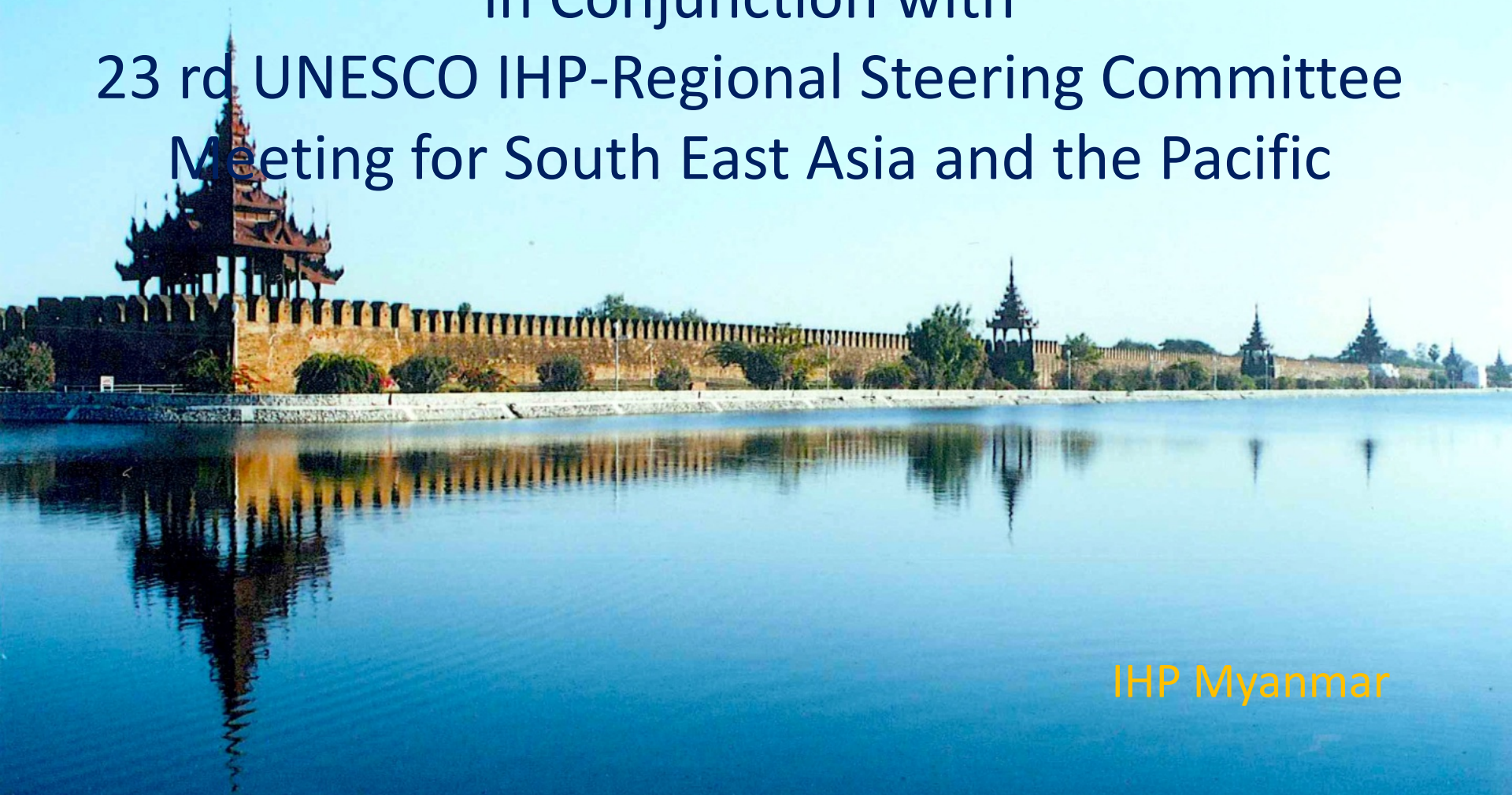
Title: Training Resource book for preparing professionals to learn from and interact with the community

Target: Water Professionals

Person in Charge: Dr. Dennis Jamieson

**ANNEX L ORGANIZATION OF THE 23RD RSC MEETING
IN MYANMAR AND ASSOCIATED CONFERENCE**

International Conference on Integrated
Management of Drought and Flood
in Conjunction with
23 rd UNESCO IHP-Regional Steering Committee
Meeting for South East Asia and the Pacific



IHP Myanmar



Mandalay Swan Hotel



Sedona Hotel





Keynote Speakers

Committee

Transportation System

A photograph of a flooded road. The water is murky and reflects the sky. On the right side, there is a long, low building with a dark roof. The background is filled with green trees under a bright sky. The text is overlaid in red on the left side of the image.

Flood Management

Drought Monitoring center

Early Warning System for Disaster Management

Water quality monitoring

Integrated Water resources Management

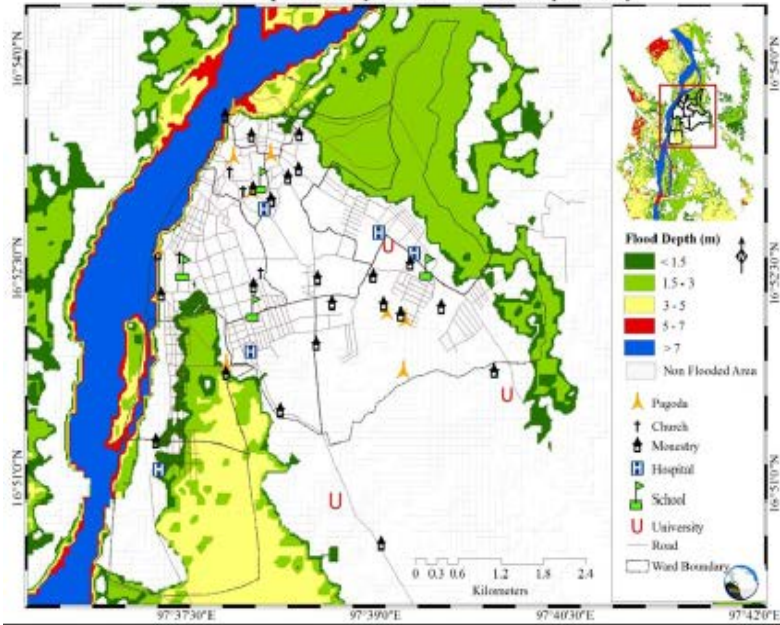
Time : 19 – 23 October 2015

Arrival	18	October
International Conference	19-20	October
Technical Field trip	21	October
RSC Meeting of IHP	22-23	October
Closing	23	October
Departure	24	October

River System in Myanmar

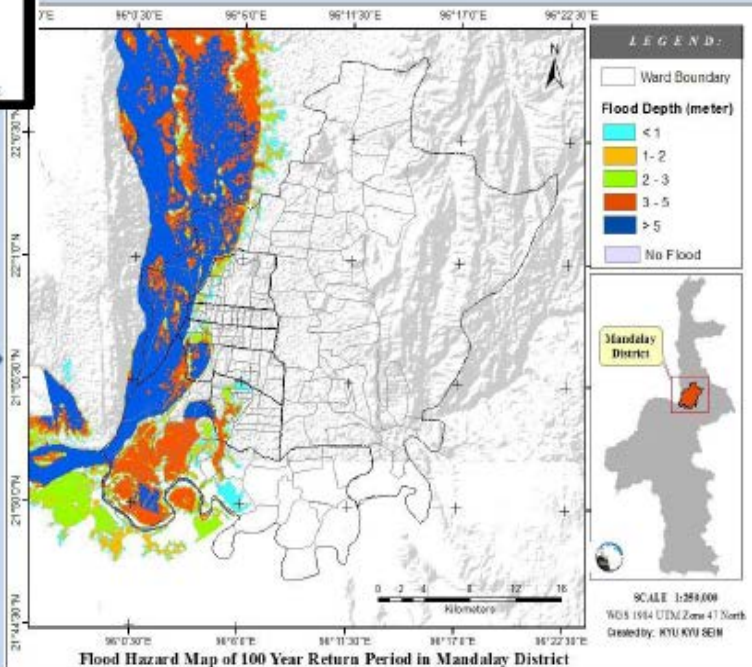


Flood Hazard Map for the 10 year Return Period in Hpa-an City



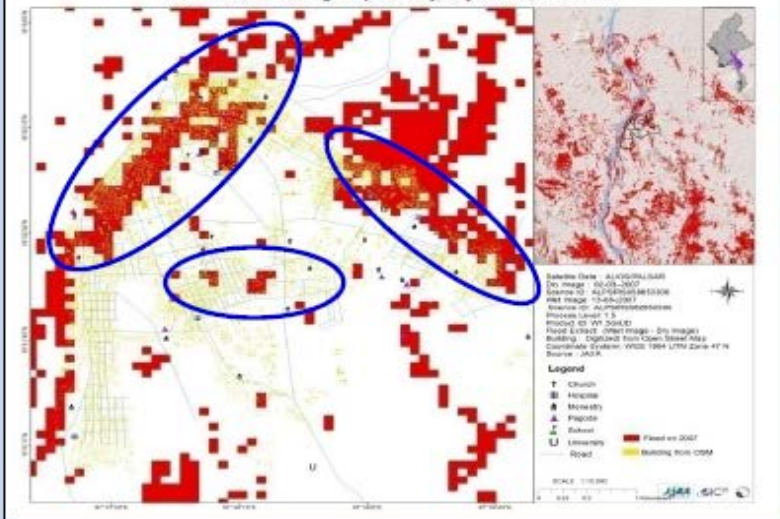
Flood Hazard Map for Hpaan

Flood Hazard Map for Mandalay



Flood Hazard Map of 100 Year Return Period in Mandalay District

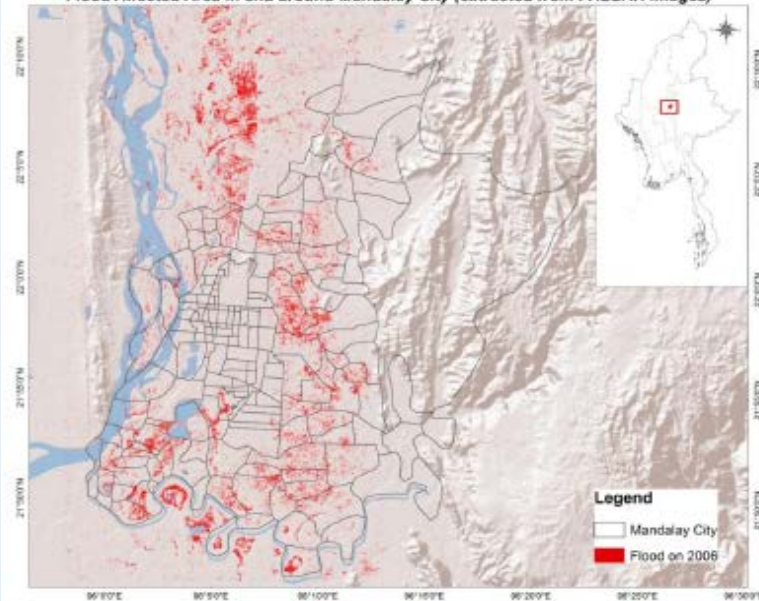
Flood Affected Building in Hpa-an City, Kayah State, MYANMAR



Flood Affected Building in Hpaan

Flood Affected area in Mandalay

Flood Affected Area in and around Mandalay City (extracted from PALSAR Images)





Widespread flood

Flood Types in Myanmar



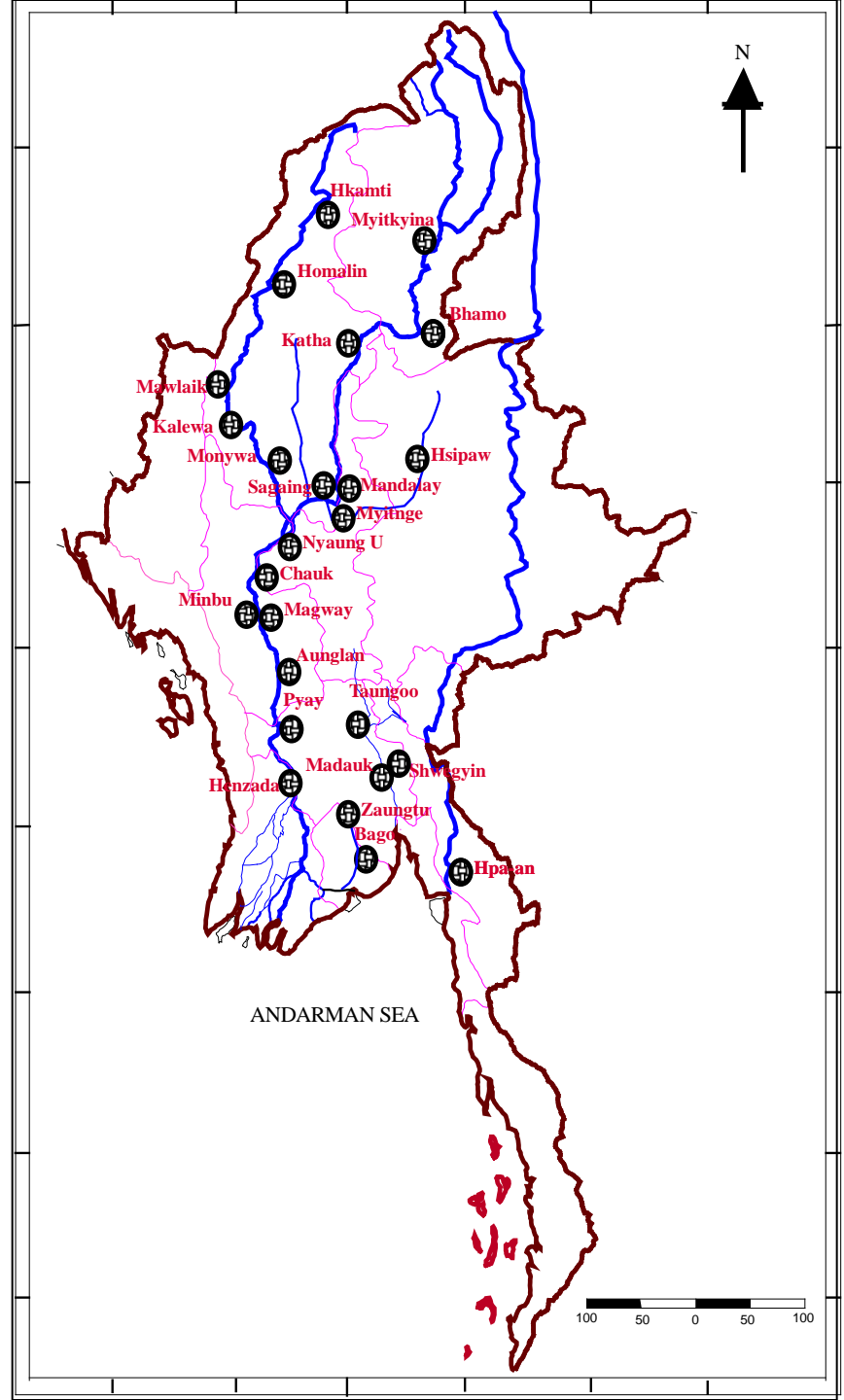
Flash Flood



River forecasting stations

in

Myanmar



Flooded area in Central Myanmar in 2013



Flooded area in Central Myanmar in 2013

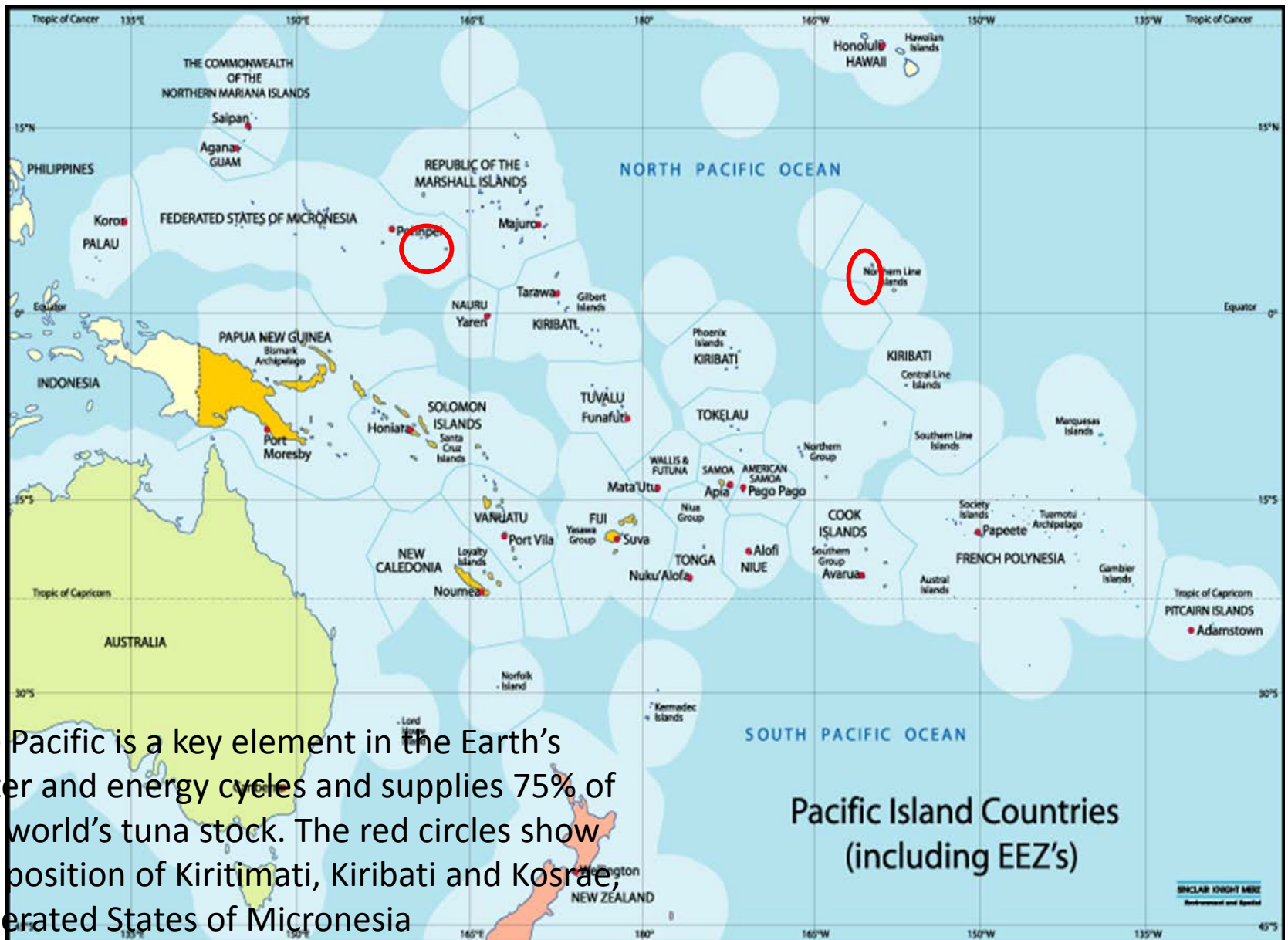


Thanks a Lot

ANNEX M_AOB : PRESENTATION ON PACIFIC ISLAND DEVELOPING STATES

**Research/applied projects Pacific Islands
(Information supplied by Ian White and Tony
Falkland)**

Figure 1. Pacific Island Countries (PICs) and their vast oceanic economic exclusion zones.



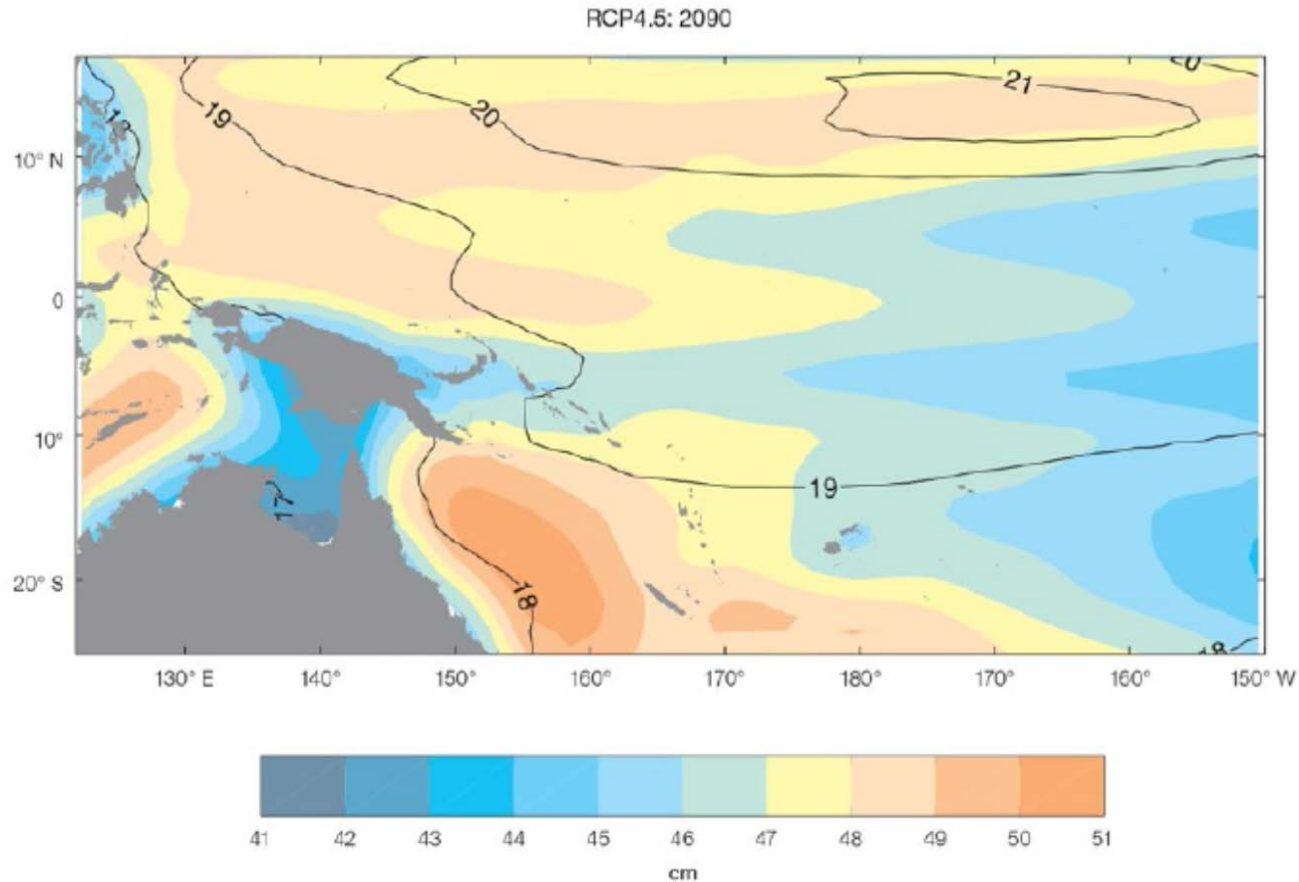
The Pacific is a key element in the Earth's water and energy cycles and supplies 75% of the world's tuna stock. The red circles show the position of Kiritimati, Kiribati and Kosrae, Federated States of Micronesia

The recent UN General Assembly Third International Conference on Small Island Developing States (SIDS) in Apia, Samoa held on 1-4 September 2014

Concluded in the Outcomes that SIDS face numerous challenges to water resources:

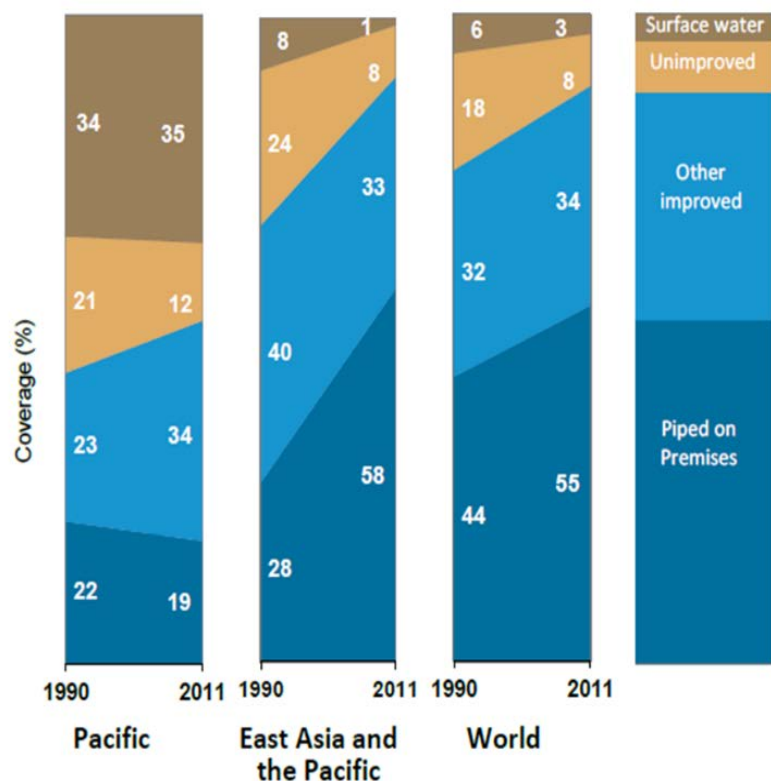
- pollution
- overexploitation of surface & groundwater & saline intrusion,
- drought & water scarcity,
- Soil erosion & impacts on coral ecosystems & reefs,
- Lack of water & wastewater treatment, sanitation & hygiene.
- Changes in rainfall patterns related to climate change & impacts on water supply

The projected impacts of sea-level rise (Figure 2)



The regional distribution of projected sea-level rise for the period 2081–2100 relative to 1986–2005 from emissions scenario RCP4.5. The uncertainty is indicated by the contours (in centimetres). [BoM & CSIRO (2014).

Water Supply Coverage, National



National Sanitation Coverage Averages*

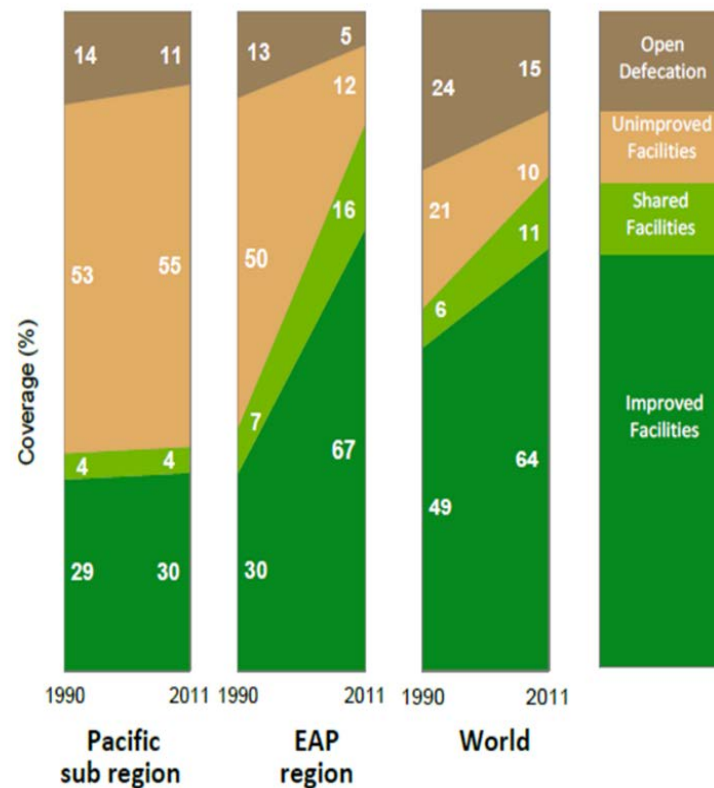


Figure 3. Progress towards meeting the 2015 Millennium Development Targets in water and sanitation in Pacific Island Countries, East Asia and the Pacific and the World (UNICEF).

Under-five mortality rate by country, 2012

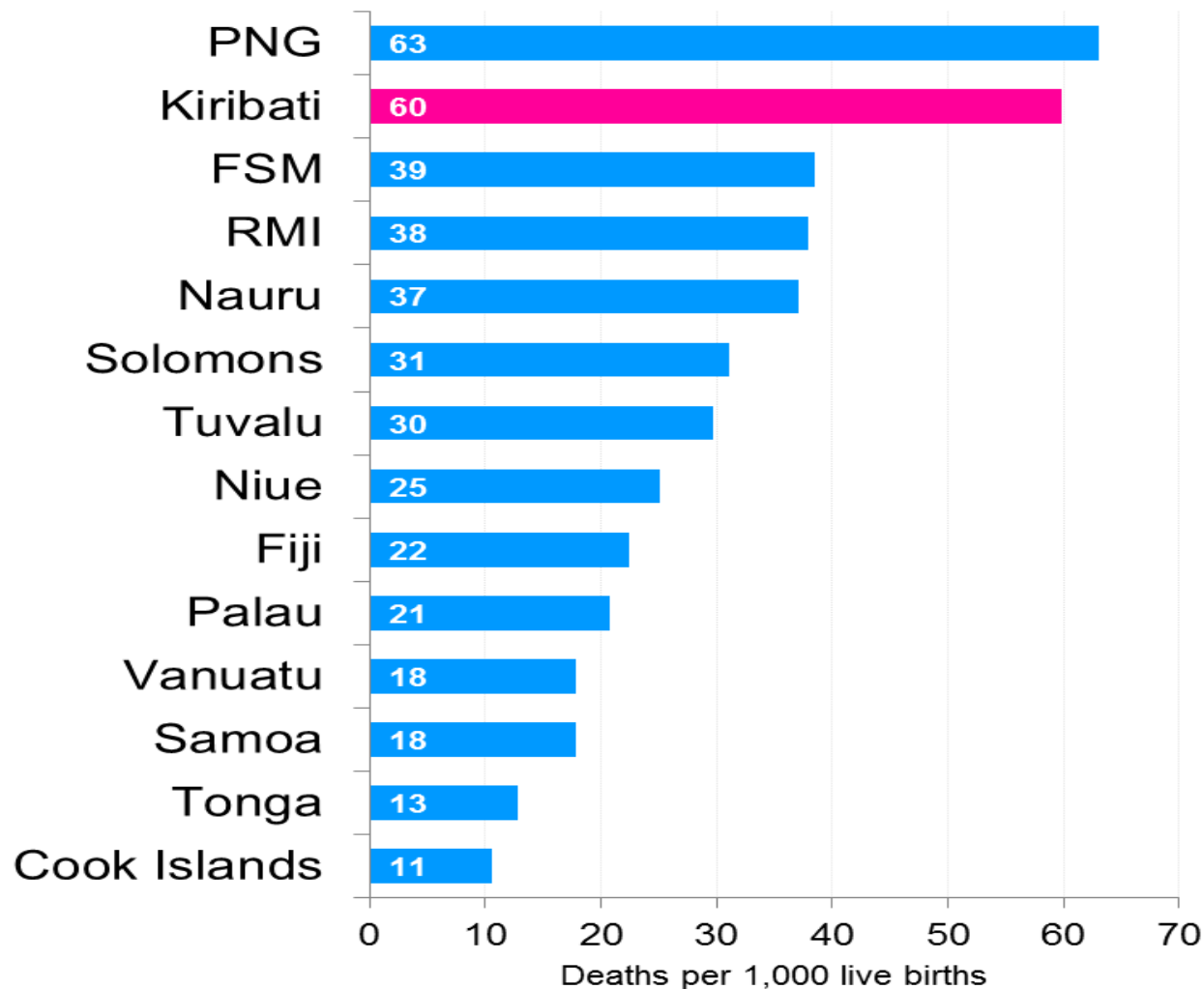


Figure 4. Under five infant mortality rates in Pacific Island Countries (UNICEF). For Australia, the infant death rate is around 4 deaths per 1,000 live births (UNICEF, year?)

The study (Falkland, A. 2011-14, Water security and vulnerability to climate change and other impacts in Pacific Island countries and East Timor) concluded that the highest risks to water security out to the year 2030 were

- increasing water demands due to population growth and urbanisation,
- pollution of water resources,
- saline intrusion into fresh groundwater due to over extraction,
- leakage from urban pipe systems,
- impact of natural hazards,
- poor water governance, management and monitoring,
- inadequately resourced agencies with restricted capacity,
- financially unsustainable water supply systems,
- vandalism and conflicts arising from property rights disputes between land owners and governments.

Pacific Regional Program: Practical Climate Resilient Approaches for Food and Water Security and Coastal Zone Management

- The overall aim of this program is to strengthen the national capacity of participating Pacific Island Countries to build their climate resilience and manage climate-related risks. The principal aims of the water sector contribution to Component 2, carried out by the Australia IHP Committee are to:
- carry out an initial risk assessment and analysis that identifies where gaps in water resources information represent a significant impediment to the management of current and emerging risks associated with climate variability and climate change; and
- to Identify practical opportunities in which participating countries can be assisted to strengthen their collection, management, analysis, communication and effective use of water resources information in order to achieve improved water security in the face of climate change
- The project is supported by the World Bank and coordinated by SPC and examined pilot sites in Kiritimati Atoll in the Republic of Kiribati and Kosrae island in the Federated States of Micronesia.
-

Satellite image of Kiritimati atoll, Kiribati.



- In terms of climate, geography and geomorphology, these islands are at opposite ends of the spectrum.
- Kiritimati, a low, limestone atoll, lying on the edge of the equatorial dry zone, with very poor soils, has the lowest mean, and most variable, annual rainfall of any permanently settled atoll in the Pacific
- . Kosrae, a high volcanic island on the northern edge of Pacific warm pool (PWP) and within the path of the intertropical convergence zone (ITCZ), with highly productive soils has one of the wettest coastal zones in the world with low rainfall variability.
- Kiritimati relies heavily on scarce highly vulnerable groundwater lenses overlying seawater for its water sources. Kosrae has abundant rainfall and perennial streams as well as groundwater.
- the high island of Kosrae is much more vulnerable to sea level rise, because of the clustering of its settlements around the coastal fringe and its geographic position in the northwestern equatorial Pacific cyclone zone, than the low atoll of Kiritimati in the central eastern equatorial zone outside the cyclone zone. In Kiritimati the discrete freshwater lenses are at slightly higher elevation than in other atolls.

- The mean annual rainfall is just less than 1,000 mm and the coefficient of variation, C_v , of annual rainfall is 0.72,
- The average annual rainfall is lower and more variable than on other populated Pacific Island countries.
- Most other Pacific Island countries have average annual rainfalls between 1,500 mm and 3,000 mm and C_v 's of annual rainfall between 0.15 and 0.25.
- The freshwater resources of Kiritimati consist of groundwater and limited rainwater

Kiritimati and Kosrae share common issues which increase risk in the water supply and sanitation sector.

- Despite the vast differences in governance, geography, geology, cultures and climate, the study found Inadequate monitoring of water resources with major implications for management and planning
- Inadequate storage of water resource data
- Lack of capacity and resources to use data to improve management
- Lack of capacity and resources to critically assess aid projects in the sector
- Almost no connection with the local meteorology office
- Poor communication and cooperation between water agencies.
- Poor systematic communication between water agencies and island government
- Decaying infrastructure with inadequate maintenance
- Lack of resources to treat water
- Lack of capacity and resources to plan or implement plans
- **Aid projects being implemented in the sector which are not whole island solutions and will not address future development needs.**
- Sub-optimal use of rainwater harvesting
- Potential to increase the use of renewable energy in water supply systems.
- Sanitation is scarcely mentioned.

- The current Kiritimati Improved Water Supply Project, funded by the European Union and managed by the Water and Sanitation Programme of SPC, is focused on water supply improvements for the second largest village of London and a nearby settlement Tennessee. The overall objective of the Project is to improve livelihoods and enable human, social and economic development on Kiritimati Island.

Main activities of this project are:

- Install, rehabilitate and operate monitoring bores for the freshwater lenses used to supply London and Tennessee and revise assessments of sustainable yields.
- Undertake urgent improvement works to the existing water supply system, including rehabilitation of infiltration galleries and solar and wind powered pumps, install flow meters and refurbish water disinfection facilities.
- Undertake detail design work of the proposed water supply upgrade works and construct new facilities (including infiltration galleries, pipeline, storage tanks).
- Provide training to local water supply personnel in water supply system management, operation and maintenance and in vital water monitoring activities.
- Implement consumer education and awareness regarding the wise use of the limited available water resources.